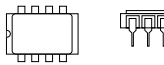
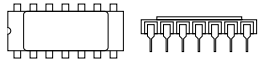
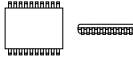
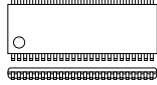
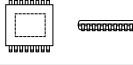
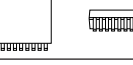
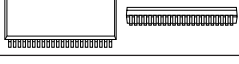
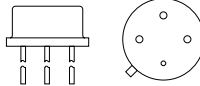
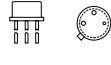
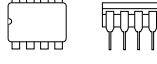
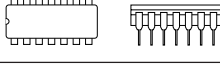

PACKAGE INFORMATION

PACKAGE INFORMATION

Package Cross Reference	3
Package Dimensions	6
TO-220 Lead Bend Options	69
Surface Mount Products	76
Tape And Reel	80

LINEAR TECHNOLOGY PACKAGE CROSS REFERENCE

	PACKAGE OUTLINE*	DESCRIPTION	LTC	NSC	ADI/PMI		MOT	TI	LINFIN	MAXIM
SIDE BRAZED		8-Lead Side Brazed (Hermetic)	D8	D	D	—	I	—	—	DA
		14-, 16-, 18- and 20-Lead Side Brazed (Hermetic)	D	D	D	YB QB XB	L	—	—	DD, DE, DN, DP
TSSOP Thin Shrink Small Outline		14-, 20-, 28-Lead TSSOP (4.4mm)	F		U	—		DL PW	—	UP, UG, UI
		48-, 56-Lead TSSOP (6.1mm)	FW							
		16-, 20-, 28-Lead TSSOP (4.4mm) Exposed Die Pad	FE							
SSOP Shrink Small Outline		16-, 20-, 24-, and 28-Lead SSOP (Narrow 0.150)	GN							
		16-, 20-, 28- and 36-Lead Plastic SSOP (5.3mm)	G	MSA	RS		—	DB		AP, AG, AT
		36- and 44-Lead SSOP (Wide 0.300)	GW	MSA	—	—		DB		AX
METAL CANS		8- or 10-Lead TO-5 Metal Can	H	H	H	H J K	G	—	T	TV, TW, VS
		3- or 4-Lead TO-39 Metal Can	H	H	H	H J K	G	—	T	TV, TW, VS
		2-, 3- or 4-Lead Standard TO-46 Metal Can or in Thermal Caps	H	H	H		—	—	T	—
		3-Lead TO-52 Metal Can	H							SR
CERDIP Ceramic Dual-In-Line		8-Lead Ceramic DIP (Hermetic)	J8	J J8	Q	Z	U	JG	Y	JA
		14-, 16-Lead Ceramic DIP (Narrow 0.300, Hermetic)	J	J J14 J16	D Q	Y Q X	L J	J	J	RD, RN, RE, RP
Proprietary Device Prefixes			LT LTC	LF LP LH MF LM	AD	OP REF CMP	MC	TL	LX SG	MAX

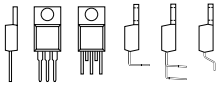
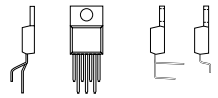
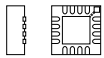
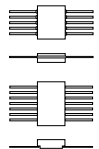
*Package Outlines Above Not to Scale

PACKAGE CROSS REFERENCE

	PACKAGE OUTLINE*	DESCRIPTION	LTC	NSC	ADI/PMI		MOT	TI	LINFIN	MAXIM
LCC		20-Pin Leadless Chip Carrier (Rectangular, Hermetic)	L	E	E	F	FN	FN FK	L	L
		20-Pin Leadless Chip Carrier (Square 0.350, Hermetic)	LS	E	E	F	FN	FN FK	L	L
DD PAK		3-Lead DD Pak	M	S	—	—	—	—	DD	—
		5-Lead DD Pak	Q	S	—	—	—	—	DD	—
		7-Lead DD Pak	R	S	—	—	—	—	—	—
MSOP		8- and 10-Lead, Micro Small Outline Package (MSOP)	MS8 MS	—	—	—	—	DGK	—	UA
		8- and 10-Lead Micro Small Outline Package (MSOP), Exposed Die Pad Option	MS8E MSE	—	—	—	—	—	—	—
PDIP Plastic Dual-In-Line		8-Lead PDIP, Plastic Dual-In-Line	N8	N N8	N	P	P1	P	M	P
		14-, 16-, 18-, 20- and 24-Lead PDIP, Plastic Dual-In-Line (Narrow 0.300)	N	N N14	N	P	P2	N NE	N	ND, NE, NN, NP, NG
		28-Lead PDIP, Plastic Dual-In-Line (Wide 0.600)	NW	—	N	P	P	N	—	PI
TO-3P (TO-247)		3-Lead TO-3P (Similar to TO-247)	P	—	—	—	—	—	—	K
SO Small Outline		8-Lead SO (Narrow 0.150)	S8	M	R	S08	D	D	—	SA
		14- and 16-Lead Plastic SO (Narrow 0.150)	S	M	R	S014 S016	D	D	—	SD SE
		16-, 18-, 20-, 24- and 28-Lead SO (Wide 0.300)	SW	M	R	S016 S018 S020 S024 S028	D	D	—	WE, WN, WP, WF WG, WI
		3-Lead SOT-223 Small Outline Transistor	ST	MP	—	—	—	—	ST	UR
		3-Lead SOT-23 4-Lead SOT-143	S3 S4	M3	RT	—	—	DBV	—	UR, US
		5-, 6- and 8-Lead TSOT	S5, S6 TS8	M5	RT	—	—	DBV	—	UT, UK
		6-Lead SC70	SC6	—	—	—	—	—	—	—
Proprietary Device Prefixes			LT LTC	LF LP LH MF LM	AD	OP REF CMP	MC	TL	LX SG	MAX

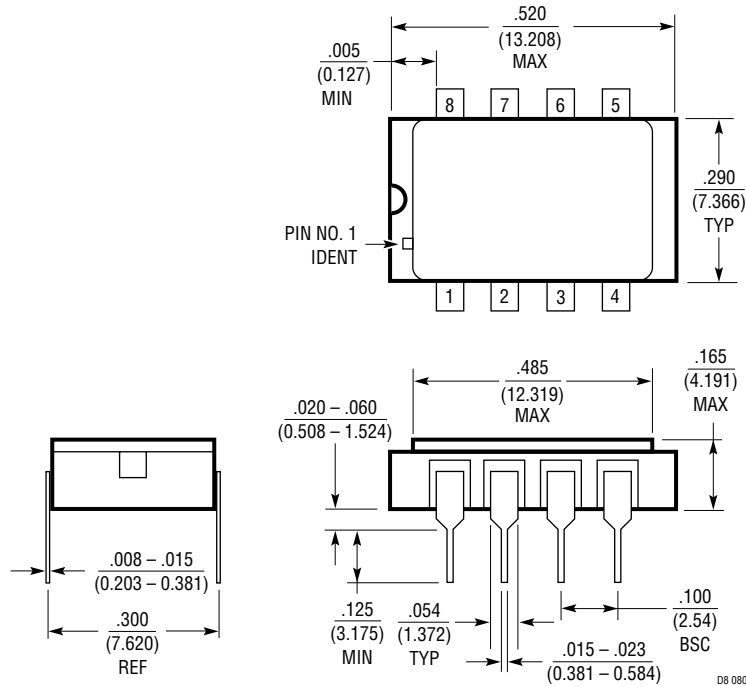
*Package Outlines Above Not to Scale

PACKAGE CROSS REFERENCE

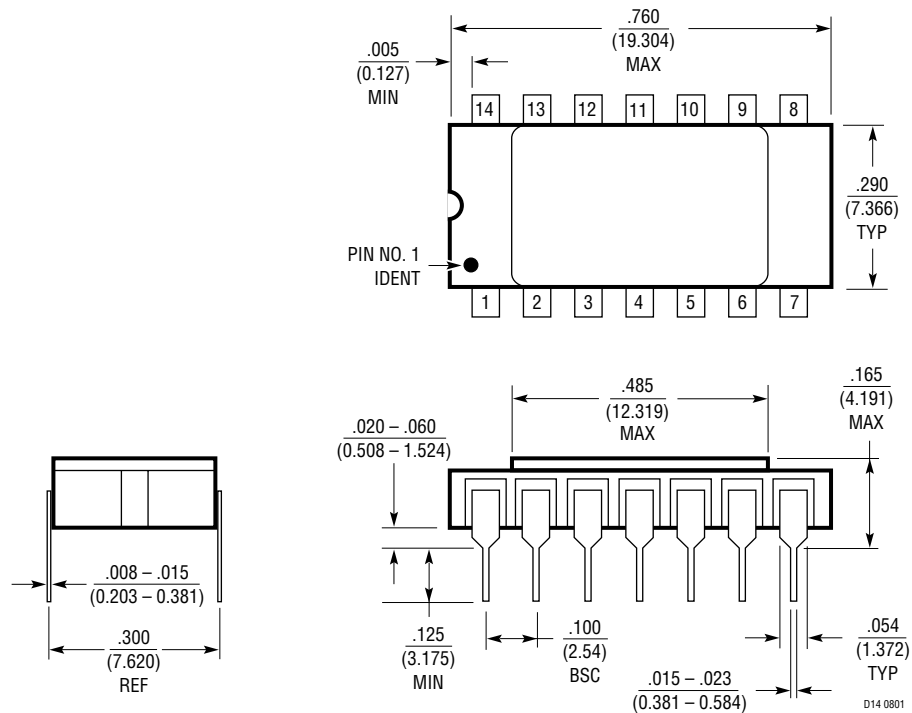
	PACKAGE OUTLINE*	DESCRIPTION	LTC	NSC	ADI/PMI		MOT	TI	LINFIN	MAXIM
TO-220		3- or 5-Lead TO-220	T T	T T	— —	— —	T —	KC KV	P P	C C
		7-Lead TO-220 (Formerly Y Package)	T7	—	—	—	—	—	—	C
QFN Quad Flat No Lead		16-Lead QFN (3mm × 3mm)	UD	—						
		16- and 24-Lead QFN (4mm × 4mm)	UF	LQA						
		32-Lead QFN (5mm × 5mm)	UH	—						
		48-Lead QFN (7mm × 7mm)	UK							
		64-Lead QFN (9mm × 9mm)	UP							
		38-Lead QFN (5mm × 7mm)	UHF							
DFN Dual Flat No Lead		12-Lead DFN (4mm × 3mm)	UE	—						
		8- and 10-Lead DFN (3mm × 3mm)	DD							
		12- and 14-Lead DFN (4mm × 3mm)	DE							
		8-Lead DFN (3mm × 2mm)	DDB							
		6-lead DFN (2mm × 2mm)	DC							
		16-Lead DFN (5mm × 3mm)	DHC							
FLATPAK		10- or 14-Lead Flatpak, Glass Sealed (Hermetic)	W	W	L	RC	F	U010	F	FB
		10- or 14-Lead Flatpak, Metal Sealed, Bottom Brazed (Hermetic)	WB	F	AH-148 LM	OH-148	—	W010 W014	—	M
TO-92		3-Lead, TO-92 Package	Z	Z	—	—	P	LP	—	ZR
Proprietary Device Prefixes			LT LTC	LF LP LH MF LM	AD	OP REF CMP	MC	TL	LX SG	MAX

*Package Outlines Above Not to Scale

D8 Package
8-Lead Side Brazed (Hermetic)
 (Reference LTC DWG # 05-08-1210)



D Package
14-Lead Side Brazed (Hermetic)
 (Reference LTC DWG # 05-08-1210)

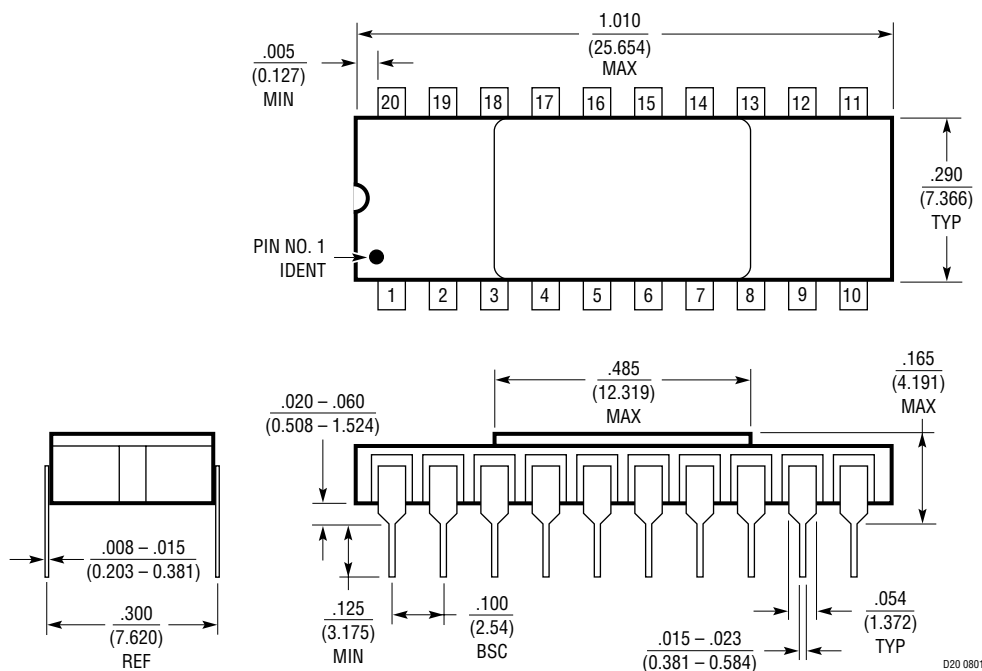


The drawing shows a 12-pin connector with the following dimensions:

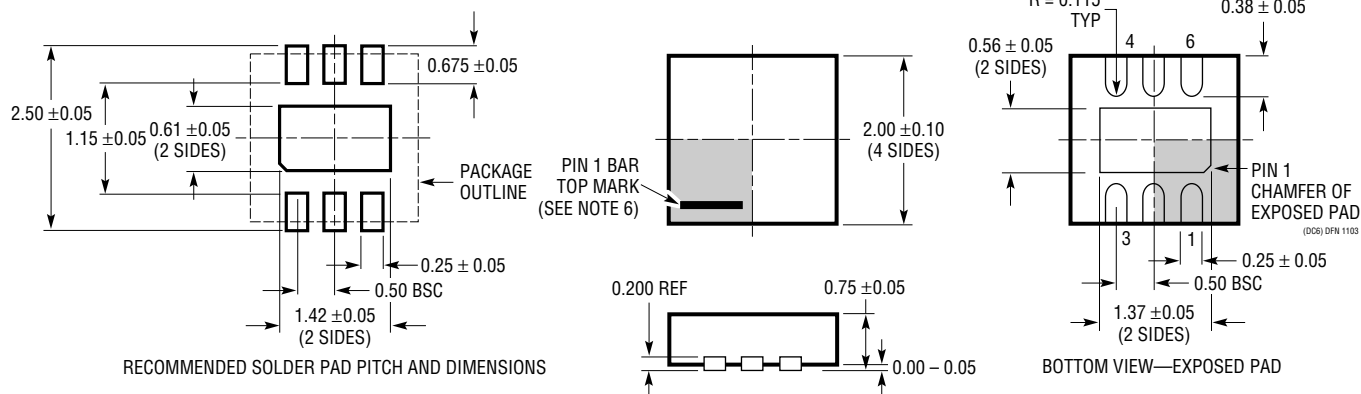
- Top View:**
 - Overall width: $.300$ (7.620) REF
 - Pin pitch: $.100$ (2.54) BSC
 - Pin width: $.054$ (1.372) TYP
 - Pin length: $.165$ (4.191) MAX
 - Pin thickness: $.008 - .015$ (0.203 - 0.381)
- Side View:**
 - Overall height: $.485$ (12.319) MAX
 - Pin height: $.125$ (3.175) MIN
 - Pin thickness: $.020 - .060$ (0.508 - 1.524)
 - Pin length: $.015 - .023$ (0.381 - 0.584)

PACKAGE DIMENSIONS

D Package 20-Lead Side Brazed (Hermetic) (Reference LTC DWG # 05-08-1210)

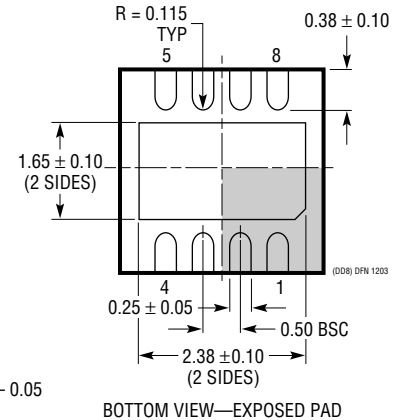
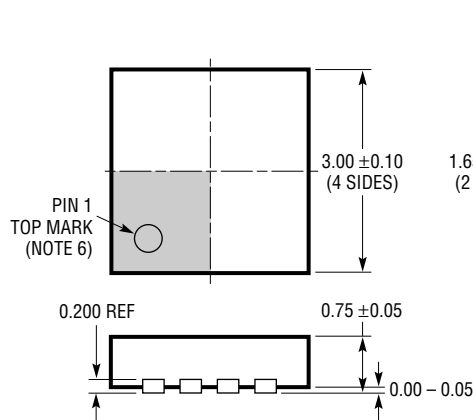
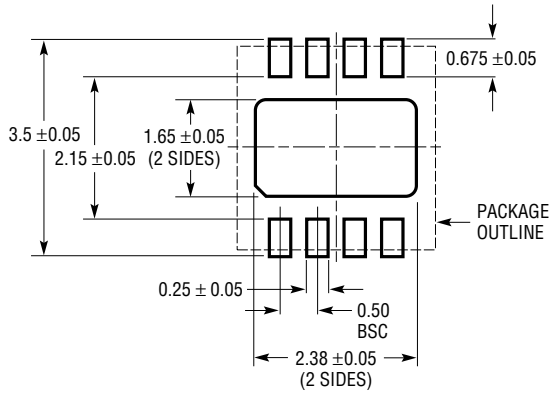


DC Package 6-Lead Plastic DFN (2mm × 2mm) (Reference LTC DWG # 05-08-1703)



PACKAGE DIMENSIONS

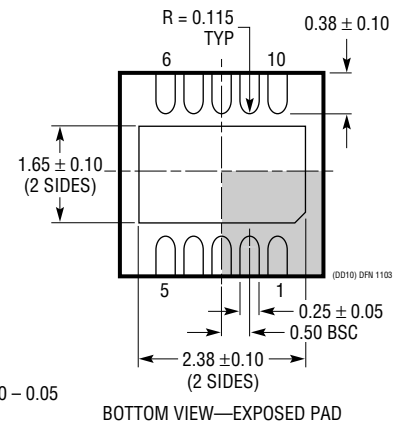
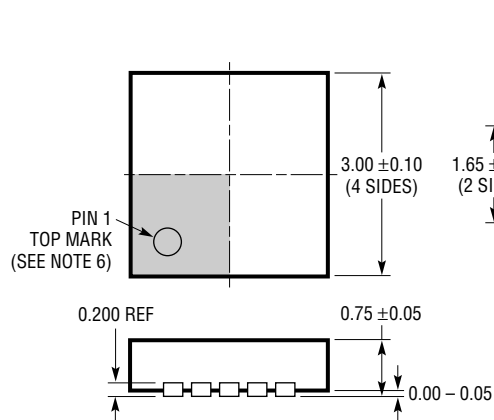
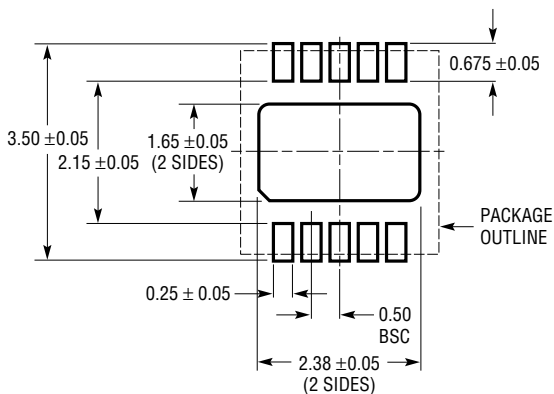
DD Package 8-Lead Plastic DFN (3mm × 3mm) (Reference LTC DWG # 05-08-1698)



NOTE:

1. DRAWING TO BE MADE A JEDEC PACKAGE OUTLINE M0-229 VARIATION OF (WEED-1)
2. DRAWING NOT TO SCALE
3. ALL DIMENSIONS ARE IN MILLIMETERS
4. DIMENSIONS OF EXPOSED PAD ON BOTTOM OF PACKAGE DO NOT INCLUDE MOLD FLASH. MOLD FLASH, IF PRESENT, SHALL NOT EXCEED 0.15mm ON ANY SIDE
5. EXPOSED PAD SHALL BE SOLDER PLATED
6. SHADED AREA IS ONLY A REFERENCE FOR PIN 1 LOCATION ON TOP AND BOTTOM OF PACKAGE

DD Package 10-Lead Plastic DFN (3mm × 3mm) (Reference LTC DWG # 05-08-1699)

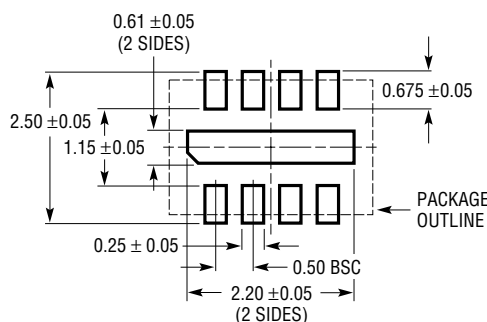


NOTE:

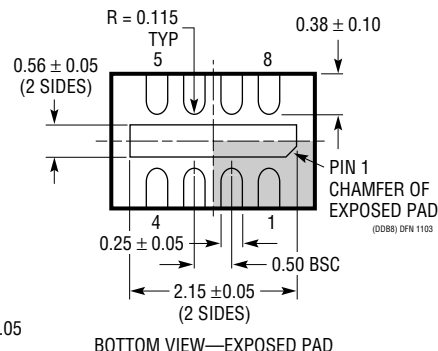
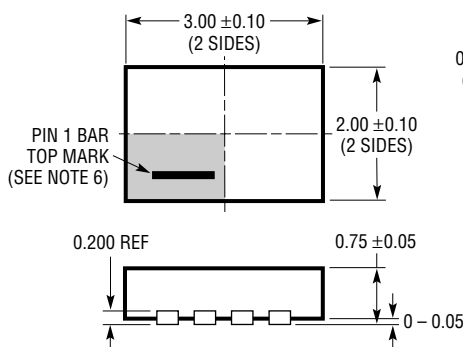
1. DRAWING TO BE MADE A JEDEC PACKAGE OUTLINE M0-229 VARIATION OF (WEED-2). CHECK THE LTC WEBSITE DATA SHEET FOR CURRENT STATUS OF VARIATION ASSIGNMENT
2. DRAWING NOT TO SCALE
3. ALL DIMENSIONS ARE IN MILLIMETERS
4. DIMENSIONS OF EXPOSED PAD ON BOTTOM OF PACKAGE DO NOT INCLUDE MOLD FLASH. MOLD FLASH, IF PRESENT, SHALL NOT EXCEED 0.15mm ON ANY SIDE
5. EXPOSED PAD SHALL BE SOLDER PLATED
6. SHADED AREA IS ONLY A REFERENCE FOR PIN 1 LOCATION ON THE TOP AND BOTTOM OF PACKAGE

PACKAGE DIMENSIONS

DDB Package 8-Lead Plastic DFN (3mm × 2mm) (Reference LTC DWG # 05-08-1702)



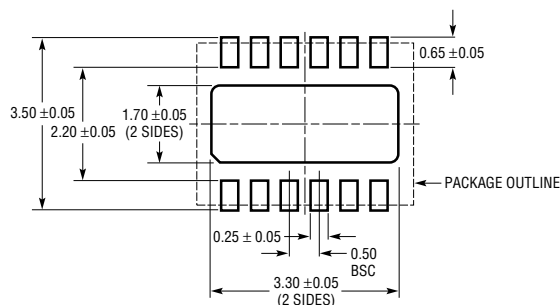
RECOMMENDED SOLDER PAD PITCH AND DIMENSIONS



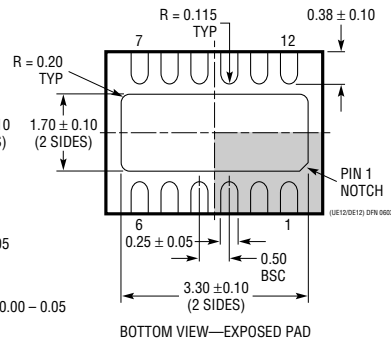
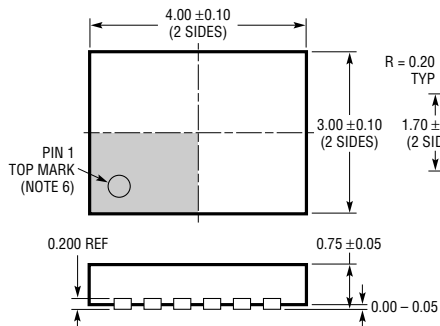
NOTE:

1. DRAWING CONFORMS TO VERSION (WECD-1) IN JEDEC PACKAGE OUTLINE M0-229
2. DRAWING NOT TO SCALE
3. ALL DIMENSIONS ARE IN MILLIMETERS
4. DIMENSIONS OF EXPOSED PAD ON BOTTOM OF PACKAGE DO NOT INCLUDE MOLD FLASH. MOLD FLASH, IF PRESENT, SHALL NOT EXCEED 0.15mm ON ANY SIDE
5. EXPOSED PAD SHALL BE SOLDER PLATED
6. SHADED AREA IS ONLY A REFERENCE FOR PIN 1 LOCATION ON THE TOP AND BOTTOM OF PACKAGE

DE/UE Package 12-Lead Plastic DFN (4mm × 3mm) (Reference LTC DWG # 05-08-1695)



RECOMMENDED SOLDER PAD PITCH AND DIMENSIONS



NOTE:

1. DRAWING PROPOSED TO BE A VARIATION OF VERSION (WGED) IN JEDEC PACKAGE OUTLINE M0-229
2. DRAWING NOT TO SCALE
3. ALL DIMENSIONS ARE IN MILLIMETERS
4. DIMENSIONS OF EXPOSED PAD ON BOTTOM OF PACKAGE DO NOT INCLUDE MOLD FLASH. MOLD FLASH, IF PRESENT, SHALL NOT EXCEED 0.15mm ON ANY SIDE
5. EXPOSED PAD SHALL BE SOLDER PLATED
6. SHADED AREA IS ONLY A REFERENCE FOR PIN 1 LOCATION ON THE TOP AND BOTTOM OF PACKAGE

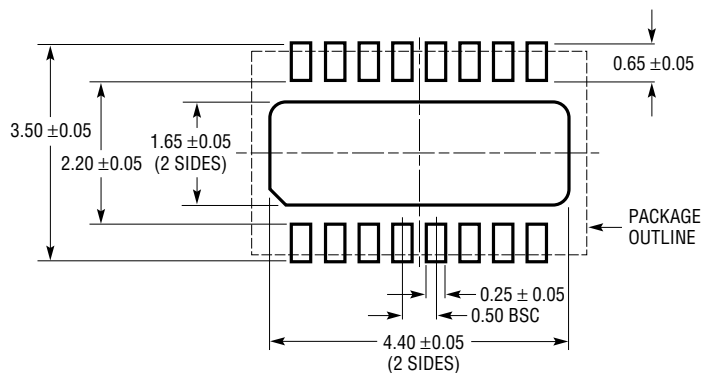
DE Package
14-Lead Plastic DFN (4mm × 3mm)
 (Reference LTC DWG # 05-08-1708)



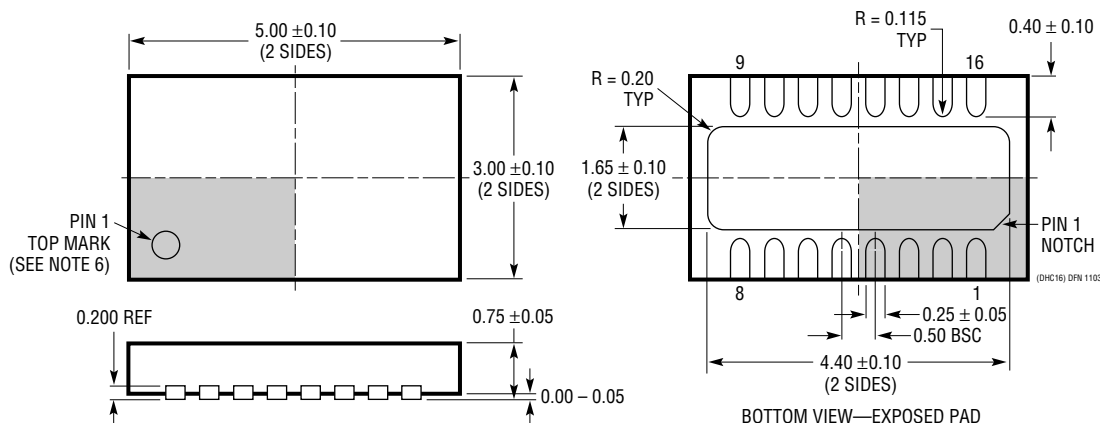
1. DRAWING PROPOSED TO BE MADE VARIATION OF VERSION (WGED-3) IN JEDEC PACKAGE OUTLINE MO-229
2. DRAWING NOT TO SCALE
3. ALL DIMENSIONS ARE IN MILLIMETERS
4. DIMENSIONS OF EXPOSED PAD ON BOTTOM OF PACKAGE DO NOT INCLUDE MOLD FLASH. MOLD FLASH, IF PRESENT, SHALL NOT EXCEED 0.15mm ON ANY SIDE
5. EXPOSED PAD SHALL BE SOLDER PLATED
6. SHADED AREA IS ONLY A REFERENCE FOR PIN 1 LOCATION ON THE TOP AND BOTTOM OF PACKAGE

PACKAGE DIMENSIONS

DHC Package 16-Lead Plastic DFN (5mm × 3mm) (Reference LTC DWG # 05-08-1706)



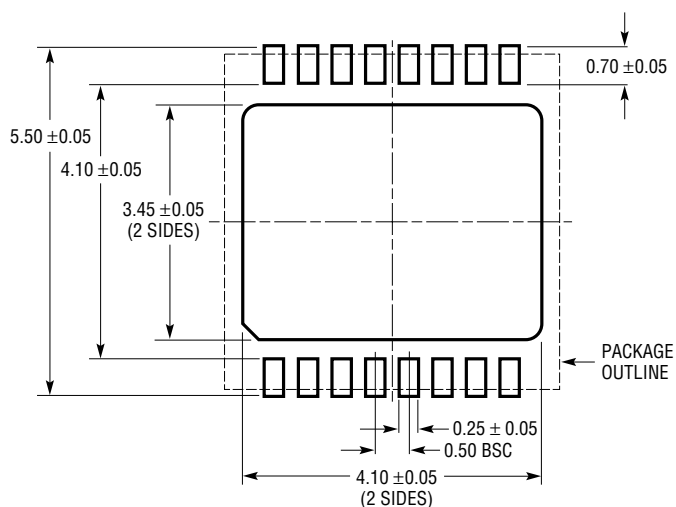
RECOMMENDED SOLDER PAD PITCH AND DIMENSIONS



NOTE:

1. DRAWING PROPOSED TO BE MADE VARIATION OF VERSION (WJED-1) IN JEDEC PACKAGE OUTLINE MO-229
2. DRAWING NOT TO SCALE
3. ALL DIMENSIONS ARE IN MILLIMETERS
4. DIMENSIONS OF EXPOSED PAD ON BOTTOM OF PACKAGE DO NOT INCLUDE MOLD FLASH. MOLD FLASH, IF PRESENT, SHALL NOT EXCEED 0.15mm ON ANY SIDE
5. EXPOSED PAD SHALL BE SOLDER PLATED
6. SHADED AREA IS ONLY A REFERENCE FOR PIN 1 LOCATION ON THE TOP AND BOTTOM OF PACKAGE

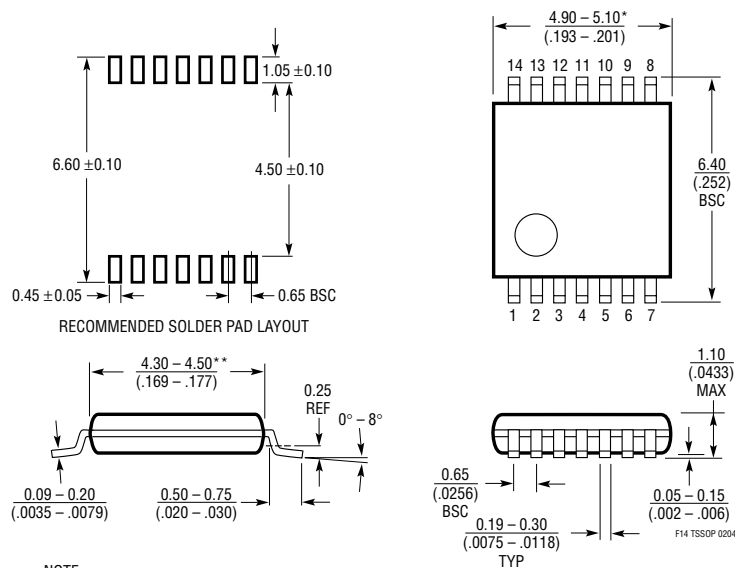
DH Package
16-Lead Plastic DFN (5mm × 5mm)
 (Reference LTC DWG # 05-08-1709)

[illegible]

- NOTE:
1. DRAWING PROPOSED TO BE MADE VARIATION OF VERSION (WJJD-1) IN JEDEC PACKAGE OUTLINE MO-229
 2. DRAWING NOT TO SCALE
 3. ALL DIMENSIONS ARE IN MILLIMETERS
 4. DIMENSIONS OF EXPOSED PAD ON BOTTOM OF PACKAGE DO NOT INCLUDE MOLD FLASH. MOLD FLASH, IF PRESENT, SHALL NOT EXCEED 0.15mm ON ANY SIDE
 5. EXPOSED PAD SHALL BE SOLDER PLATED
 6. SHADED AREA IS ONLY A REFERENCE FOR PIN 1 LOCATION ON THE TOP AND BOTTOM OF PACKAGE

PACKAGE DIMENSIONS

F Package 14-Lead Plastic TSSOP (4.4mm) (Reference LTC DWG # 05-08-1650)



NOTE:

1. CONTROLLING DIMENSION: MILLIMETERS

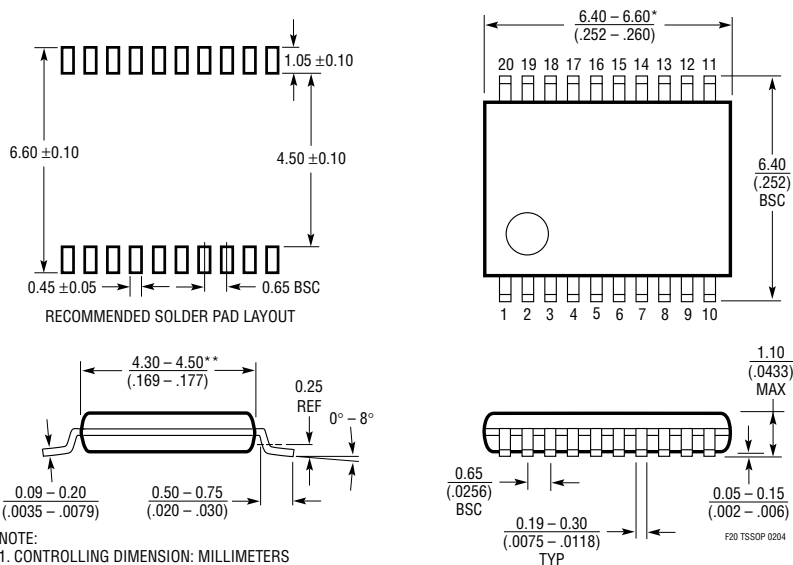
2. DIMENSIONS ARE IN $\frac{\text{MILLIMETERS}}{\text{(INCHES)}}$

3. DRAWING NOT TO SCALE

*DIMENSIONS DO NOT INCLUDE MOLD FLASH. MOLD FLASH SHALL NOT EXCEED .152mm (.006") PER SIDE

**DIMENSIONS DO NOT INCLUDE INTERLEAD FLASH. INTERLEAD FLASH SHALL NOT EXCEED .254mm (.010") PER SIDE

F Package 20-Lead Plastic TSSOP (4.4mm) (Reference LTC DWG # 05-08-1650)



NOTE:

1. CONTROLLING DIMENSION: MILLIMETERS

2. DIMENSIONS ARE IN $\frac{\text{MILLIMETERS}}{\text{(INCHES)}}$

3. DRAWING NOT TO SCALE

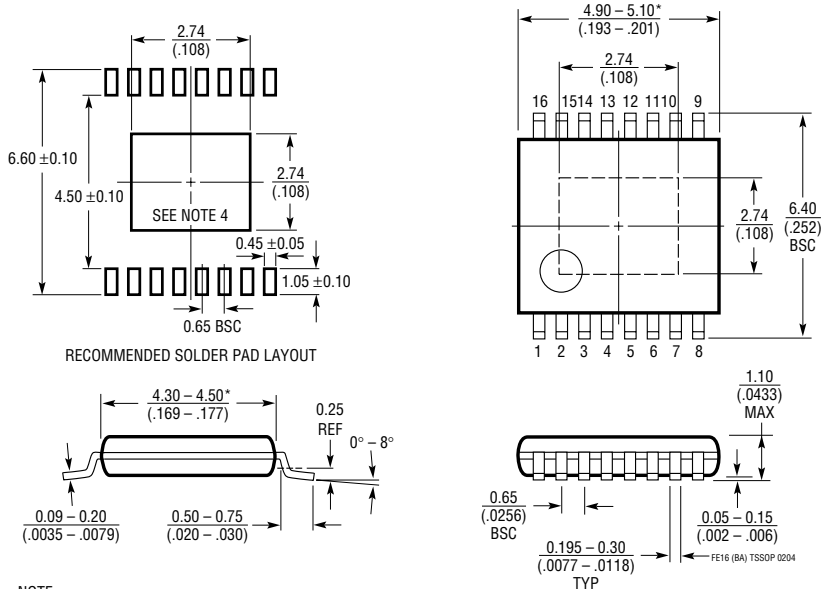
*DIMENSIONS DO NOT INCLUDE MOLD FLASH. MOLD FLASH SHALL NOT EXCEED .152mm (.006") PER SIDE

**DIMENSIONS DO NOT INCLUDE INTERLEAD FLASH. INTERLEAD FLASH SHALL NOT EXCEED .254mm (.010") PER SIDE

PACKAGE DIMENSIONS

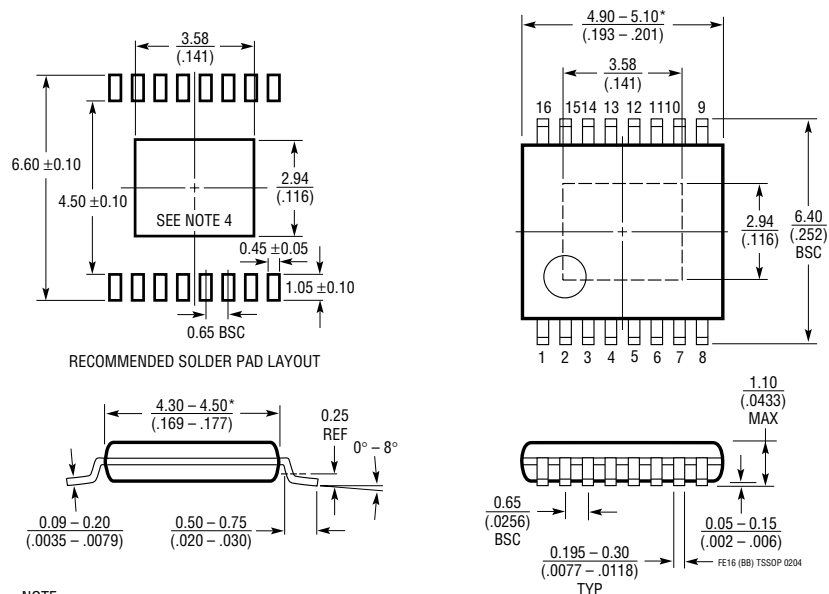
FE Package 16-Lead Plastic TSSOP (4.4mm) (Reference LTC DWG # 05-08-1663)

Exposed Pad Variation BA



FE Package 16-Lead Plastic TSSOP (4.4mm) (Reference LTC DWG # 05-08-1663)

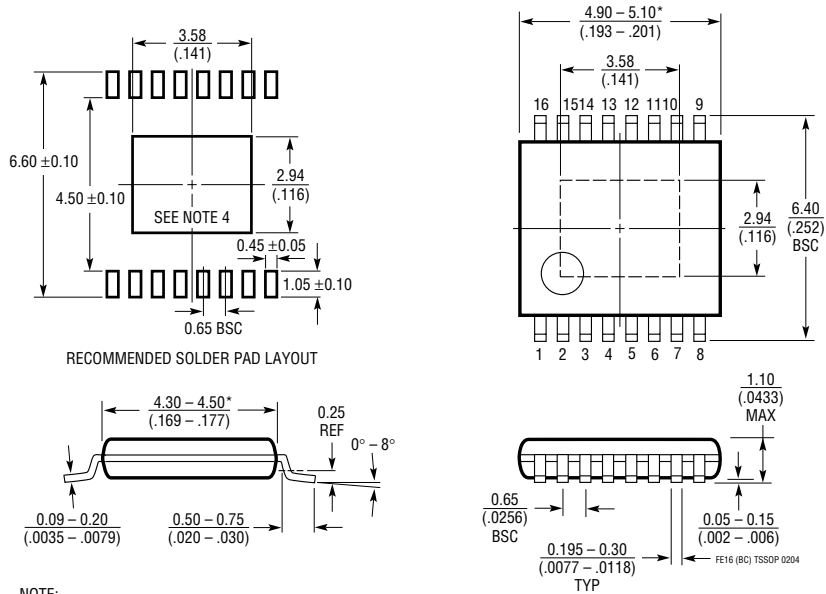
Exposed Pad Variation BB



PACKAGE DIMENSIONS

FE Package 16-Lead Plastic TSSOP (4.4mm) (Reference LTC DWG # 05-08-1663)

Exposed Pad Variation BC



NOTE:

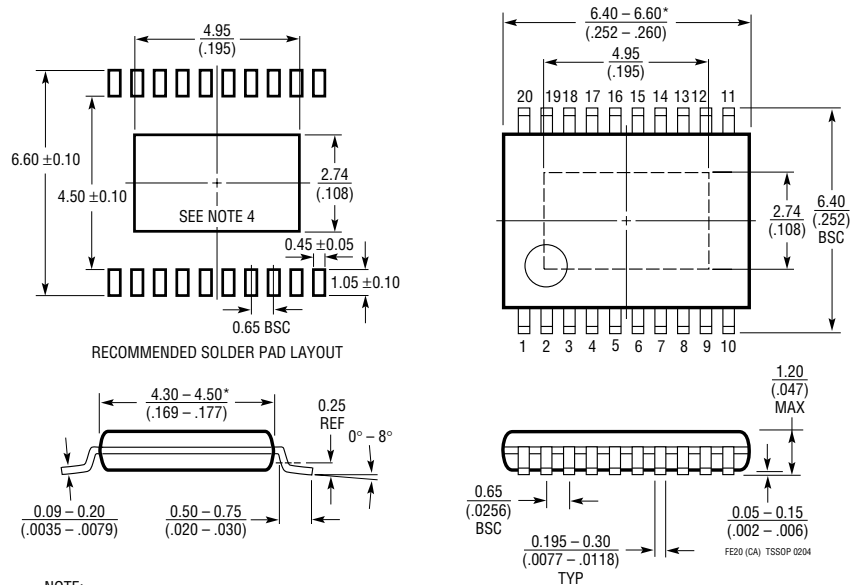
1. CONTROLLING DIMENSION: MILLIMETERS
2. DIMENSIONS ARE IN MILLIMETERS
(INCHES)
3. DRAWING NOT TO SCALE

4. RECOMMENDED MINIMUM PCB METAL SIZE
FOR EXPOSED PAD ATTACHMENT

*DIMENSIONS DO NOT INCLUDE MOLD FLASH. MOLD FLASH
SHALL NOT EXCEED 0.150mm (.006") PER SIDE

FE Package 20-Lead Plastic TSSOP (4.4mm) (Reference LTC DWG # 05-08-1663)

Exposed Pad Variation CA



NOTE:

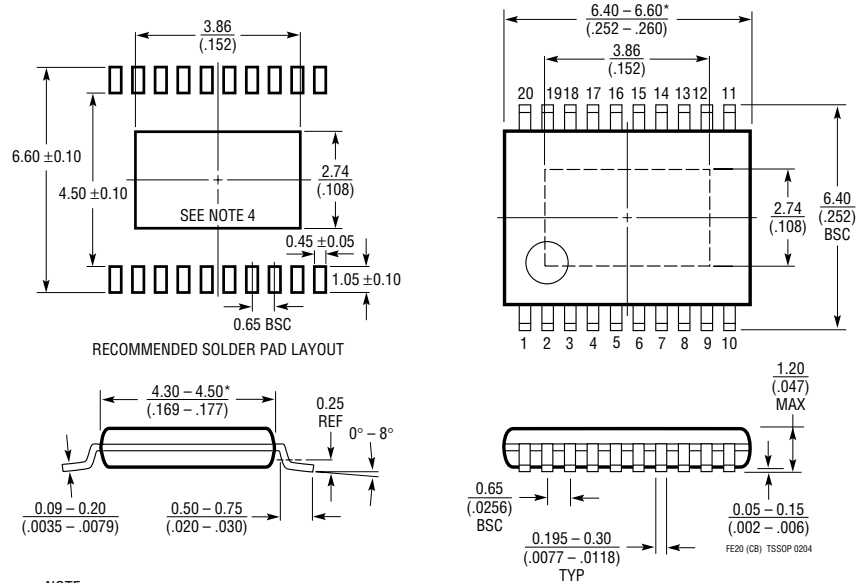
1. CONTROLLING DIMENSION: MILLIMETERS
2. DIMENSIONS ARE IN MILLIMETERS
(INCHES)
3. DRAWING NOT TO SCALE

4. RECOMMENDED MINIMUM PCB METAL SIZE
FOR EXPOSED PAD ATTACHMENT

*DIMENSIONS DO NOT INCLUDE MOLD FLASH. MOLD FLASH
SHALL NOT EXCEED 0.150mm (.006") PER SIDE

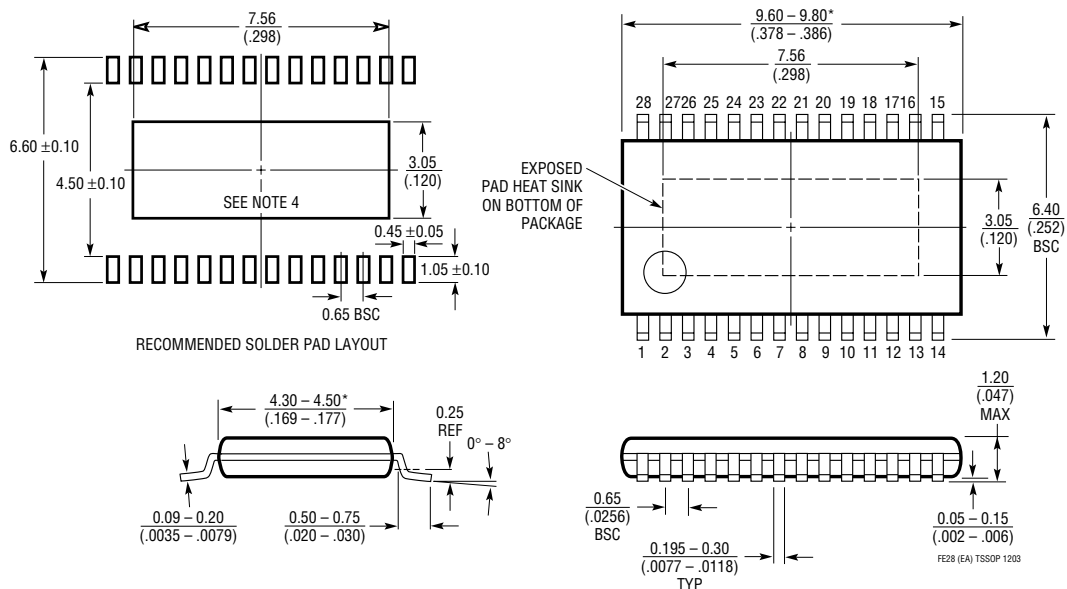
FE Package 20-Lead Plastic TSSOP (4.4mm) (Reference LTC DWG # 05-08-1663)

Exposed Pad Variation CB



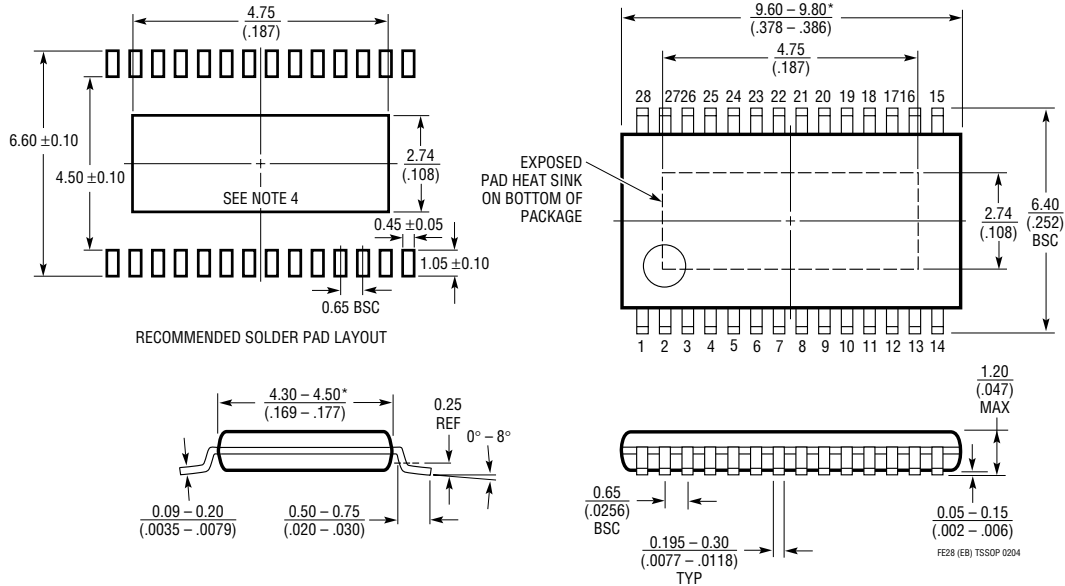
FE Package 28-Lead Plastic TSSOP (4.4mm) (Reference LTC DWG # 05-08-1663)

Exposed Pad Variation EA



PACKAGE DIMENSIONS

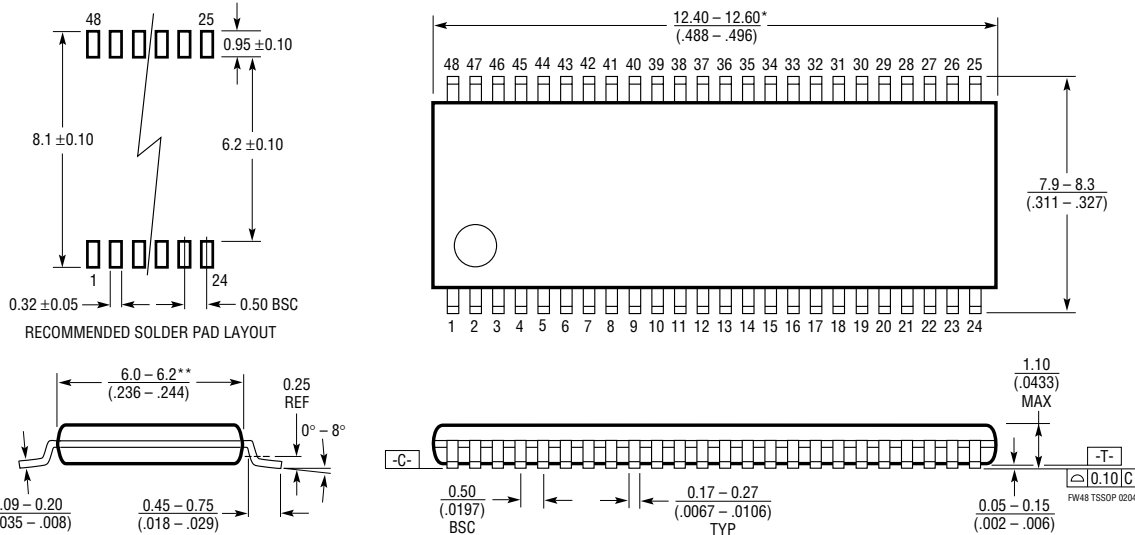
FE Package 28-Lead Plastic TSSOP (4.4mm) (Reference LTC DWG # 05-08-1663) Exposed Pad Variation EB



NOTE:

1. CONTROLLING DIMENSION: MILLIMETERS
 2. DIMENSIONS ARE IN MILLIMETERS (INCHES)
 3. DRAWING NOT TO SCALE
 4. RECOMMENDED MINIMUM PCB METAL SIZE FOR EXPOSED PAD ATTACHMENT
- *DIMENSIONS DO NOT INCLUDE MOLD FLASH. MOLD FLASH SHALL NOT EXCEED 0.150mm (.006") PER SIDE

FW Package 48-Lead Plastic TSSOP (6.1mm) (Reference LTC DWG # 05-08-1651)

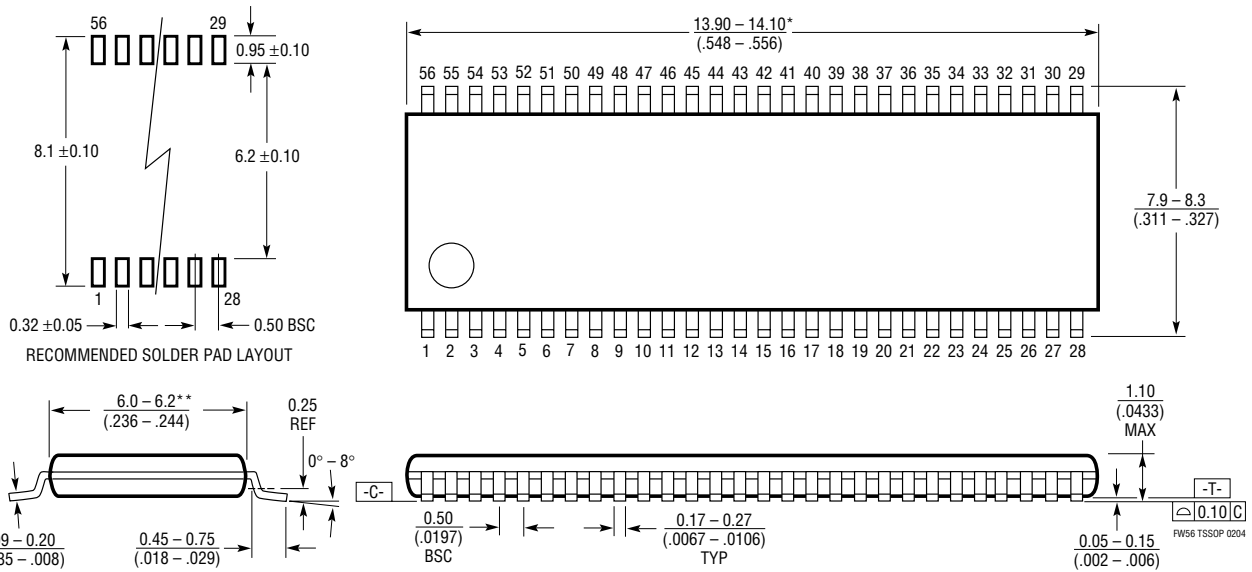


NOTE:

1. CONTROLLING DIMENSION: MILLIMETERS
2. DIMENSIONS ARE IN MILLIMETERS (INCHES)
3. DRAWING NOT TO SCALE
- *DIMENSIONS DO NOT INCLUDE MOLD FLASH. MOLD FLASH SHALL NOT EXCEED .152mm (.006") PER SIDE
- **DIMENSIONS DO NOT INCLUDE INTERLEAD FLASH. INTERLEAD FLASH SHALL NOT EXCEED .254mm (.010") PER SIDE

PACKAGE DIMENSIONS

FW Package 56-Lead Plastic TSSOP (6.1mm) (Reference LTC DWG # 05-08-1651)



NOTE:

1. CONTROLLING DIMENSION: MILLIMETERS

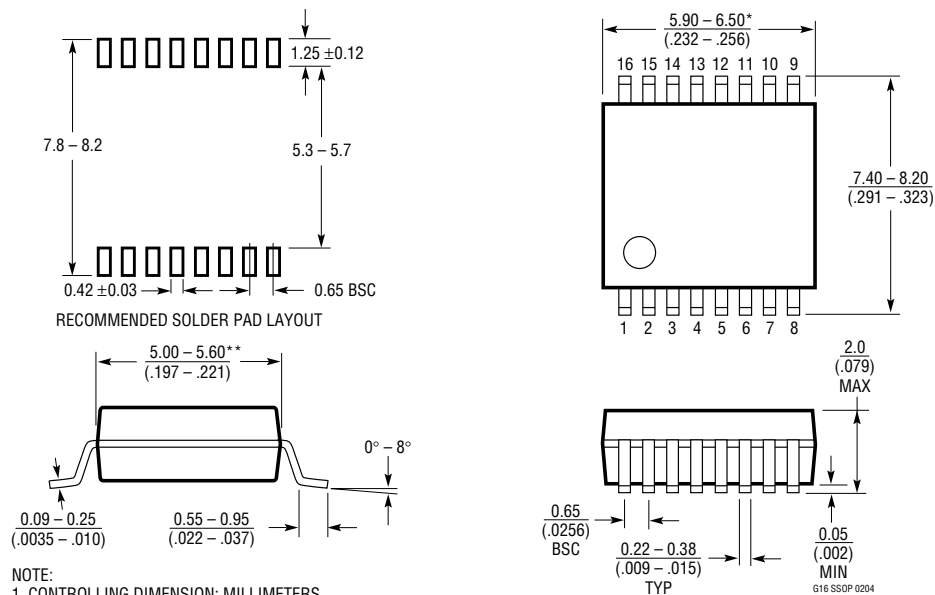
2. DIMENSIONS ARE IN $\frac{\text{MILLIMETERS}}{(\text{INCHES})}$

3. DRAWING NOT TO SCALE

*DIMENSIONS DO NOT INCLUDE MOLD FLASH. MOLD FLASH SHALL NOT EXCEED .152mm (.006") PER SIDE

**DIMENSIONS DO NOT INCLUDE INTERLEAD FLASH. INTERLEAD FLASH SHALL NOT EXCEED .254mm (.010") PER SIDE

G Package 16-Lead Plastic SSOP (5.3mm) (Reference LTC DWG # 05-08-1640)



NOTE:

1. CONTROLLING DIMENSION: MILLIMETERS

2. DIMENSIONS ARE IN $\frac{\text{MILLIMETERS}}{(\text{INCHES})}$

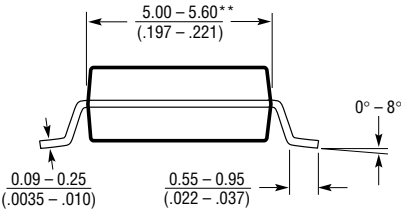
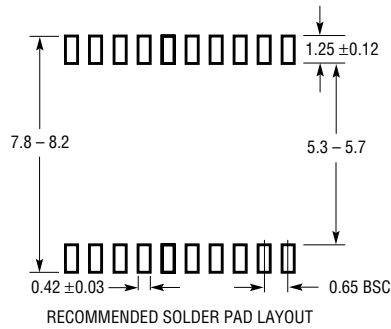
3. DRAWING NOT TO SCALE

*DIMENSIONS DO NOT INCLUDE MOLD FLASH. MOLD FLASH SHALL NOT EXCEED .152mm (.006") PER SIDE

**DIMENSIONS DO NOT INCLUDE INTERLEAD FLASH. INTERLEAD FLASH SHALL NOT EXCEED .254mm (.010") PER SIDE

PACKAGE DIMENSIONS

G Package 20-Lead Plastic SSOP (5.3mm) (Reference LTC DWG # 05-08-1640)



NOTE:

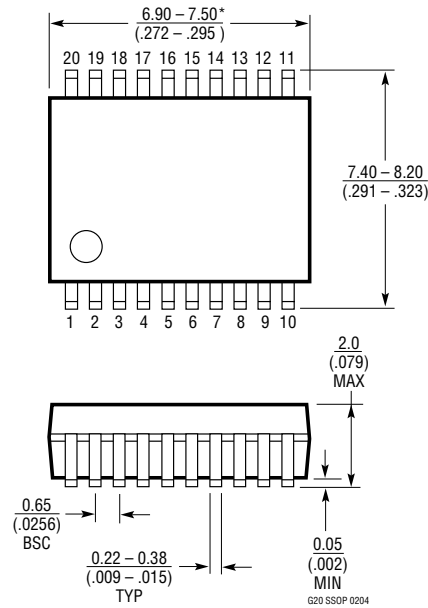
1. CONTROLLING DIMENSION: MILLIMETERS

2. DIMENSIONS ARE IN $\frac{\text{MILLIMETERS}}{\text{(INCHES)}}$

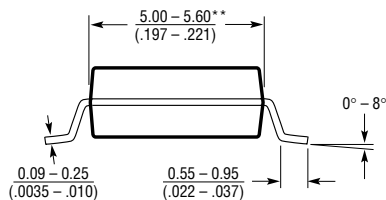
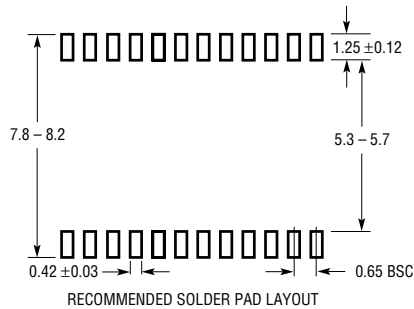
3. DRAWING NOT TO SCALE

*DIMENSIONS DO NOT INCLUDE MOLD FLASH. MOLD FLASH SHALL NOT EXCEED .152mm (.006") PER SIDE

**DIMENSIONS DO NOT INCLUDE INTERLEAD FLASH. INTERLEAD FLASH SHALL NOT EXCEED .254mm (.010") PER SIDE



G Package 24-Lead Plastic SSOP (5.3mm) (Reference LTC DWG # 05-08-1640)



NOTE:

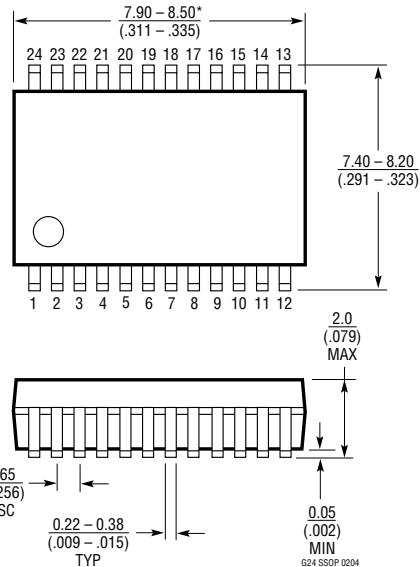
1. CONTROLLING DIMENSION: MILLIMETERS

2. DIMENSIONS ARE IN $\frac{\text{MILLIMETERS}}{\text{(INCHES)}}$

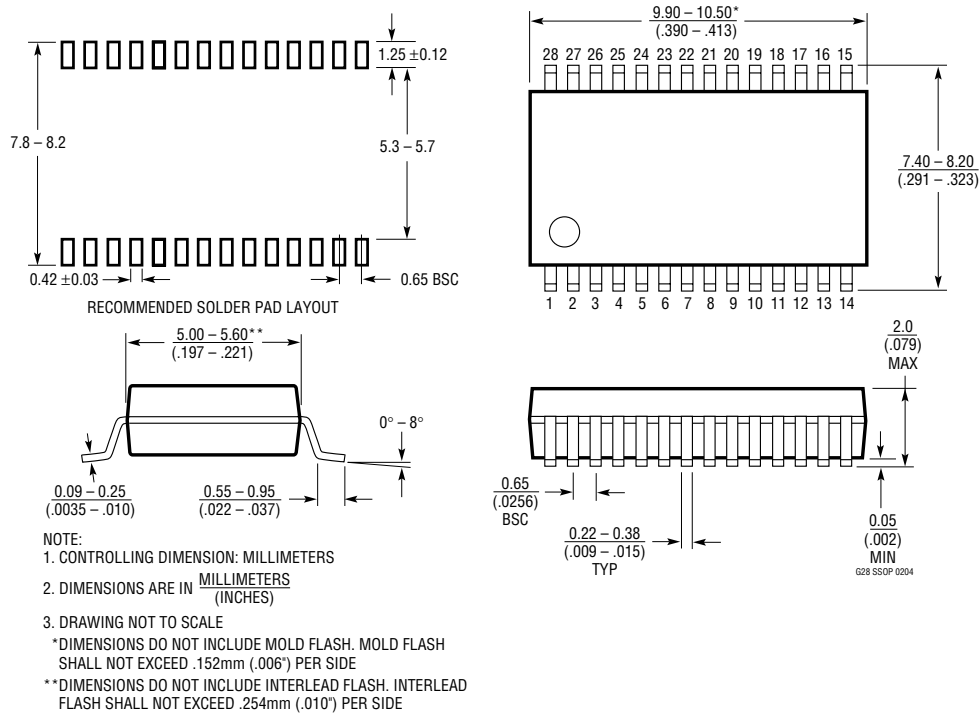
3. DRAWING NOT TO SCALE

*DIMENSIONS DO NOT INCLUDE MOLD FLASH. MOLD FLASH SHALL NOT EXCEED .152mm (.006") PER SIDE

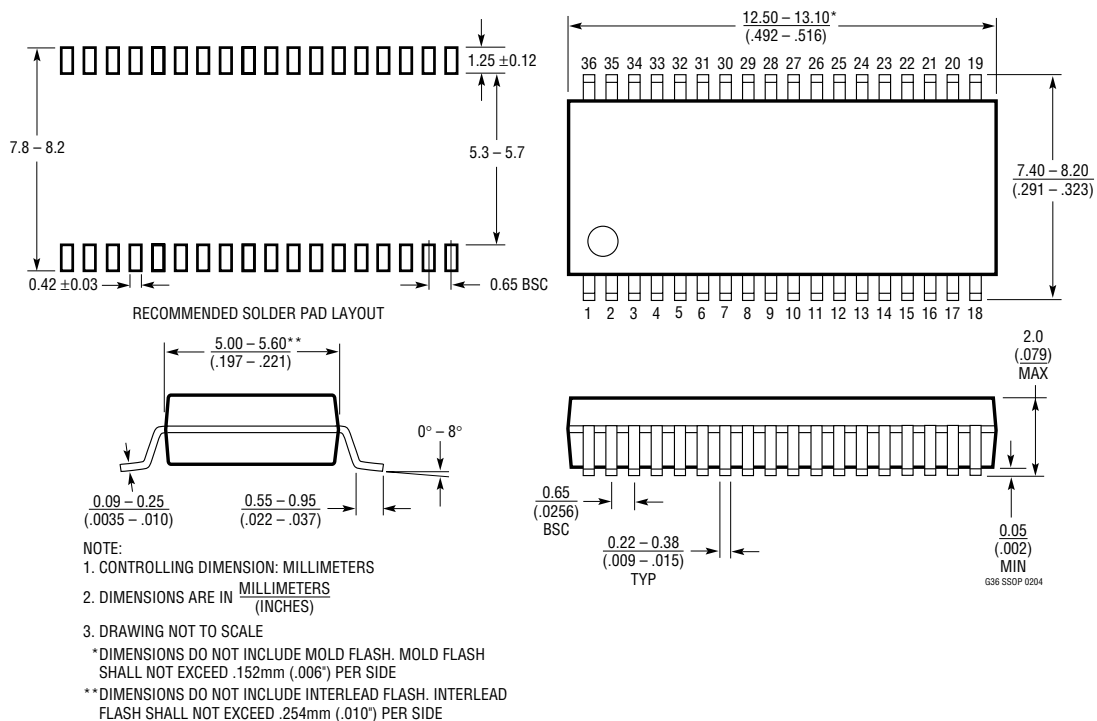
**DIMENSIONS DO NOT INCLUDE INTERLEAD FLASH. INTERLEAD FLASH SHALL NOT EXCEED .254mm (.010") PER SIDE



G Package 28-Lead Plastic SSOP (5.3mm) (Reference LTC DWG # 05-08-1640)

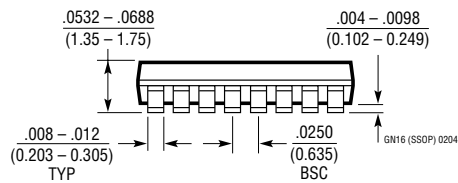
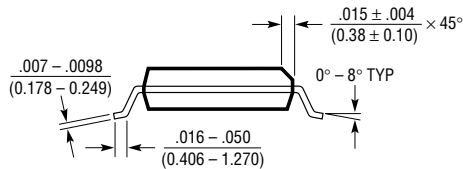
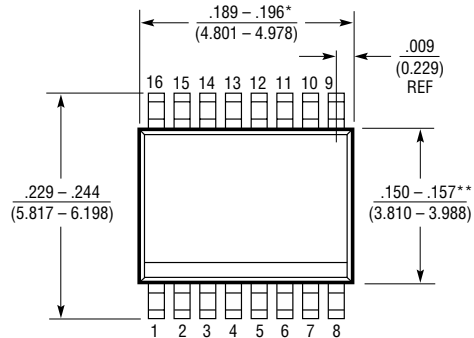
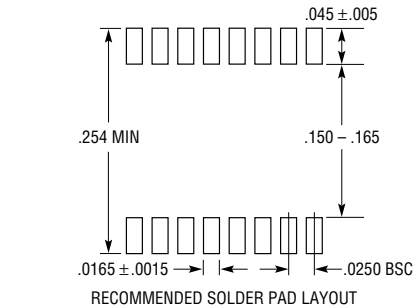


G Package 36-Lead Plastic SSOP (5.3mm) (Reference LTC DWG # 05-08-1640)



PACKAGE DIMENSIONS

GN Package 16-Lead Plastic SSOP (Narrow .150 Inch) (Reference LTC DWG # 05-08-1641)



NOTE:

1. CONTROLLING DIMENSION: INCHES

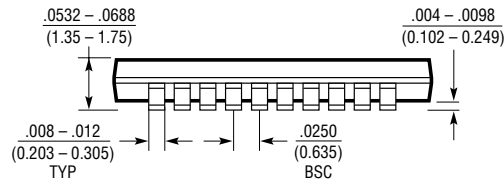
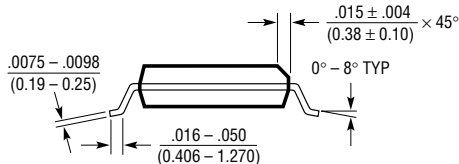
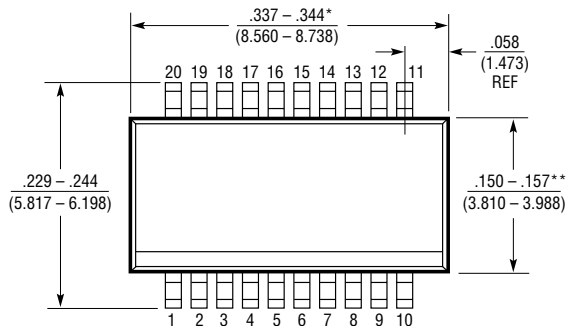
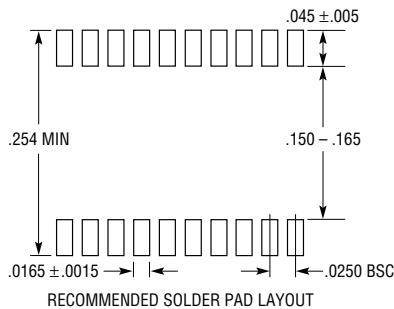
2. DIMENSIONS ARE IN $\frac{\text{INCHES}}{\text{MILLIMETERS}}$

3. DRAWING NOT TO SCALE

*DIMENSION DOES NOT INCLUDE MOLD FLASH. MOLD FLASH SHALL NOT EXCEED 0.006" (0.152mm) PER SIDE

**DIMENSION DOES NOT INCLUDE INTERLEAD FLASH. INTERLEAD FLASH SHALL NOT EXCEED 0.010" (0.254mm) PER SIDE

GN Package 20-Lead Plastic SSOP (Narrow .150 Inch) (Reference LTC DWG # 05-08-1641)



NOTE:

1. CONTROLLING DIMENSION: INCHES

2. DIMENSIONS ARE IN $\frac{\text{INCHES}}{\text{MILLIMETERS}}$

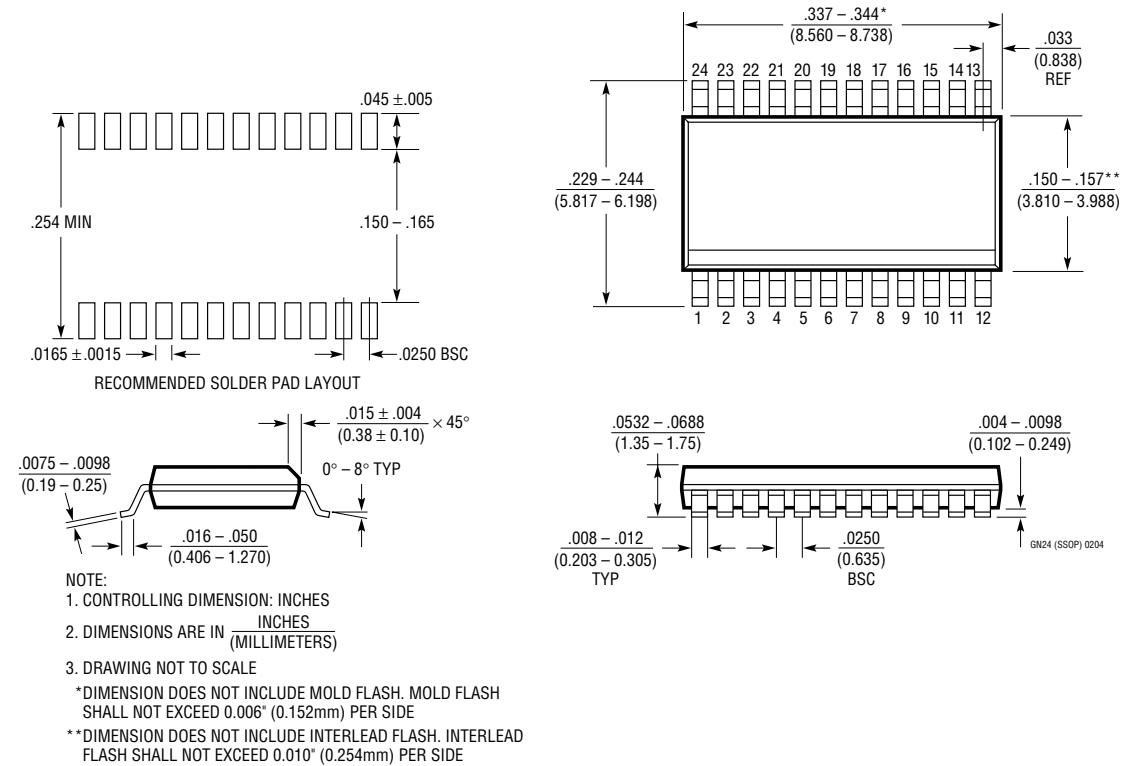
3. DRAWING NOT TO SCALE

*DIMENSION DOES NOT INCLUDE MOLD FLASH. MOLD FLASH SHALL NOT EXCEED 0.006" (0.152mm) PER SIDE

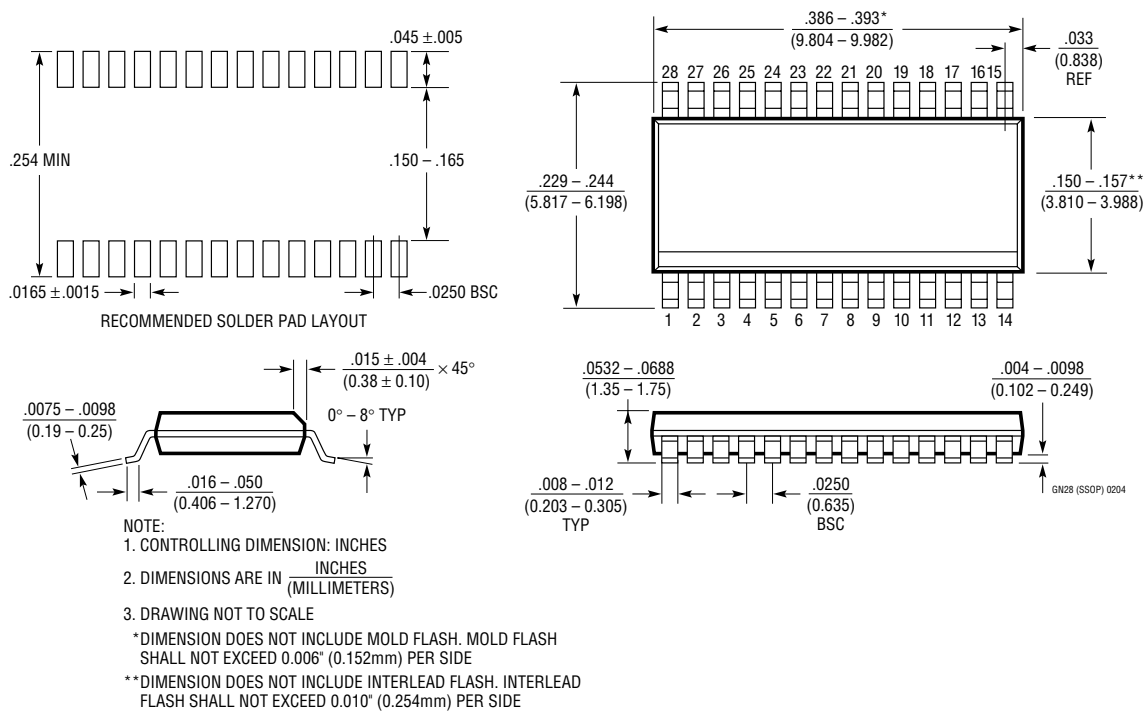
**DIMENSION DOES NOT INCLUDE INTERLEAD FLASH. INTERLEAD FLASH SHALL NOT EXCEED 0.010" (0.254mm) PER SIDE

GN20 (SSOP) 0204

GN Package 24-Lead Plastic SSOP (Narrow .150 Inch) (Reference LTC DWG # 05-08-1641)

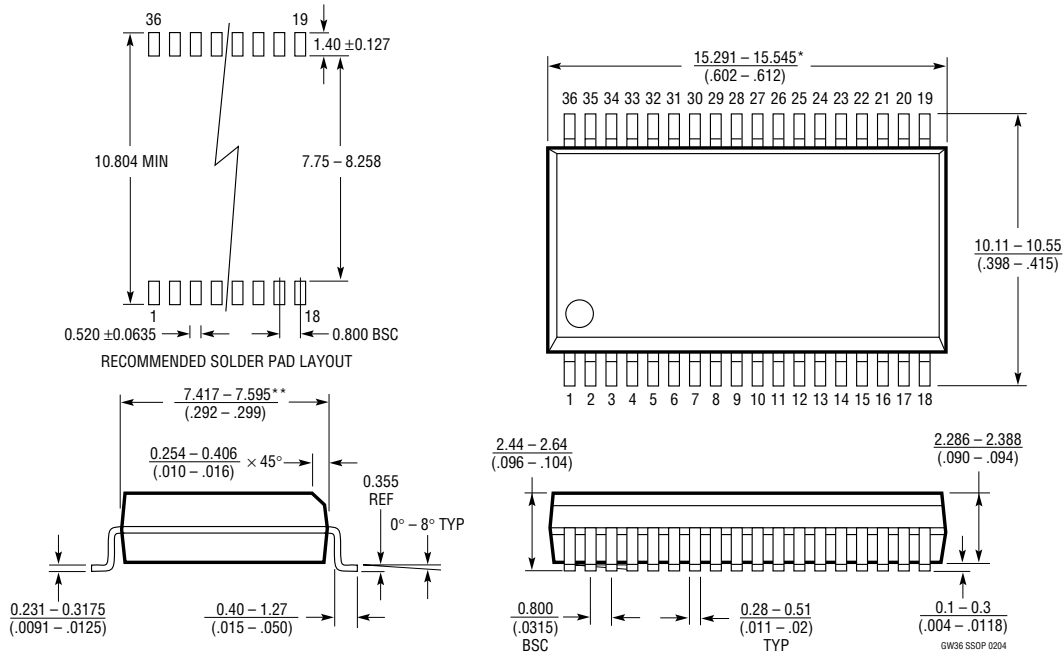


GN Package 28-Lead Plastic SSOP (Narrow .150 Inch) (Reference LTC DWG # 05-08-1641)

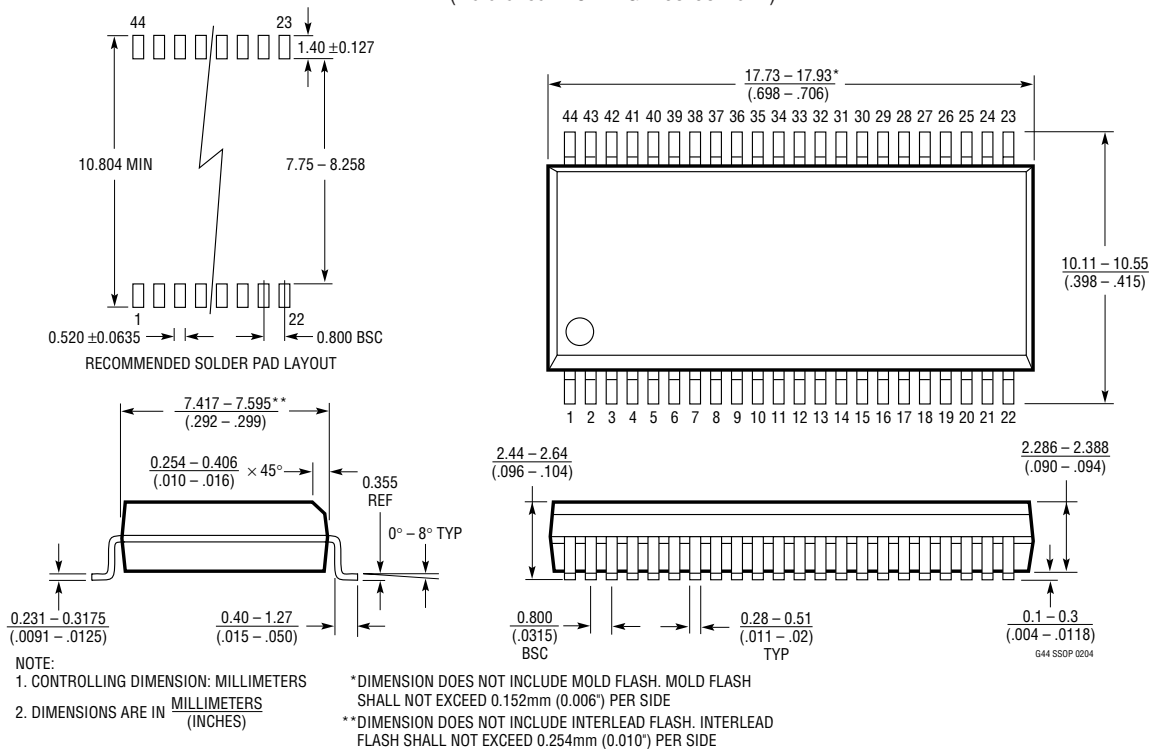


PACKAGE DIMENSIONS

GW Package 36-Lead Plastic SSOP (Wide .300 Inch) (Reference LTC DWG # 05-08-1642)

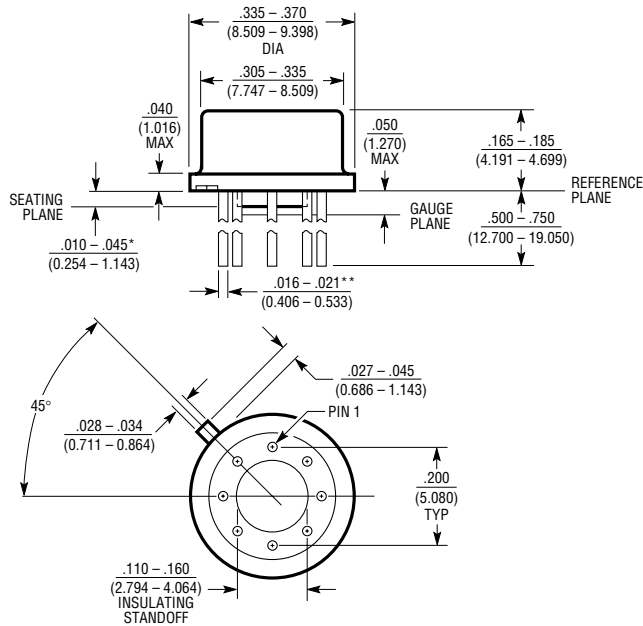


GW Package 44-Lead Plastic SSOP (Wide .300 Inch) (Reference LTC DWG # 05-08-1642)



PACKAGE DIMENSIONS

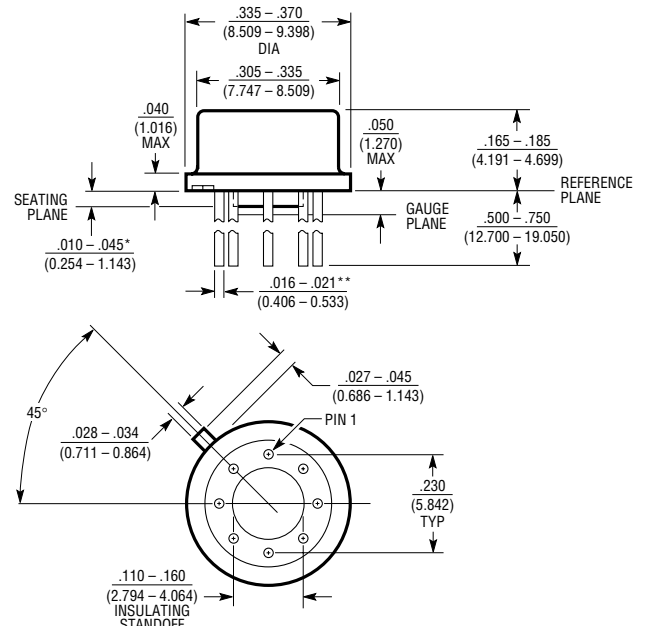
H Package
8-Lead TO-5 Metal Can (.200 Inch PCD)
 (Reference LTC DWG # 05-08-1320)



*LEAD DIAMETER IS UNCONTROLLED BETWEEN THE REFERENCE PLANE AND THE SEATING PLANE

**FOR SOLDER DIP LEAD FINISH, LEAD DIAMETER IS .016 - .024 (0.406 - 0.610) HB(TO-5) 0.200 PCD 0204

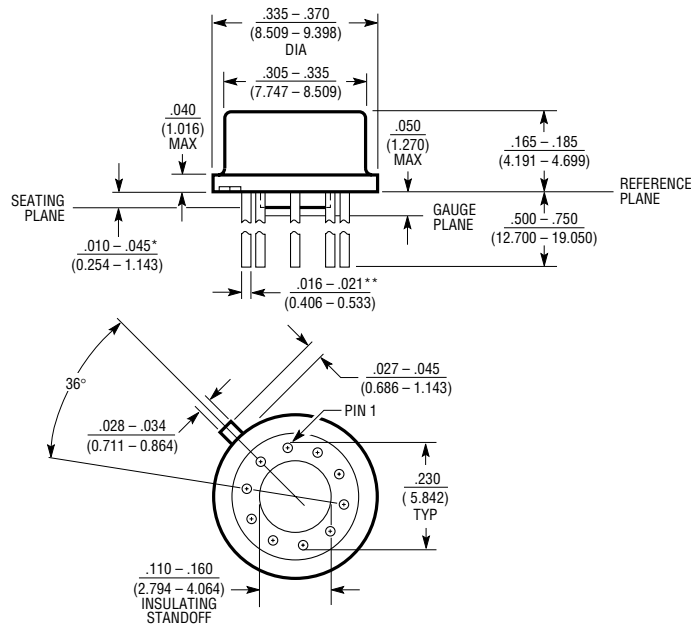
H Package
8-Lead TO-5 Metal Can (.230 Inch PCD)
 (Reference LTC DWG # 05-08-1321)



*LEAD DIAMETER IS UNCONTROLLED BETWEEN THE REFERENCE PLANE AND THE SEATING PLANE

**FOR SOLDER DIP LEAD FINISH, LEAD DIAMETER IS .016 - .024 (0.406 - 0.610) HB(TO-5) 0.230 PCD 0204

H Package
10-Lead TO-5 Metal Can
 (Reference LTC DWG # 05-08-1322)

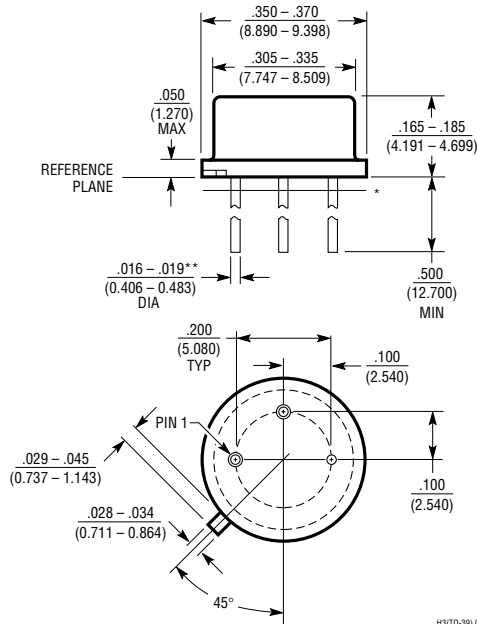


*LEAD DIAMETER IS UNCONTROLLED BETWEEN THE REFERENCE PLANE AND THE SEATING PLANE

**FOR SOLDER DIP LEAD FINISH, LEAD DIAMETER IS .016 - .024 (0.406 - 0.610) H10(TO-5) 0204

PACKAGE DIMENSIONS

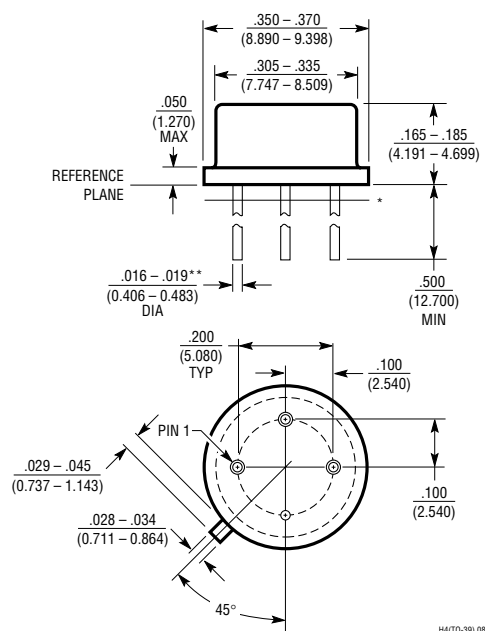
**H Package
3-Lead TO-39 Metal Can**
(Reference LTC DWG # 05-08-1330)



* LEAD DIAMETER IS UNCONTROLLED BETWEEN THE REFERENCE PLANE AND .050" BELOW THE REFERENCE PLANE

** FOR SOLDER DIP LEAD FINISH, LEAD DIAMETER IS $\frac{.016 - .024}{(0.406 - 0.610)}$

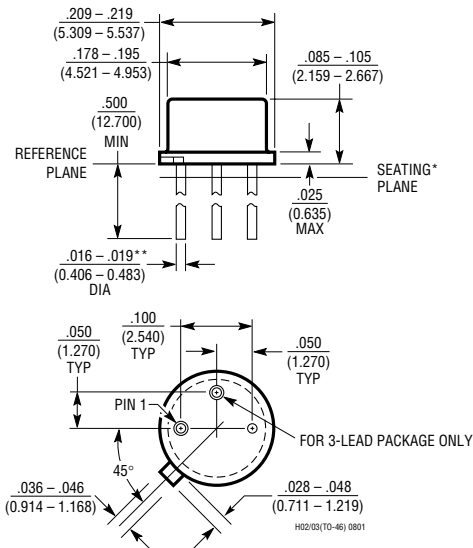
**H Package
4-Lead TO-39 Metal Can**
(Reference LTC DWG # 05-08-1331)



* LEAD DIAMETER IS UNCONTROLLED BETWEEN THE REFERENCE PLANE AND .050" BELOW THE REFERENCE PLANE

** FOR SOLDER DIP LEAD FINISH, LEAD DIAMETER IS $\frac{.016 - .024}{(0.406 - 0.610)}$

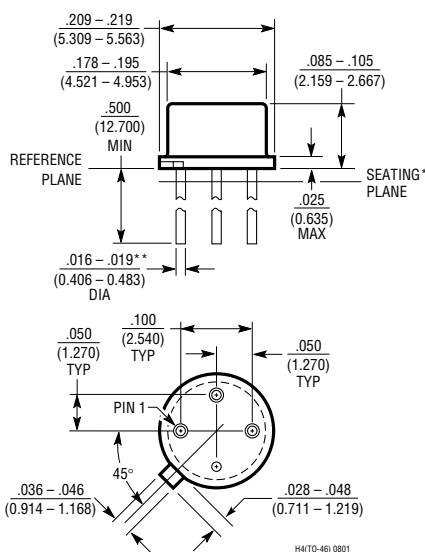
**H Package
2-Lead and 3-Lead TO-46 Metal Can**
(Reference LTC DWG # 05-08-1340)



* LEAD DIAMETER IS UNCONTROLLED BETWEEN THE REFERENCE PLANE AND .050" BELOW THE REFERENCE PLANE

** FOR SOLDER DIP LEAD FINISH, LEAD DIAMETER IS $\frac{.016 - .024}{(0.406 - 0.610)}$

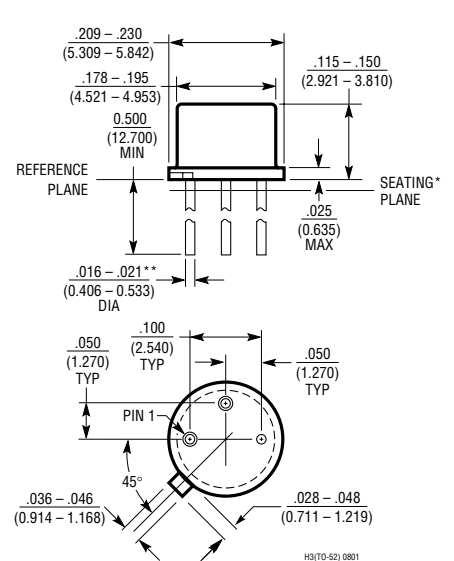
**H Package
4-Lead TO-46 Metal Can**
(Reference LTC DWG # 05-08-1341)



* LEAD DIAMETER IS UNCONTROLLED BETWEEN THE REFERENCE PLANE AND .050" BELOW THE REFERENCE PLANE

** FOR SOLDER DIP LEAD FINISH, LEAD DIAMETER IS $\frac{.016 - .024}{(0.406 - 0.610)}$

**H Package
3-Lead TO-52 Metal Can**
(Reference LTC DWG # 05-08-1350)

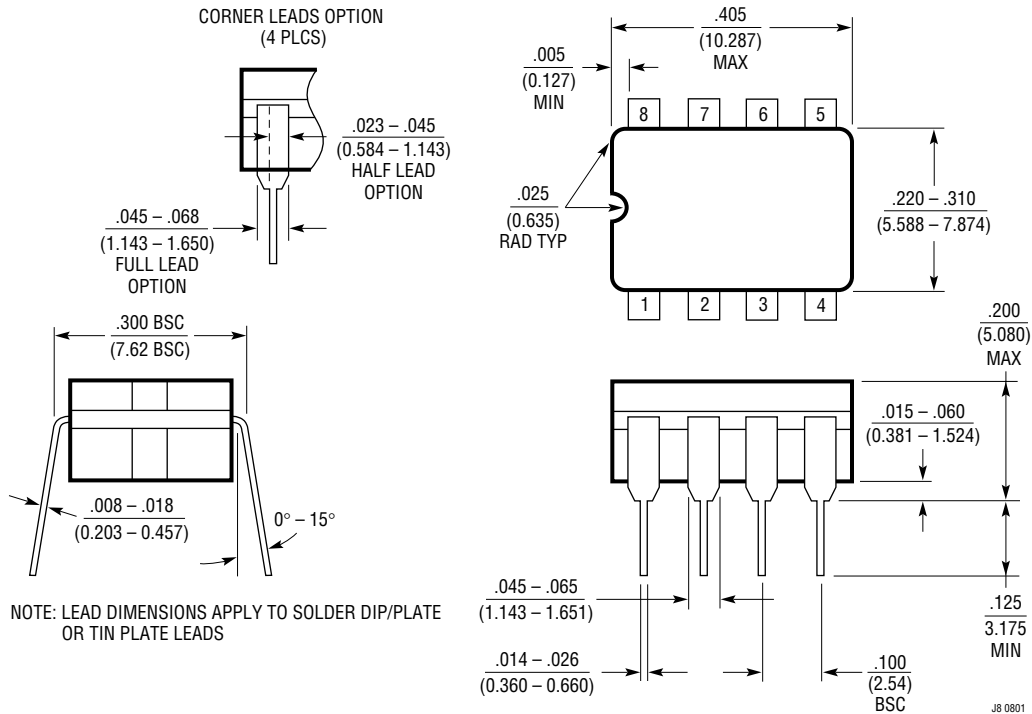


* LEAD DIAMETER IS UNCONTROLLED BETWEEN THE REFERENCE PLANE AND .050" BELOW THE REFERENCE PLANE

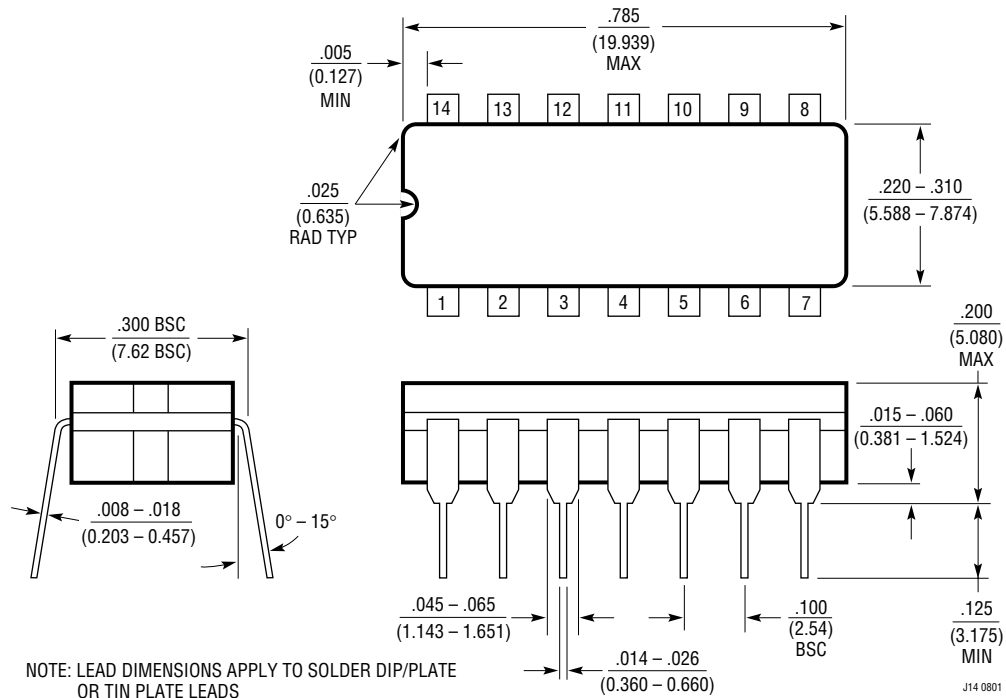
** FOR SOLDER DIP LEAD FINISH, LEAD DIAMETER IS $\frac{.016 - .024}{(0.406 - 0.610)}$

PACKAGE DIMENSIONS

J8 Package 8-Lead Cerdip (Narrow .300 Inch, Hermetic) (Reference LTC DWG # 05-08-1110)

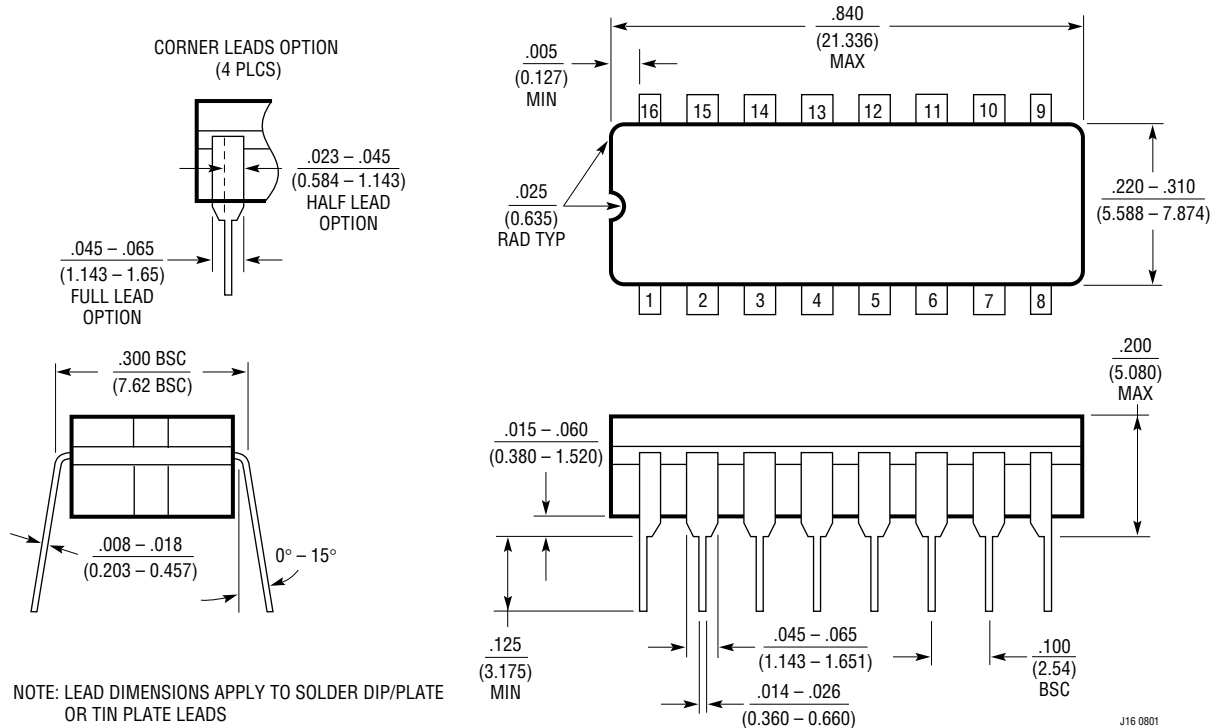


J Package 14-Lead Cerdip (Narrow .300 Inch, Hermetic) (Reference LTC DWG # 05-08-1110)

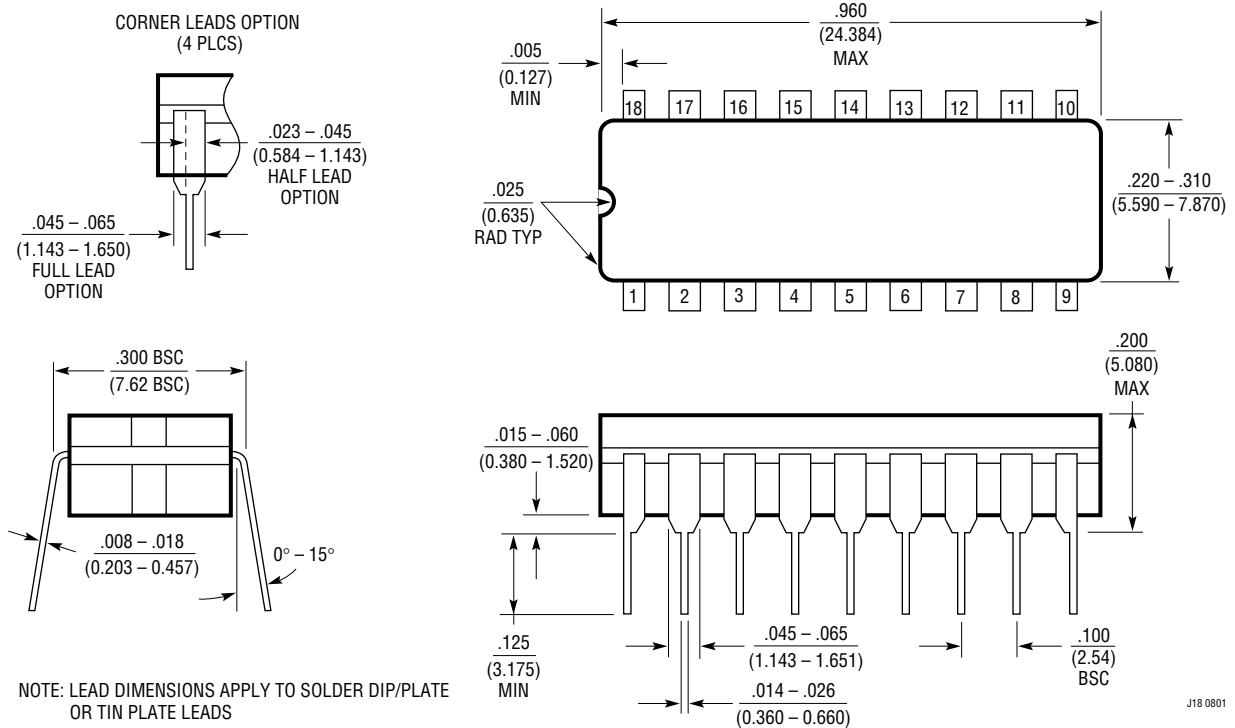


PACKAGE DIMENSIONS

J Package 16-Lead Cerdip (Narrow .300 Inch, Hermetic) (Reference LTC DWG # 05-08-1110)

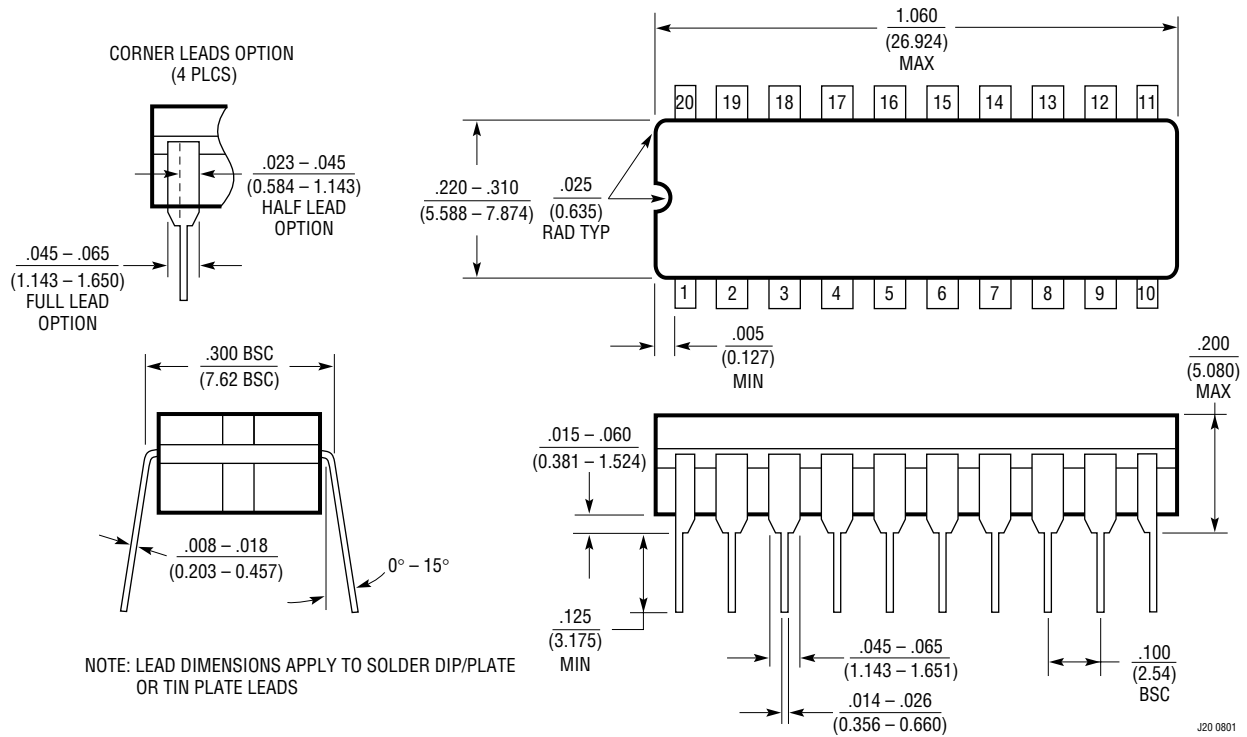


J Package 18-Lead Cerdip (Narrow .300 Inch, Hermetic) (Reference LTC DWG # 05-08-1110)

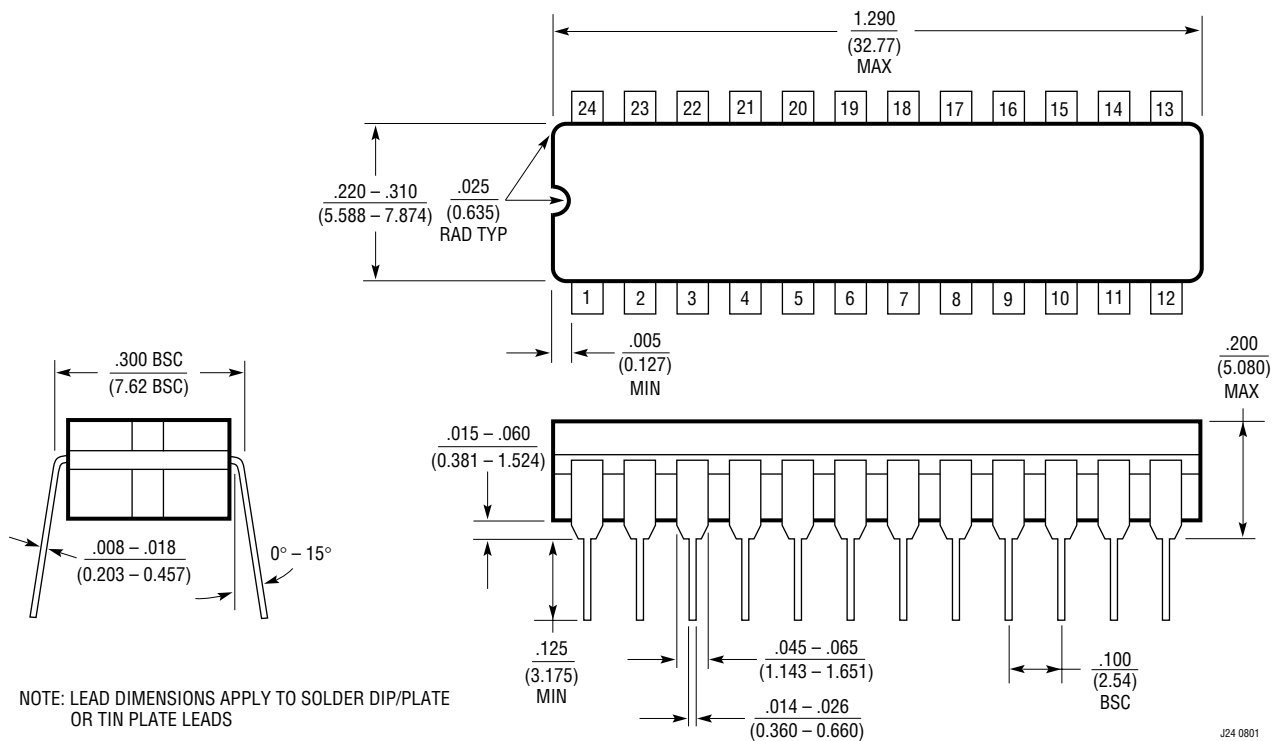


PACKAGE DIMENSIONS

J Package 20-Lead CERDIP (Narrow .300 Inch, Hermetic) (Reference LTC DWG # 05-08-1110)

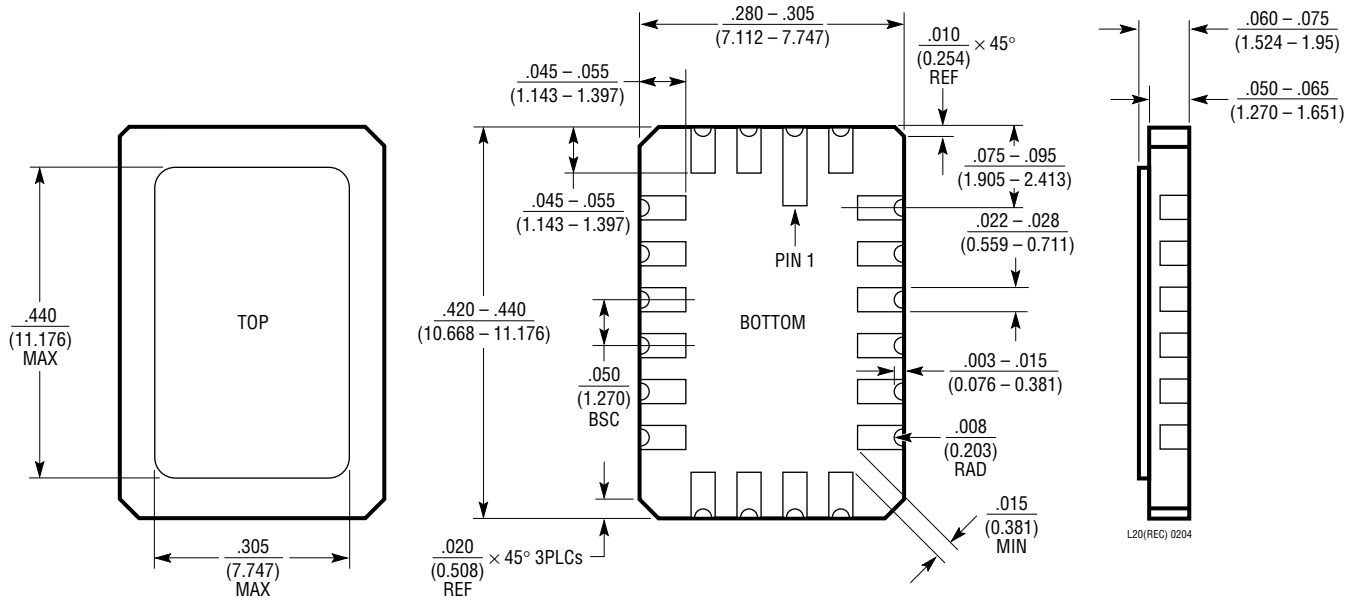


J Package 24-Lead CERDIP (Narrow .300 Inch, Hermetic) (Reference LTC DWG # 05-08-1110)

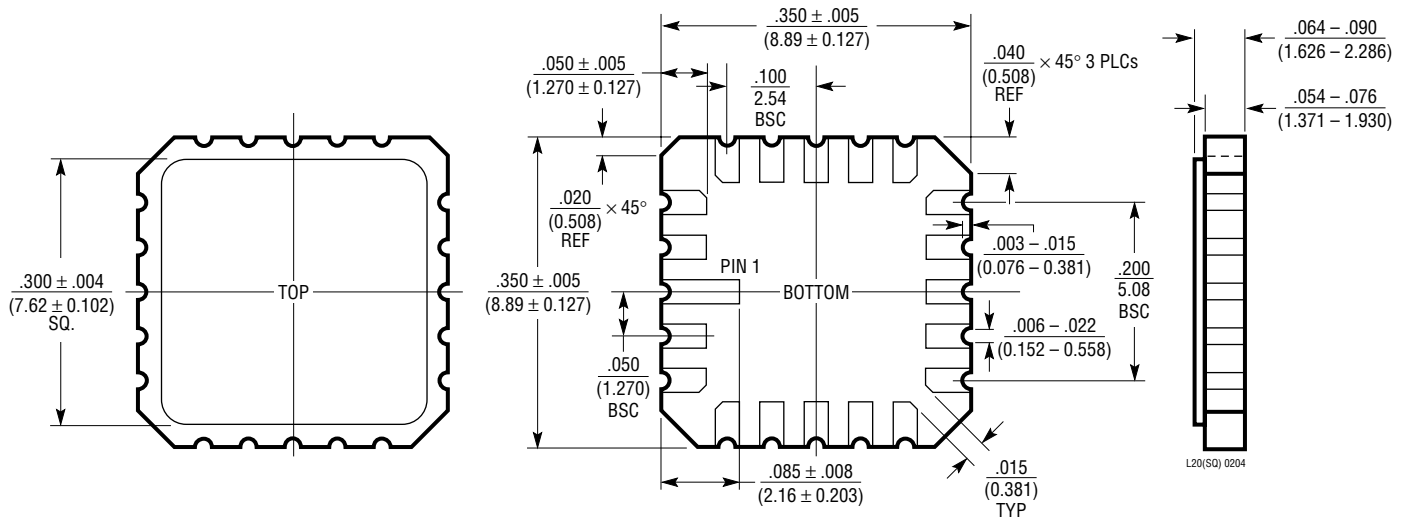


PACKAGE DIMENSIONS

L Package
20-Pin Leadless Chip Carrier (Rectangular, Hermetic)
 (Reference LTC DWG # 05-08-1250)

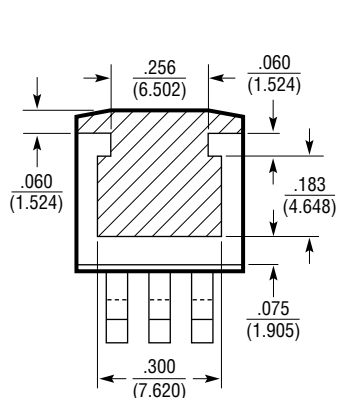


LS Package
20-Pin Leadless Chip Carrier (Square .350 Inch, Hermetic)
 (Reference LTC DWG # 05-08-1260)

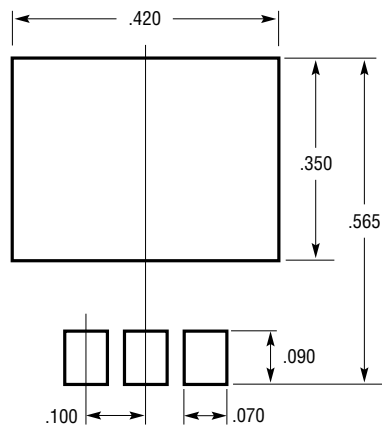
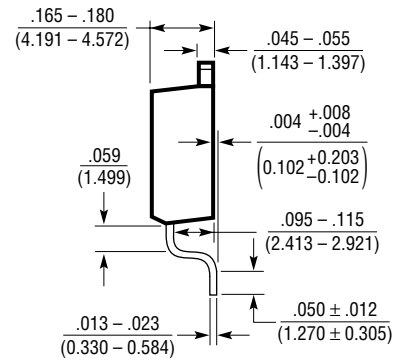
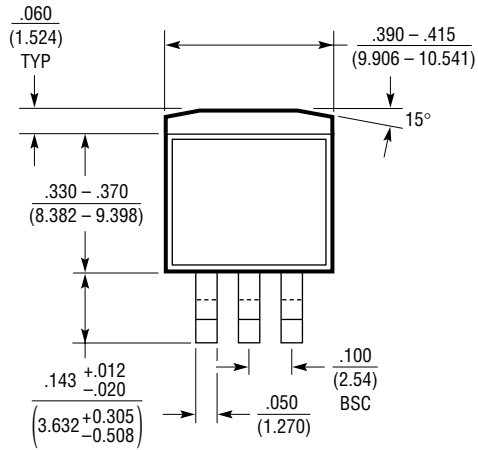


PACKAGE DIMENSIONS

M Package 3-Lead Plastic DD Pak (Reference LTC DWG # 05-08-1460)

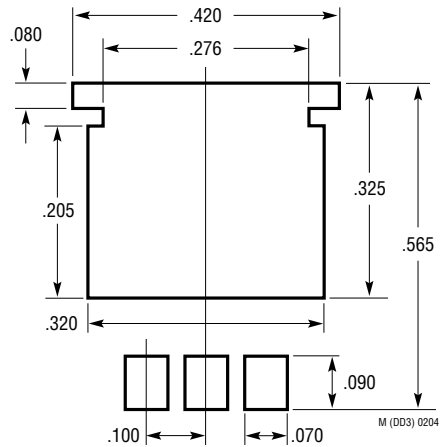


BOTTOM VIEW OF DD PAK
HATCHED AREA IS SOLDER PLATED
COPPER HEAT SINK



RECOMMENDED SOLDER PAD LAYOUT

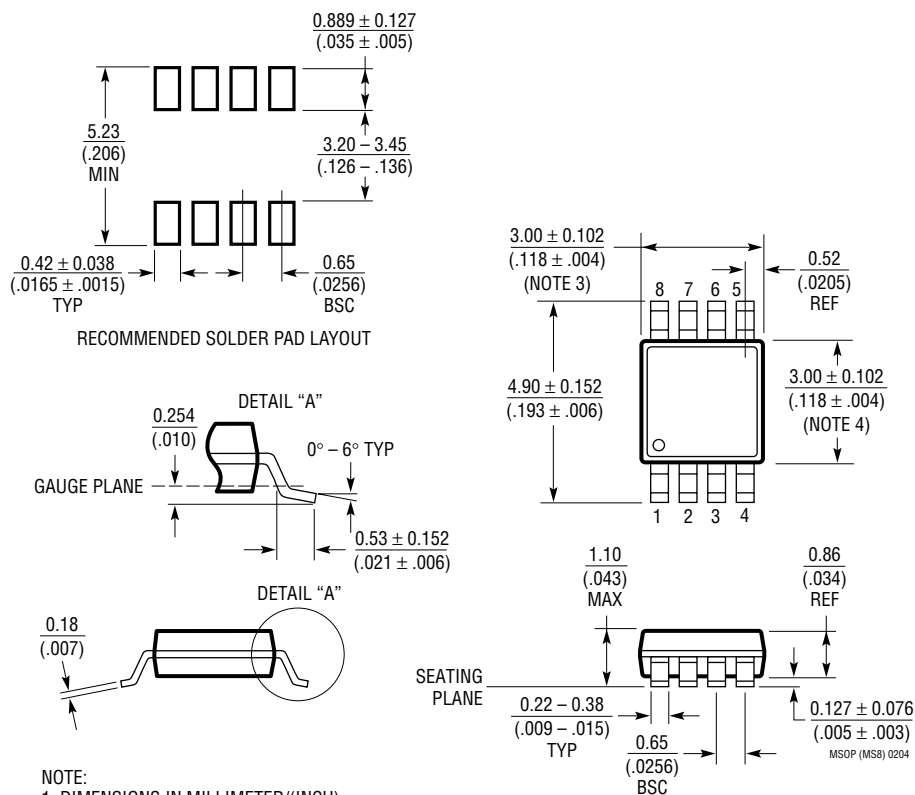
NOTE:
1. DIMENSIONS IN INCH/(MILLIMETER)
2. DRAWING NOT TO SCALE



RECOMMENDED SOLDER PAD LAYOUT
FOR THICKER SOLDER PASTE APPLICATIONS

PACKAGE DIMENSIONS

MS8 Package 8-Lead Plastic MSOP (Reference LTC DWG # 05-08-1660)

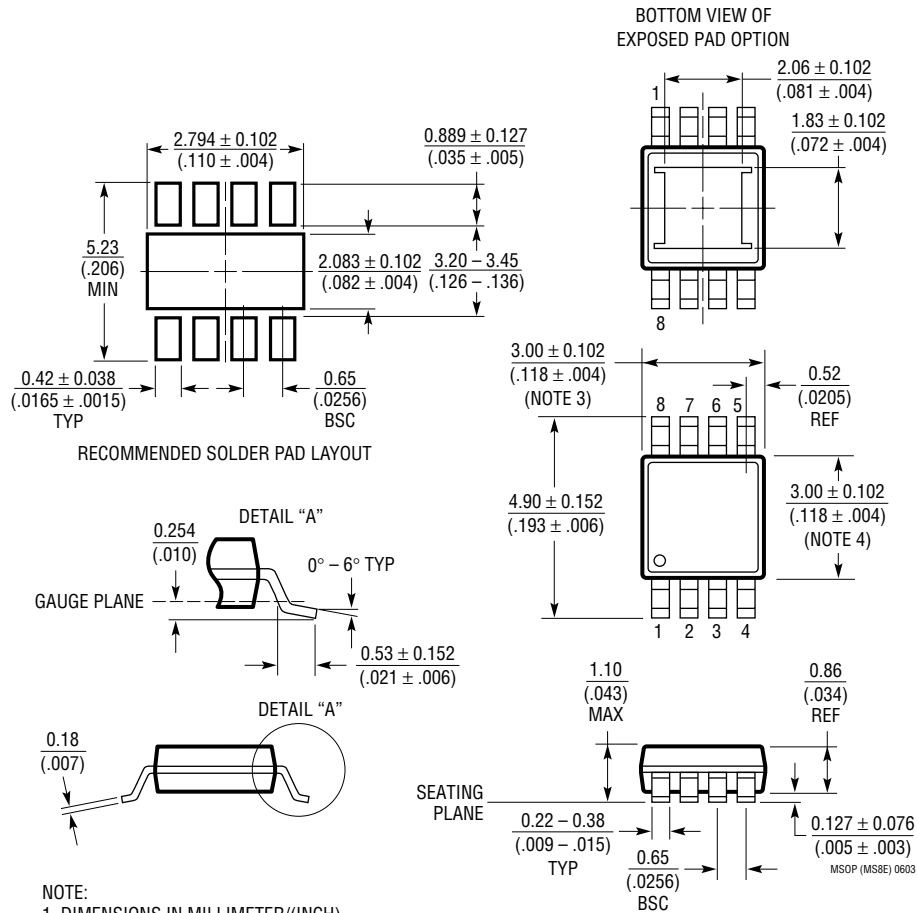


NOTE:

1. DIMENSIONS IN MILLIMETER/(INCH)
2. DRAWING NOT TO SCALE
3. DIMENSION DOES NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS.
MOLD FLASH, PROTRUSIONS OR GATE BURRS SHALL NOT EXCEED 0.152mm (.006") PER SIDE
4. DIMENSION DOES NOT INCLUDE INTERLEAD FLASH OR PROTRUSIONS.
INTERLEAD FLASH OR PROTRUSIONS SHALL NOT EXCEED 0.152mm (.006") PER SIDE
5. LEAD COPLANARITY (BOTTOM OF LEADS AFTER FORMING) SHALL BE 0.102mm (.004") MAX

PACKAGE DIMENSIONS

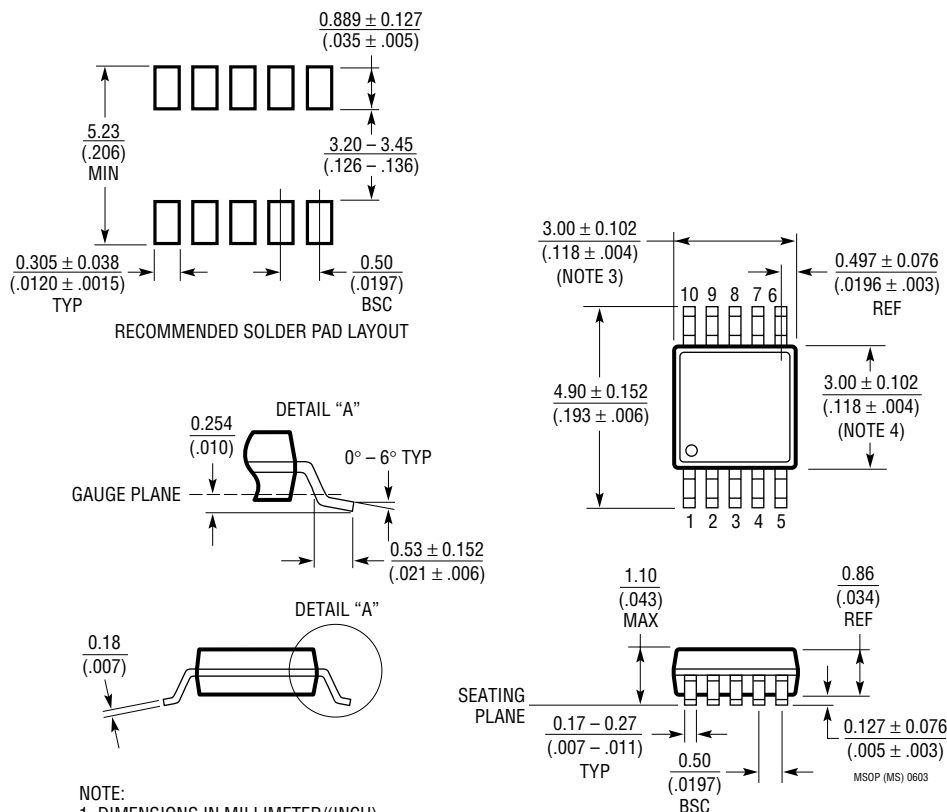
MS8E Package 8-Lead Plastic MSOP (Reference LTC DWG # 05-08-1662)



- NOTE:
1. DIMENSIONS IN MILLIMETER/(INCH)
 2. DRAWING NOT TO SCALE
 3. DIMENSION DOES NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS.
MOLD FLASH, PROTRUSIONS OR GATE BURRS SHALL NOT EXCEED 0.152mm ($.006$ ") PER SIDE
 4. DIMENSION DOES NOT INCLUDE INTERLEAD FLASH OR PROTRUSIONS.
INTERLEAD FLASH OR PROTRUSIONS SHALL NOT EXCEED 0.152mm ($.006$ ") PER SIDE
 5. LEAD COPLANARITY (BOTTOM OF LEADS AFTER FORMING) SHALL BE 0.102mm ($.004$ ") MAX

PACKAGE DIMENSIONS

MS Package 10-Lead Plastic MSOP (Reference LTC DWG # 05-08-1661)

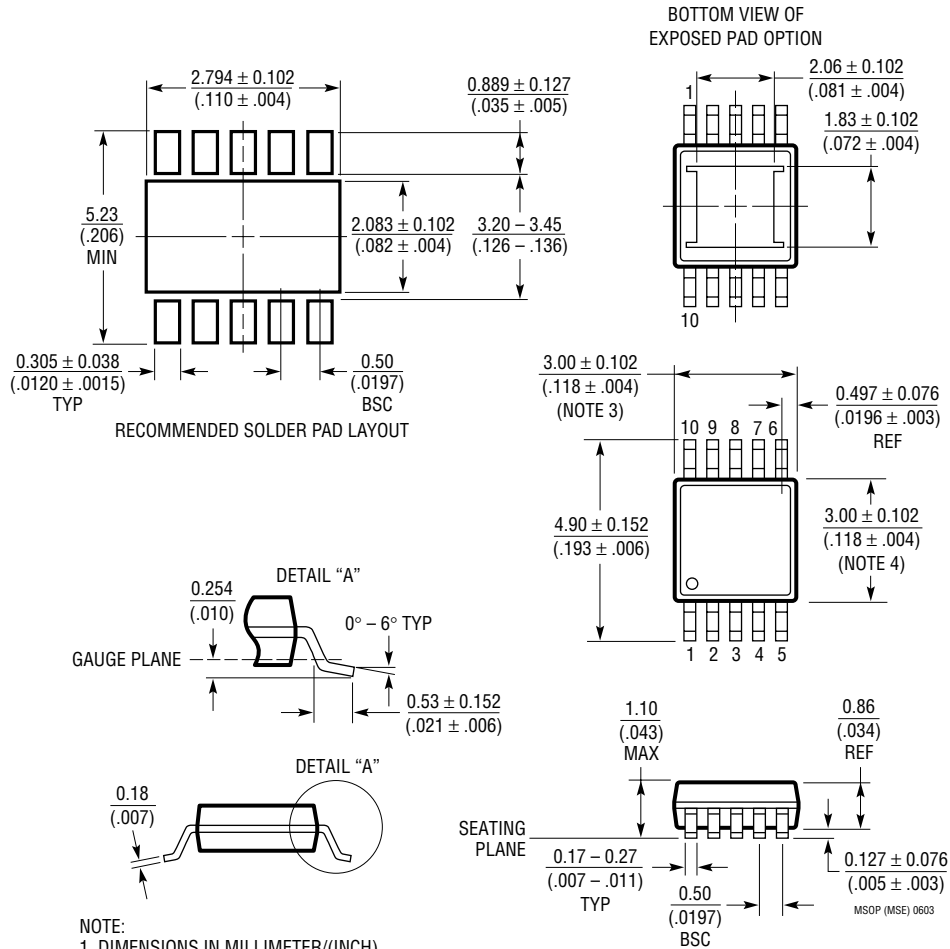


NOTE:

1. DIMENSIONS IN MILLIMETER/(INCH)
2. DRAWING NOT TO SCALE
3. DIMENSION DOES NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS.
MOLD FLASH, PROTRUSIONS OR GATE BURRS SHALL NOT EXCEED 0.152mm (.006") PER SIDE
4. DIMENSION DOES NOT INCLUDE INTERLEAD FLASH OR PROTRUSIONS.
INTERLEAD FLASH OR PROTRUSIONS SHALL NOT EXCEED 0.152mm (.006") PER SIDE
5. LEAD COPLANARITY (BOTTOM OF LEADS AFTER FORMING) SHALL BE 0.102mm (.004") MAX

PACKAGE DIMENSIONS

MSE Package 10-Lead Plastic MSOP (Reference LTC DWG # 05-08-1663)

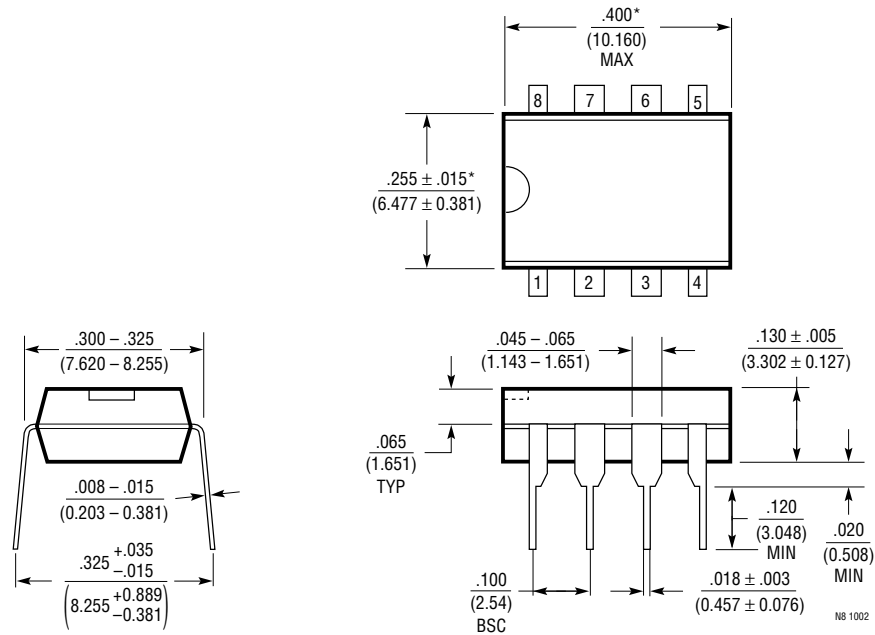


NOTE:

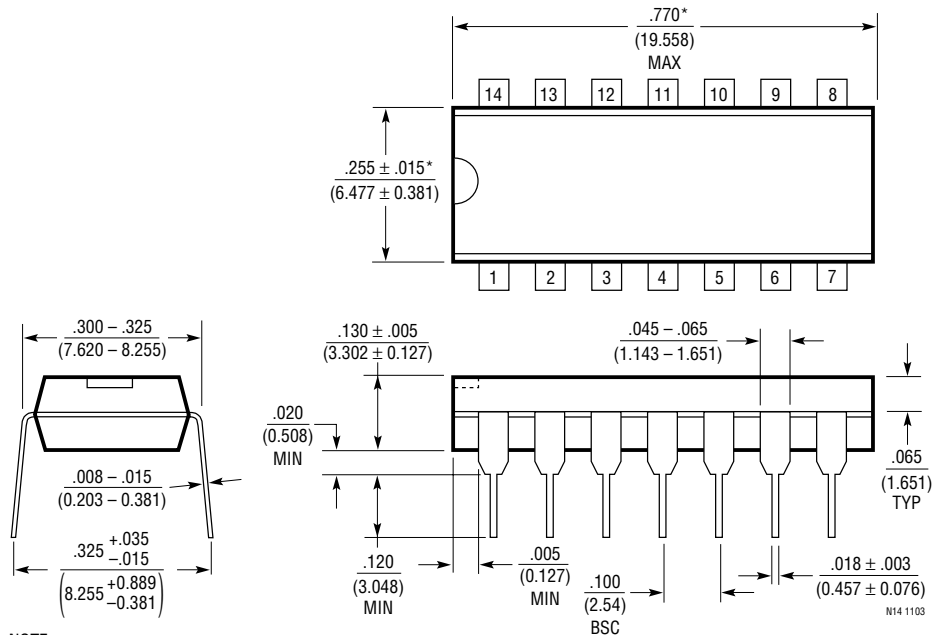
1. DIMENSIONS IN MILLIMETER/(INCH)
2. DRAWING NOT TO SCALE
3. DIMENSION DOES NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS.
MOLD FLASH, PROTRUSIONS OR GATE BURRS SHALL NOT EXCEED 0.152mm (.006") PER SIDE
4. DIMENSION DOES NOT INCLUDE INTERLEAD FLASH OR PROTRUSIONS.
INTERLEAD FLASH OR PROTRUSIONS SHALL NOT EXCEED 0.152mm (.006") PER SIDE
5. LEAD COPLANARITY (BOTTOM OF LEADS AFTER FORMING) SHALL BE 0.102mm (.004") MAX

PACKAGE DIMENSIONS

N8 Package 8-Lead PDIP (Narrow .300 Inch) (Reference LTC DWG # 05-08-1510)

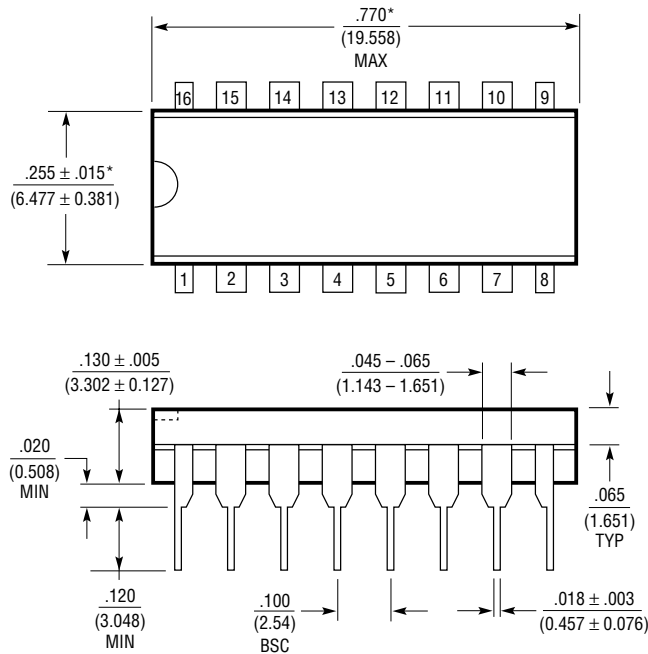


N Package 14-Lead PDIP (Narrow .300 Inch) (Reference LTC DWG # 05-08-1510)



PACKAGE DIMENSIONS

N Package 16-Lead PDIP (Narrow .300 Inch) (Reference LTC DWG # 05-08-1510)

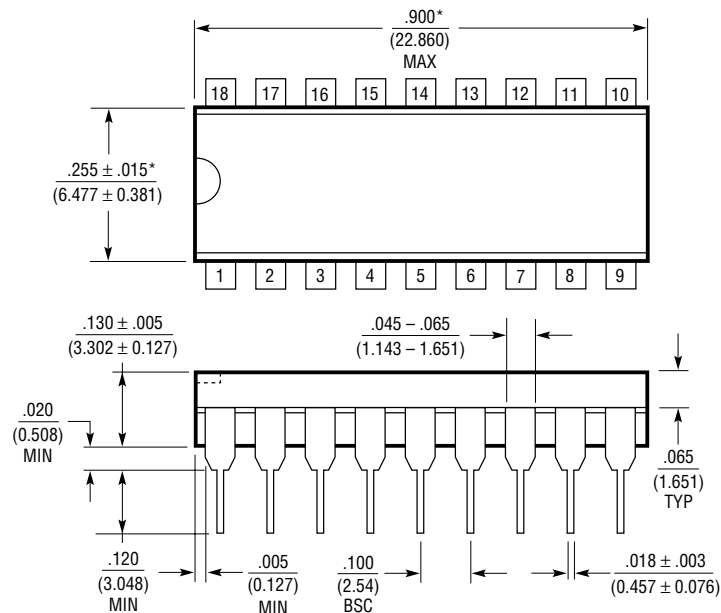


NOTE:
1. DIMENSIONS ARE $\frac{\text{INCHES}}{\text{MILLIMETERS}}$

*THESE DIMENSIONS DO NOT INCLUDE MOLD FLASH OR PROTRUSIONS.
MOLD FLASH OR PROTRUSIONS SHALL NOT EXCEED .010 INCH (0.254mm)

N16 1002

N Package 18-Lead PDIP (Narrow .300 Inch) (Reference LTC DWG # 05-08-1510)



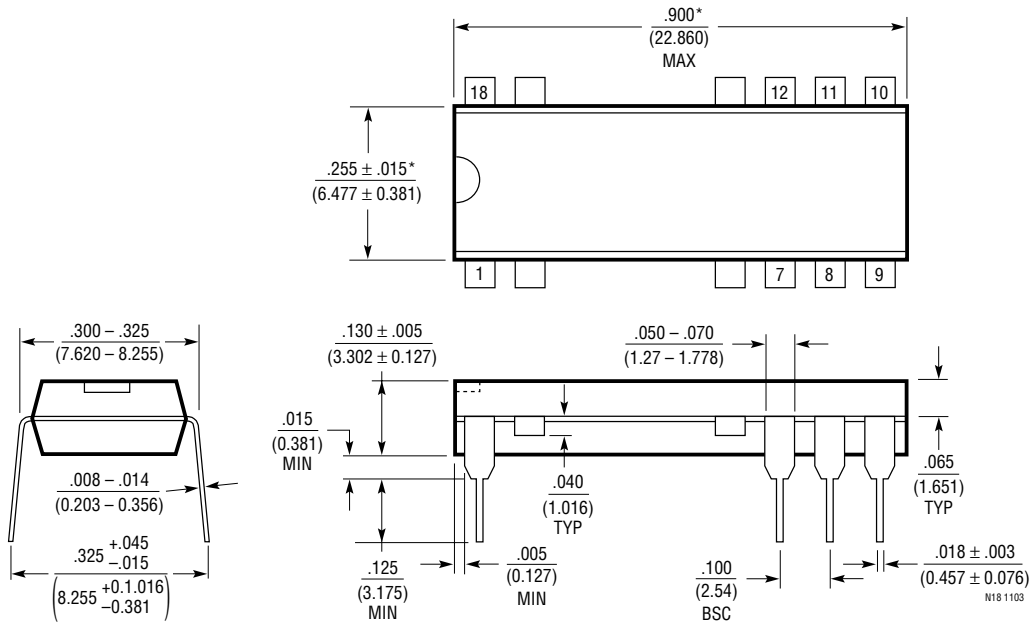
NOTE:
1. DIMENSIONS ARE $\frac{\text{INCHES}}{\text{MILLIMETERS}}$

*THESE DIMENSIONS DO NOT INCLUDE MOLD FLASH OR PROTRUSIONS.
MOLD FLASH OR PROTRUSIONS SHALL NOT EXCEED .010 INCH (0.254mm)

N18 1002

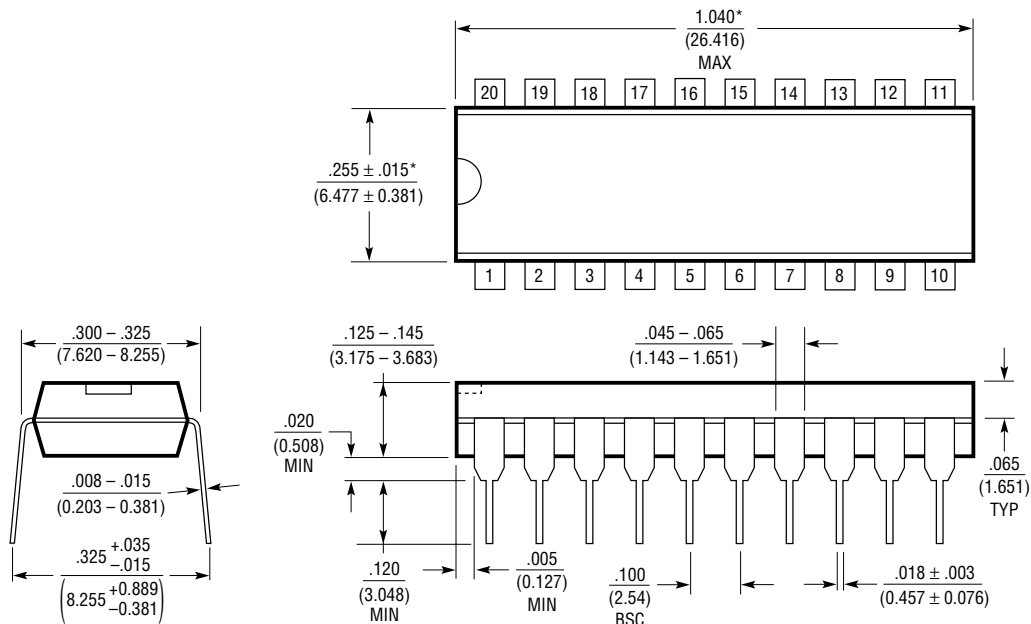
PACKAGE DIMENSIONS

N Package 18-Lead PDIP Isolation Barrier (Narrow .300 Inch) (Reference LTC DWG # 05-08-1590)



NOTE:
1. DIMENSIONS ARE $\frac{\text{INCHES}}{\text{MILLIMETERS}}$
*THESE DIMENSIONS DO NOT INCLUDE MOLD FLASH OR PROTRUSIONS.
MOLD FLASH OR PROTRUSIONS SHALL NOT EXCEED .010 INCH (0.254mm)

N Package 20-Lead PDIP (Narrow .300 Inch) (Reference LTC DWG # 05-08-1510)

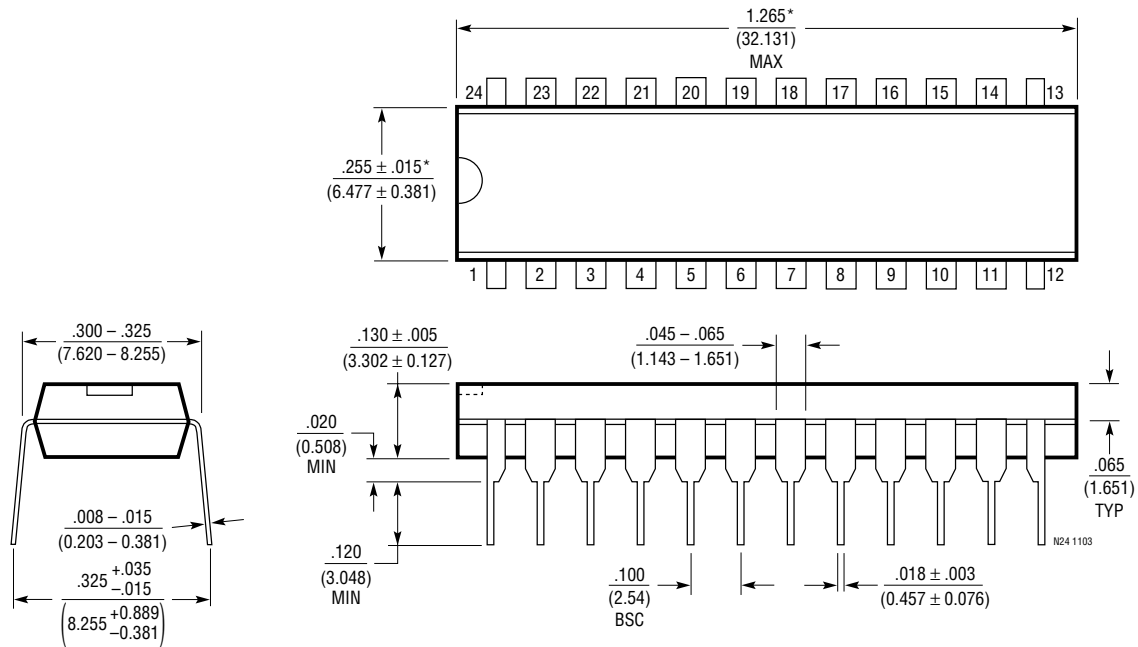


NOTE:
1. DIMENSIONS ARE $\frac{\text{INCHES}}{\text{MILLIMETERS}}$
*THESE DIMENSIONS DO NOT INCLUDE MOLD FLASH OR PROTRUSIONS.
MOLD FLASH OR PROTRUSIONS SHALL NOT EXCEED .010 INCH (0.254mm)

N20 1002

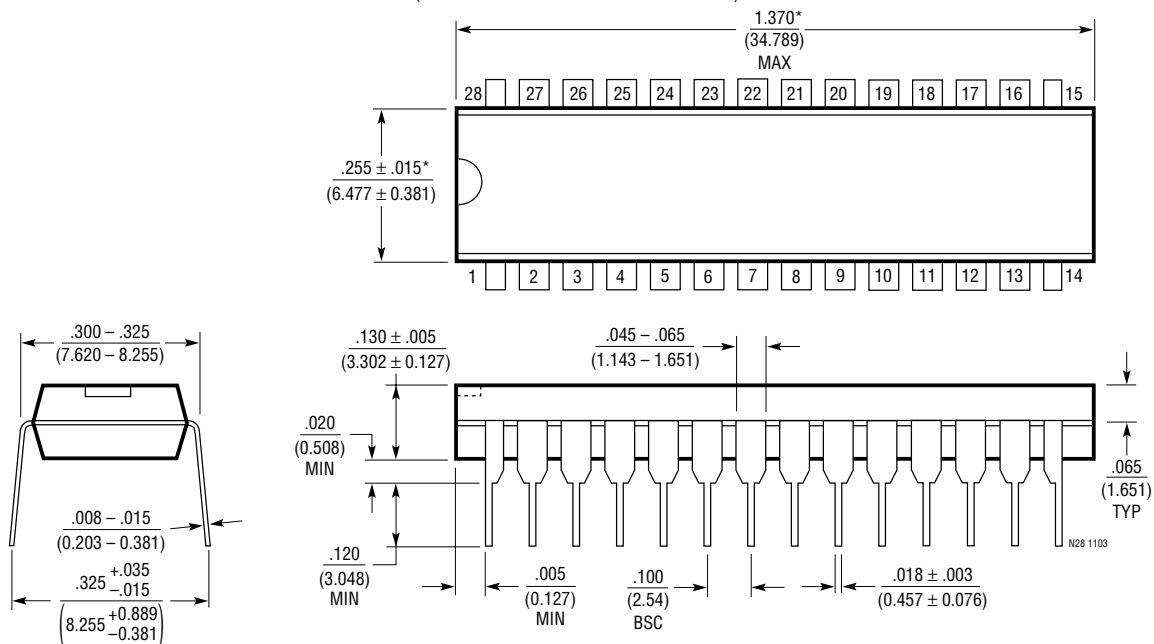
PACKAGE DIMENSIONS

N Package 24-Lead PDIP (Narrow .300 Inch) (Reference LTC DWG # 05-08-1510)



NOTE:
1. DIMENSIONS ARE $\frac{\text{INCHES}}{\text{MILLIMETERS}}$
*THESE DIMENSIONS DO NOT INCLUDE MOLD FLASH OR PROTRUSIONS.
MOLD FLASH OR PROTRUSIONS SHALL NOT EXCEED .010 INCH (0.254mm)

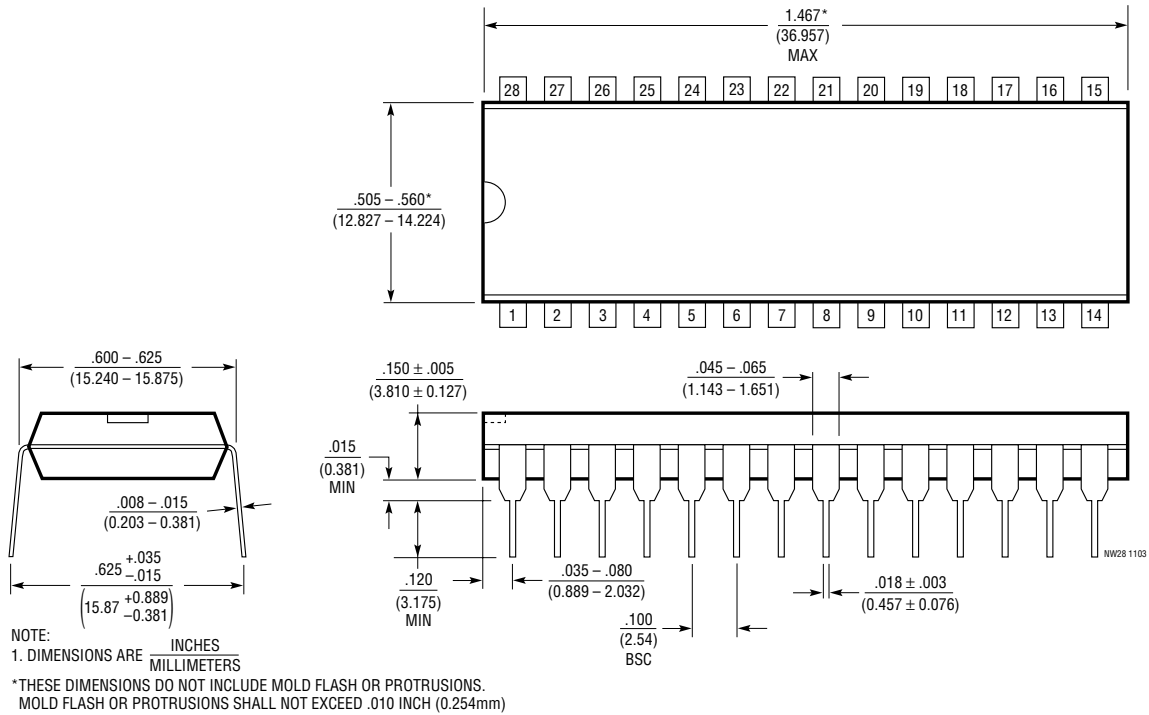
N Package 28-Lead PDIP (Narrow .300 Inch) (Reference LTC DWG # 05-08-1510)



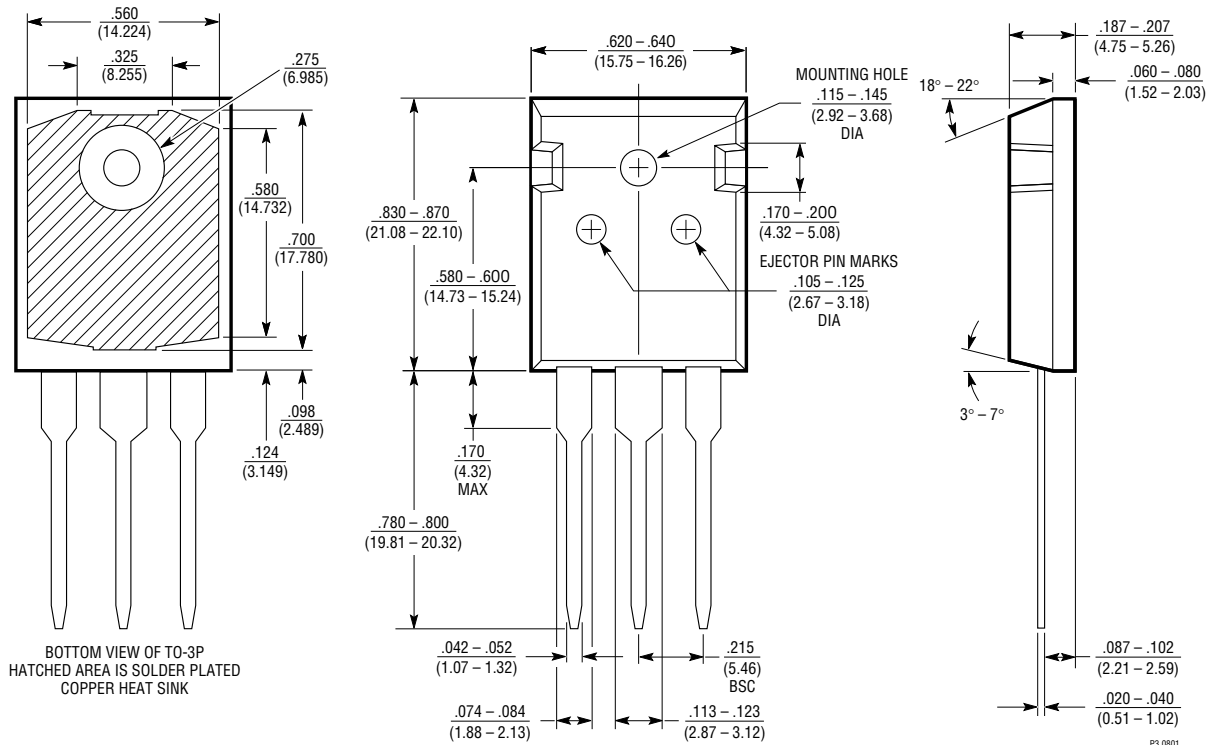
NOTE:
1. DIMENSIONS ARE $\frac{\text{INCHES}}{\text{MILLIMETERS}}$
*THESE DIMENSIONS DO NOT INCLUDE MOLD FLASH OR PROTRUSIONS.
MOLD FLASH OR PROTRUSIONS SHALL NOT EXCEED .010 INCH (0.254mm)

PACKAGE DIMENSIONS

NW Package 28-Lead PDIP (Wide .600 Inch) (Reference LTC DWG # 05-08-1520)

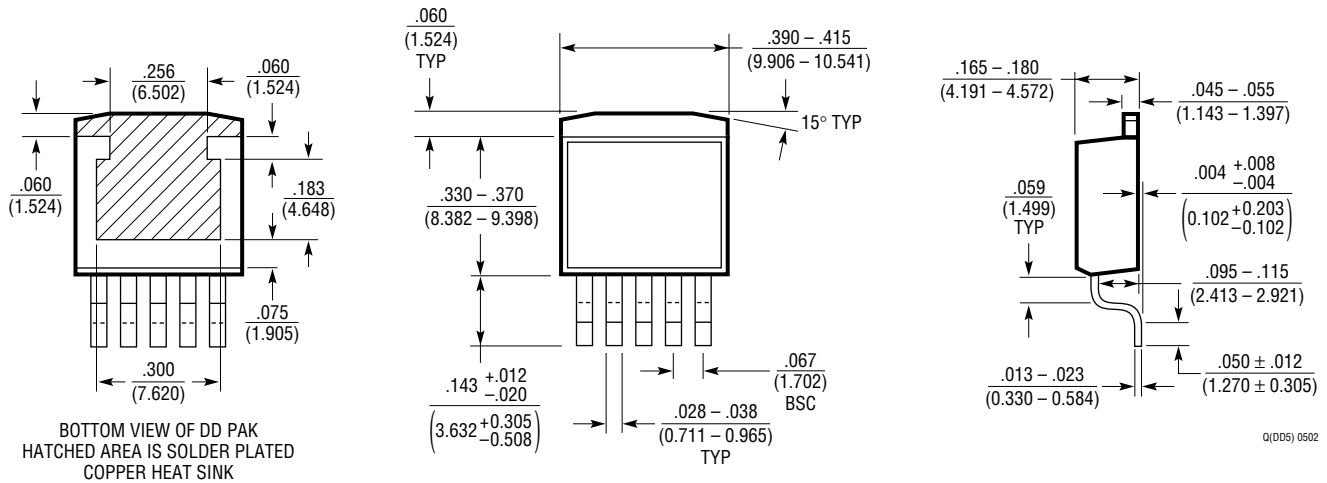


P Package 3-Lead Plastic TO-3P (Similar to TO-247) (Reference LTC DWG # 05-08-1450)

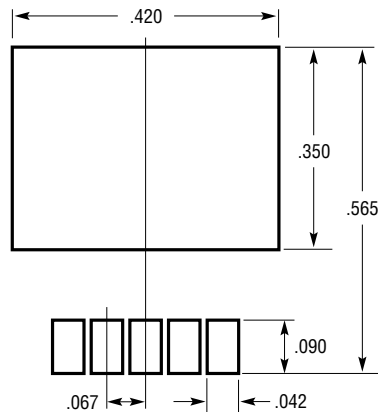


PACKAGE DIMENSIONS

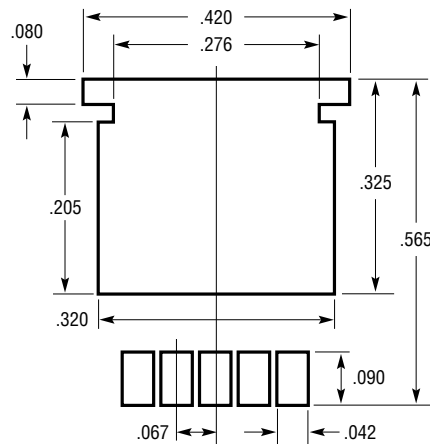
Q Package 5-Lead Plastic DD Pak (Reference LTC DWG # 05-08-1461)



Q(DD5) 0502



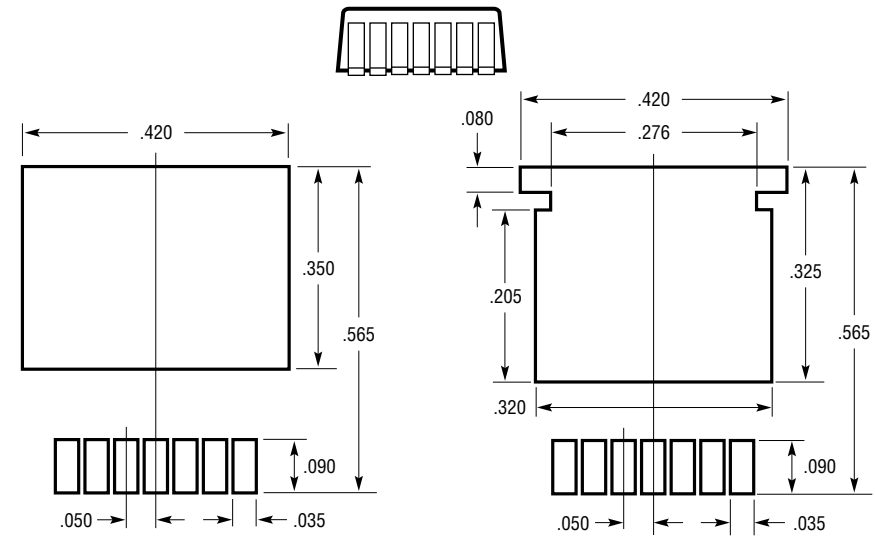
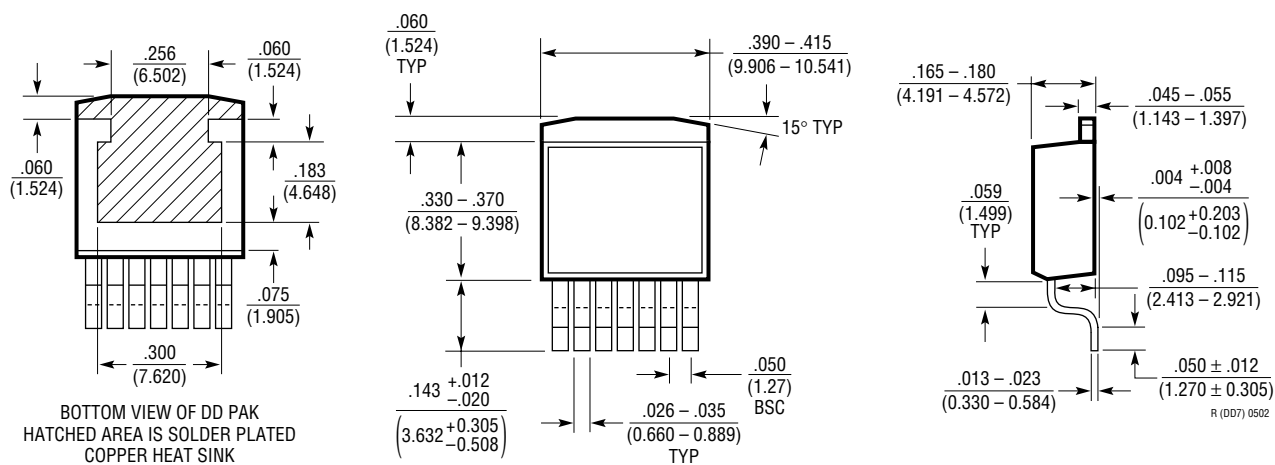
RECOMMENDED SOLDER PAD LAYOUT
NOTE:
1. DIMENSIONS IN INCH/(MILLIMETER)
2. DRAWING NOT TO SCALE



RECOMMENDED SOLDER PAD LAYOUT
FOR THICKER SOLDER PASTE APPLICATIONS

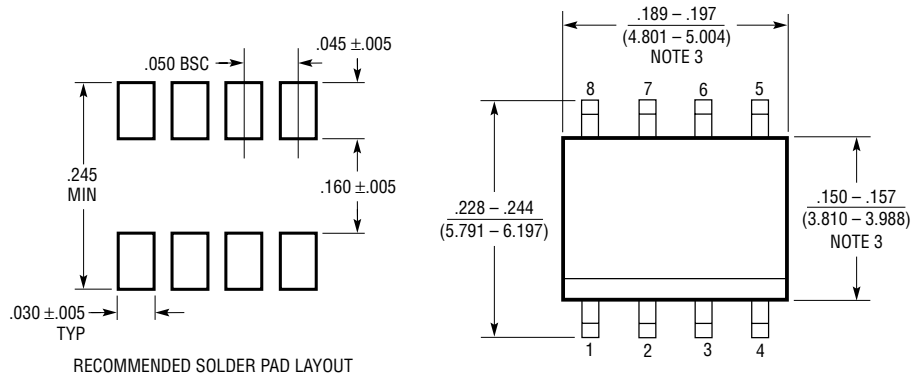
PACKAGE DIMENSIONS

R Package
7-Lead Plastic DD Pak
(Reference LTC DWG # 05-08-1462)



RECOMMENDED SOLDER PAD LAYOUT
NOTE:
1. DIMENSIONS IN INCH/(MILLIMETER)
2. DRAWING NOT TO SCALE

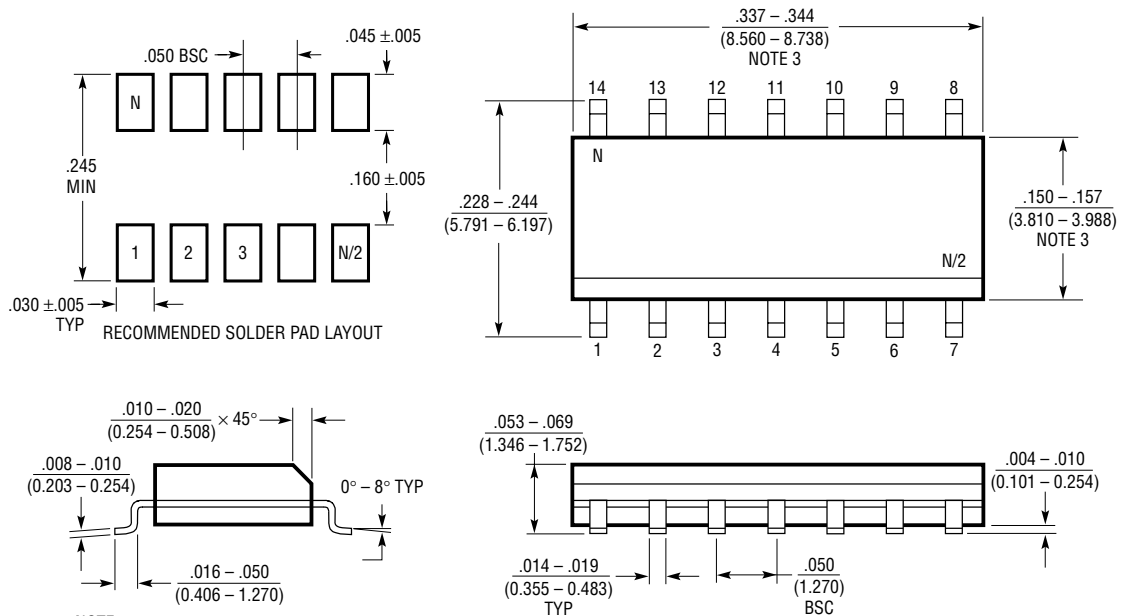
S8 Package 8-Lead Plastic Small Outline (Narrow .150 Inch) (Reference LTC DWG # 05-08-1610)



- NOTE:
1. DIMENSIONS IN INCHES (MILLIMETERS)
 2. DRAWING NOT TO SCALE
 3. THESE DIMENSIONS DO NOT INCLUDE MOLD FLASH OR PROTRUSIONS. MOLD FLASH OR PROTRUSIONS SHALL NOT EXCEED .006" (0.15mm)

S08 0303

S Package 14-Lead Plastic Small Outline (Narrow .150 Inch) (Reference LTC DWG # 05-08-1610)

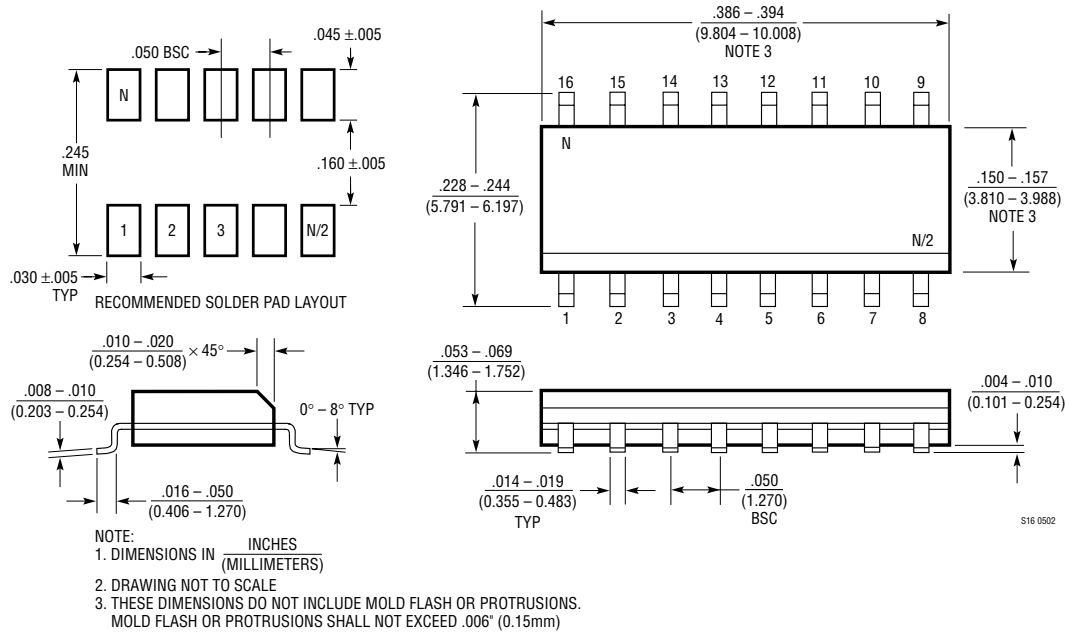


- NOTE:
1. DIMENSIONS IN INCHES (MILLIMETERS)
 2. DRAWING NOT TO SCALE
 3. THESE DIMENSIONS DO NOT INCLUDE MOLD FLASH OR PROTRUSIONS. MOLD FLASH OR PROTRUSIONS SHALL NOT EXCEED .006" (0.15mm)

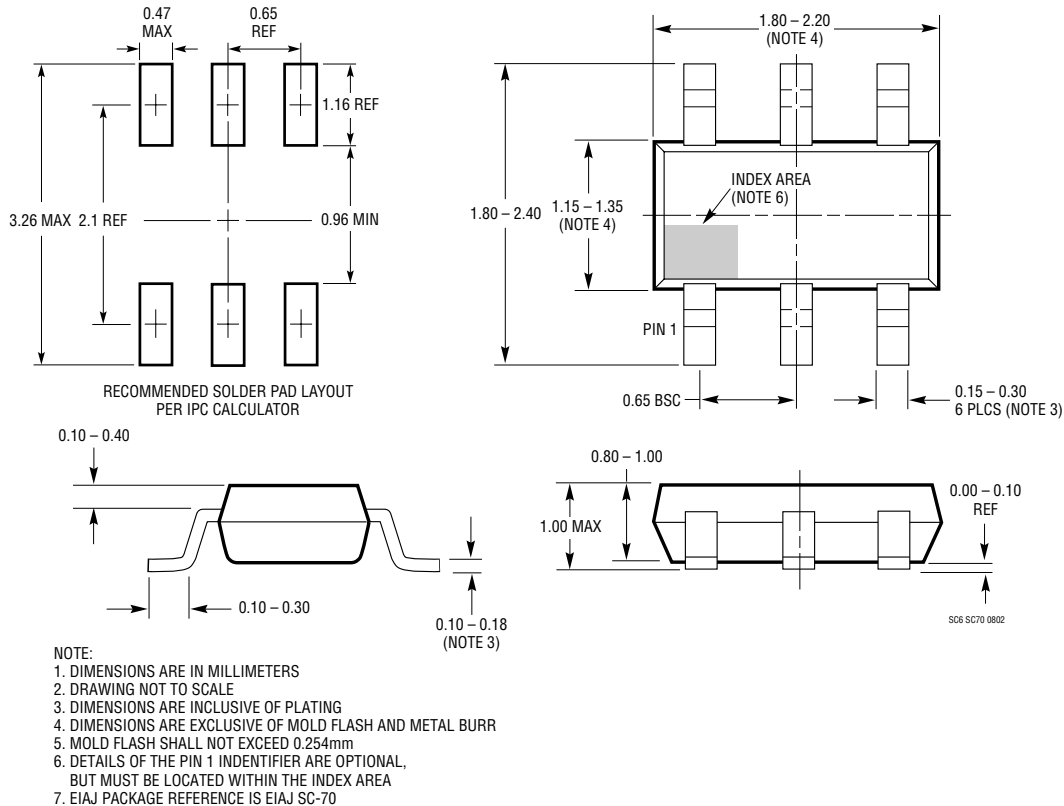
S14 0502

PACKAGE DIMENSIONS

S Package 16-Lead Plastic Small Outline (Narrow .150 Inch) (Reference LTC DWG # 05-08-1610)

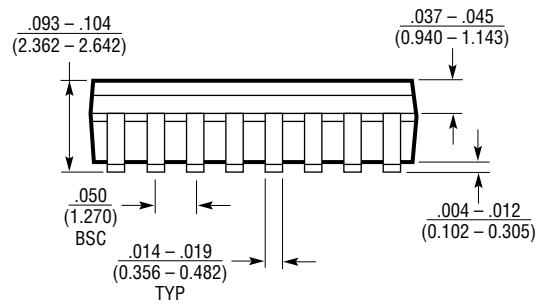
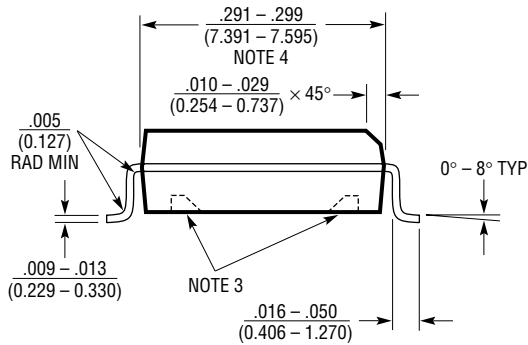
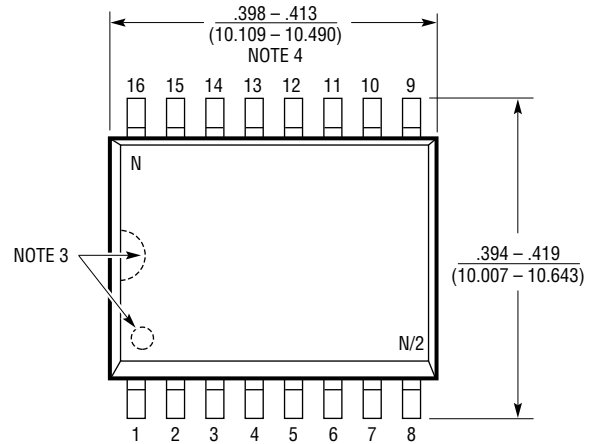
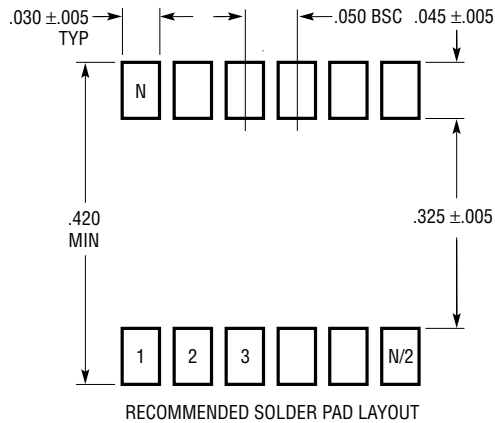


SC6 Package 6-Lead Plastic SC70 (Reference LTC DWG # 05-08-1638)



PACKAGE DIMENSIONS

SW Package 16-Lead Plastic Small Outline (Wide .300 Inch) (Reference LTC DWG # 05-08-1620)

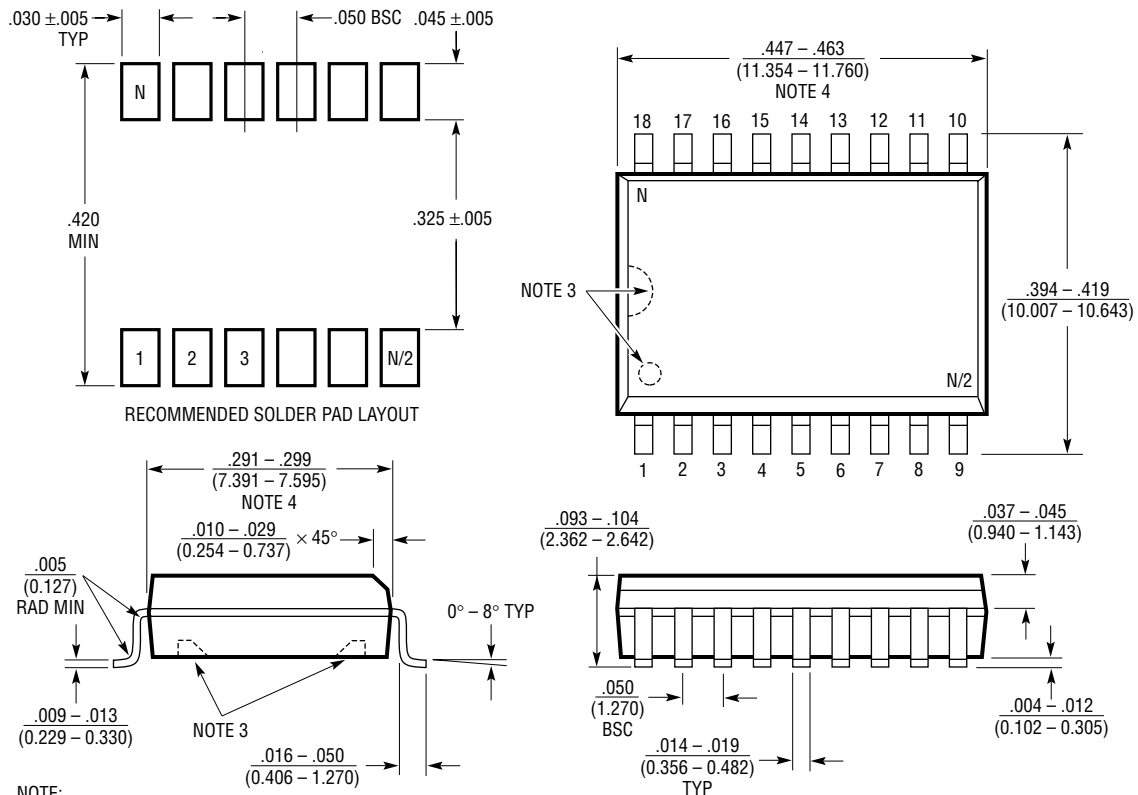


- NOTE:
1. DIMENSIONS IN INCHES (MILLIMETERS)
 2. DRAWING NOT TO SCALE
 3. PIN 1 IDENT, NOTCH ON TOP AND CAVITIES ON THE BOTTOM OF PACKAGES ARE THE MANUFACTURING OPTIONS. THE PART MAY BE SUPPLIED WITH OR WITHOUT ANY OF THE OPTIONS
 4. THESE DIMENSIONS DO NOT INCLUDE MOLD FLASH OR PROTRUSIONS. MOLD FLASH OR PROTRUSIONS SHALL NOT EXCEED .006" (0.15mm)

S16 (WIDE) 0502

PACKAGE DIMENSIONS

SW Package 18-Lead Plastic Small Outline (Wide .300 Inch) (Reference LTC DWG # 05-08-1620)

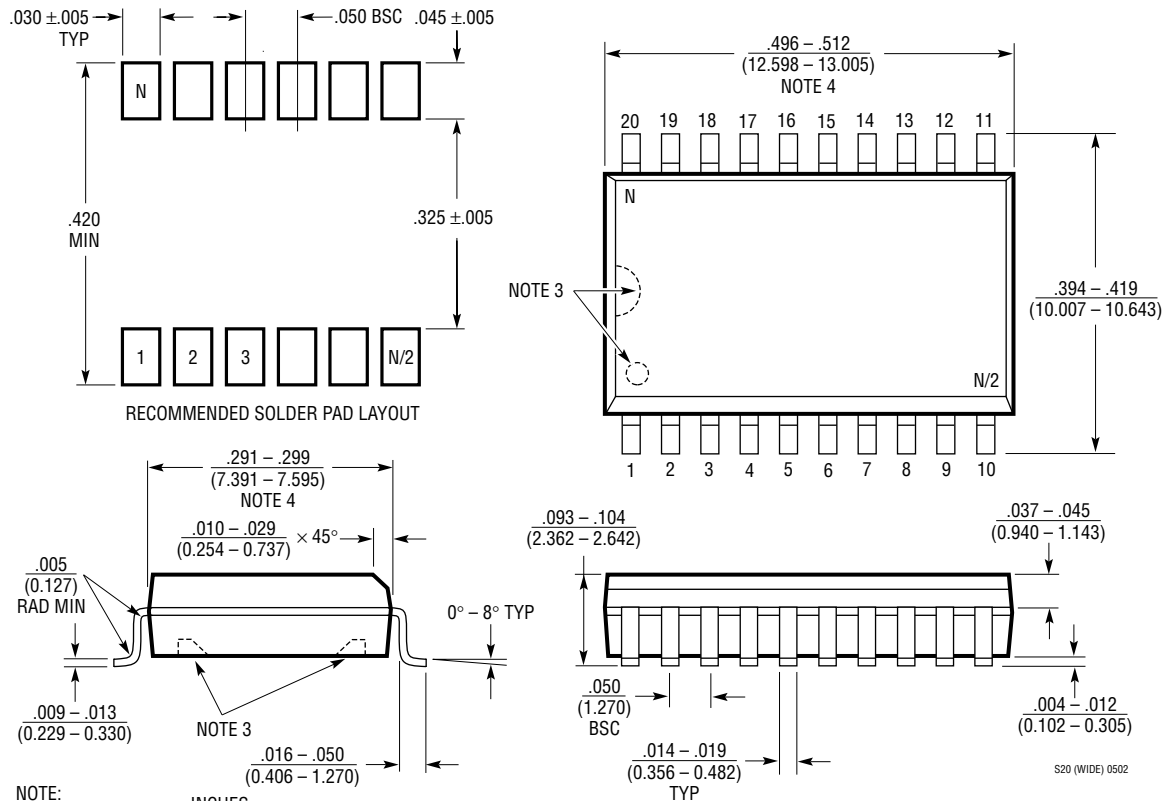


- NOTE:
1. DIMENSIONS IN INCHES (MILLIMETERS)
 2. DRAWING NOT TO SCALE
 3. PIN 1 IDENT, NOTCH ON TOP AND CAVITIES ON THE BOTTOM OF PACKAGES ARE THE MANUFACTURING OPTIONS. THE PART MAY BE SUPPLIED WITH OR WITHOUT ANY OF THE OPTIONS
 4. THESE DIMENSIONS DO NOT INCLUDE MOLD FLASH OR PROTRUSIONS. MOLD FLASH OR PROTRUSIONS SHALL NOT EXCEED $.006"$ (0.15mm)

S18 (WIDE) 0502

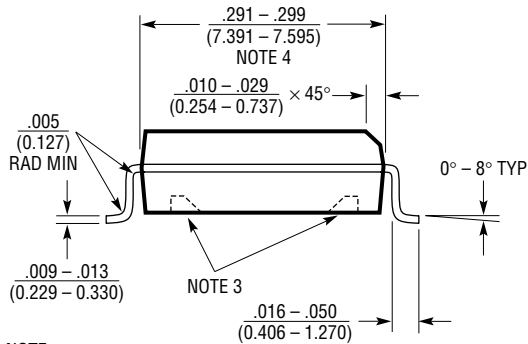
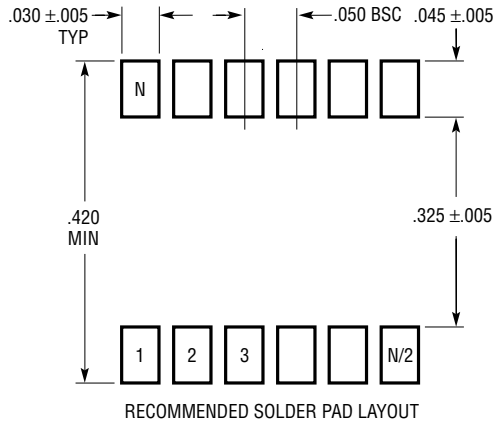
PACKAGE DIMENSIONS

SW Package 20-Lead Plastic Small Outline (Wide .300 Inch) (Reference LTC DWG # 05-08-1620)



PACKAGE DIMENSIONS

SW Package 24-Lead Plastic Small Outline (Wide .300 Inch) (Reference LTC DWG # 05-08-1620)



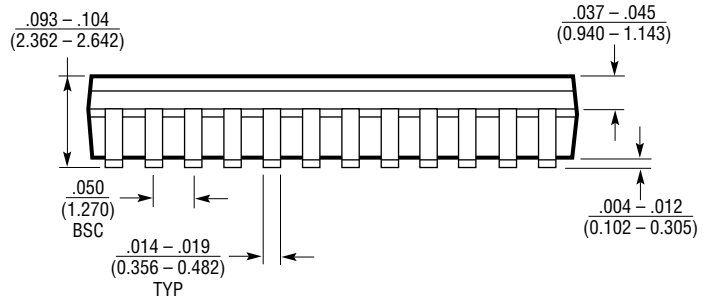
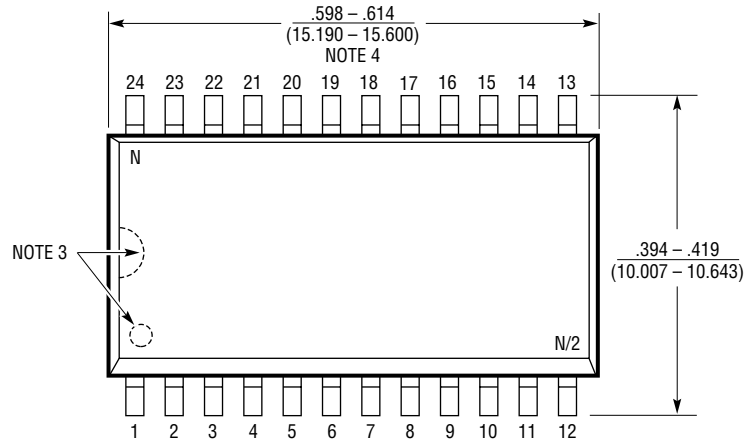
NOTE:

1. DIMENSIONS IN $\frac{\text{INCHES}}{\text{MILLIMETERS}}$

2. DRAWING NOT TO SCALE

3. PIN 1 IDENT, NOTCH ON TOP AND CAVITIES ON THE BOTTOM OF PACKAGES ARE THE MANUFACTURING OPTIONS.
THE PART MAY BE SUPPLIED WITH OR WITHOUT ANY OF THE OPTIONS

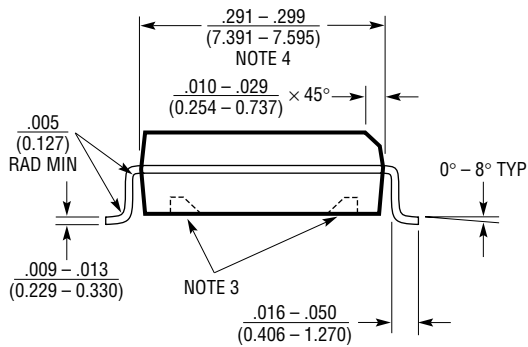
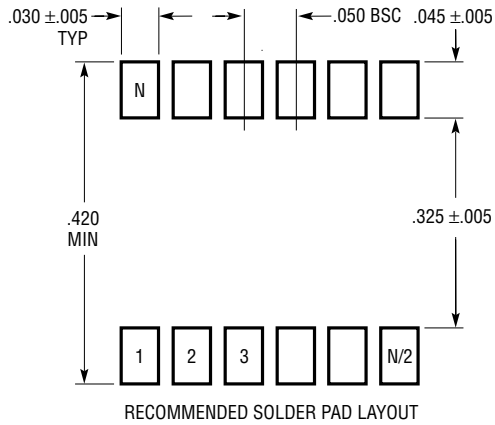
4. THESE DIMENSIONS DO NOT INCLUDE MOLD FLASH OR PROTRUSIONS.
MOLD FLASH OR PROTRUSIONS SHALL NOT EXCEED .006" (0.15mm)



S24 (WIDE) 0502

PACKAGE DIMENSIONS

SW Package 28-Lead Plastic Small Outline (Wide .300 Inch) (Reference LTC DWG # 05-08-1620)



NOTE:
1. DIMENSIONS IN INCHES (MILLIMETERS)

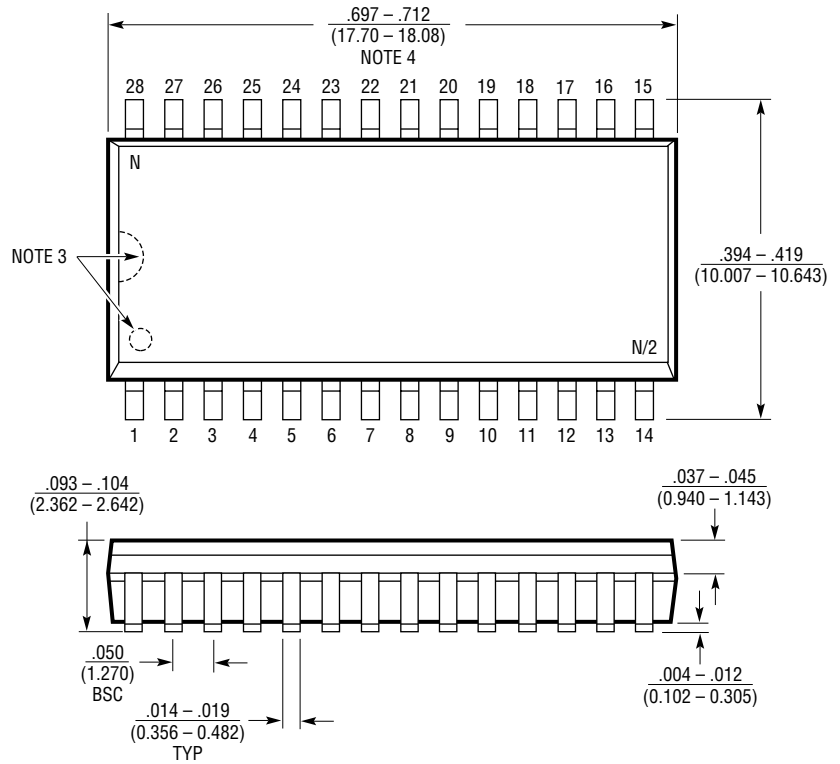
2. DRAWING NOT TO SCALE

3. PIN 1 IDENT, NOTCH ON TOP AND CAVITIES ON THE BOTTOM OF PACKAGES ARE THE MANUFACTURING OPTIONS.

THE PART MAY BE SUPPLIED WITH OR WITHOUT ANY OF THE OPTIONS

4. THESE DIMENSIONS DO NOT INCLUDE MOLD FLASH OR PROTRUSIONS.

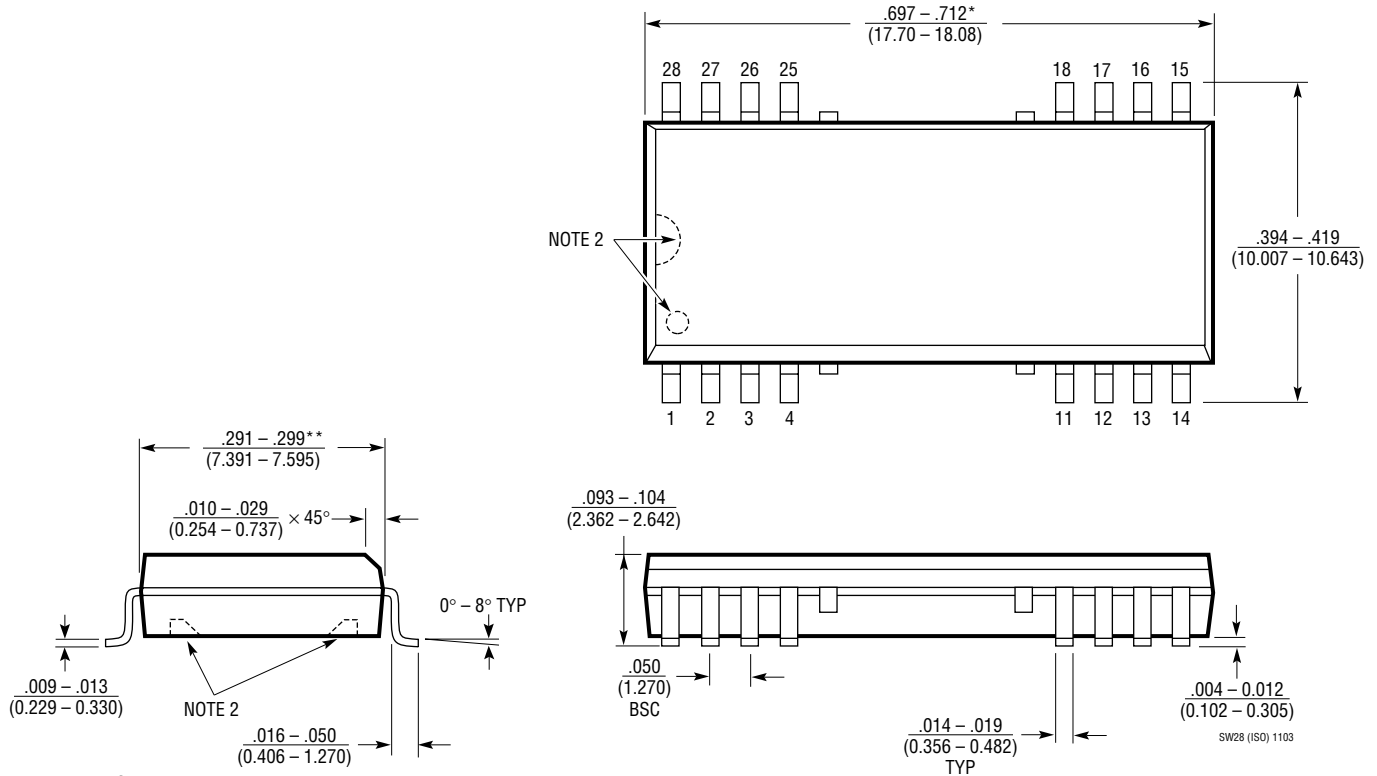
MOLD FLASH OR PROTRUSIONS SHALL NOT EXCEED .006" (0.15mm)



S28 (WIDE) 0502

PACKAGE DIMENSIONS

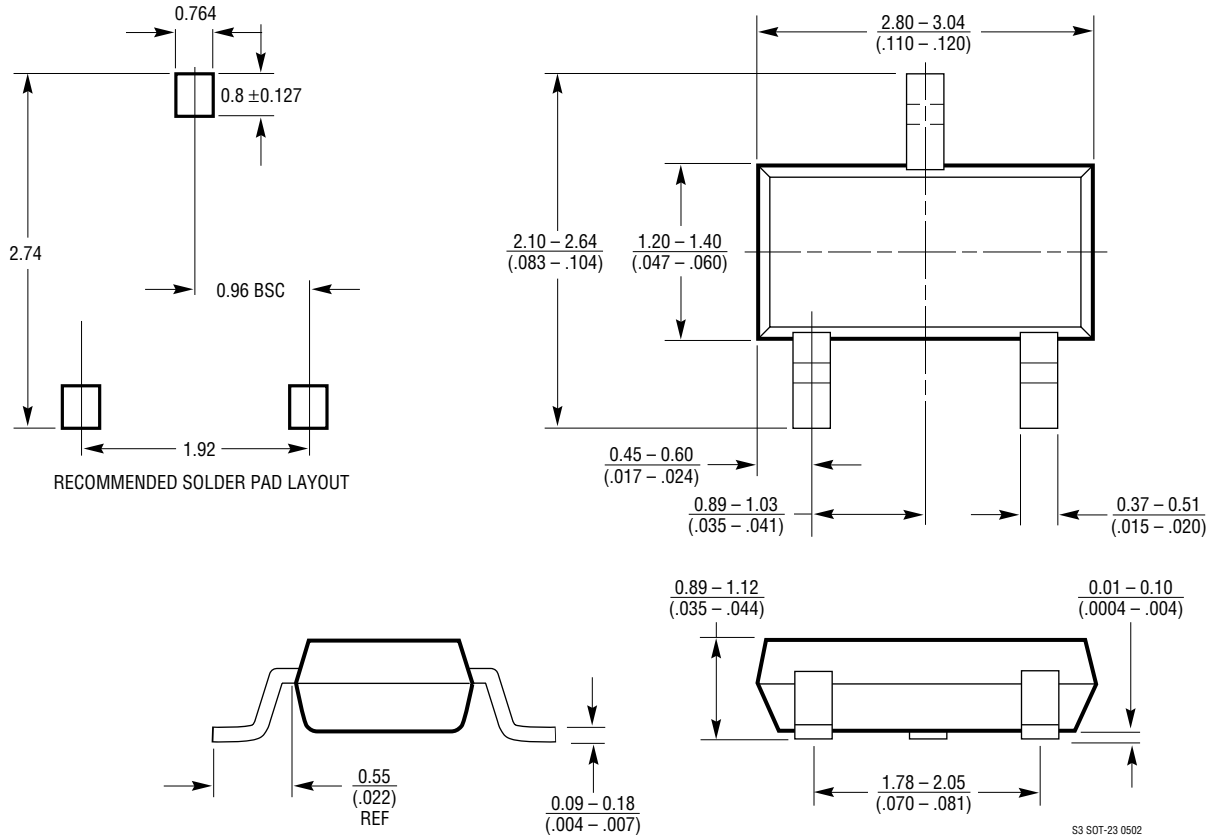
SW Package 28-Lead Plastic Small Outline Isolation Barrier (Wide .300 Inch) (Reference LTC DWG # 05-08-1690)



NOTE:
1. DIMENSIONS IN INCHES (MILLIMETERS)
2. PIN 1 IDENT, NOTCH ON TOP AND CAVITIES ON THE BOTTOM OF PACKAGES ARE THE MANUFACTURING OPTIONS. THE PART MAY BE SUPPLIED WITH OR WITHOUT ANY OF THE OPTIONS.
*DIMENSION DOES NOT INCLUDE MOLD FLASH. MOLD FLASH SHALL NOT EXCEED .006" (0.152mm) PER SIDE
**DIMENSION DOES NOT INCLUDE INTERLEAD FLASH. INTERLEAD FLASH SHALL NOT EXCEED .010" (0.254mm) PER SIDE

PACKAGE DIMENSIONS

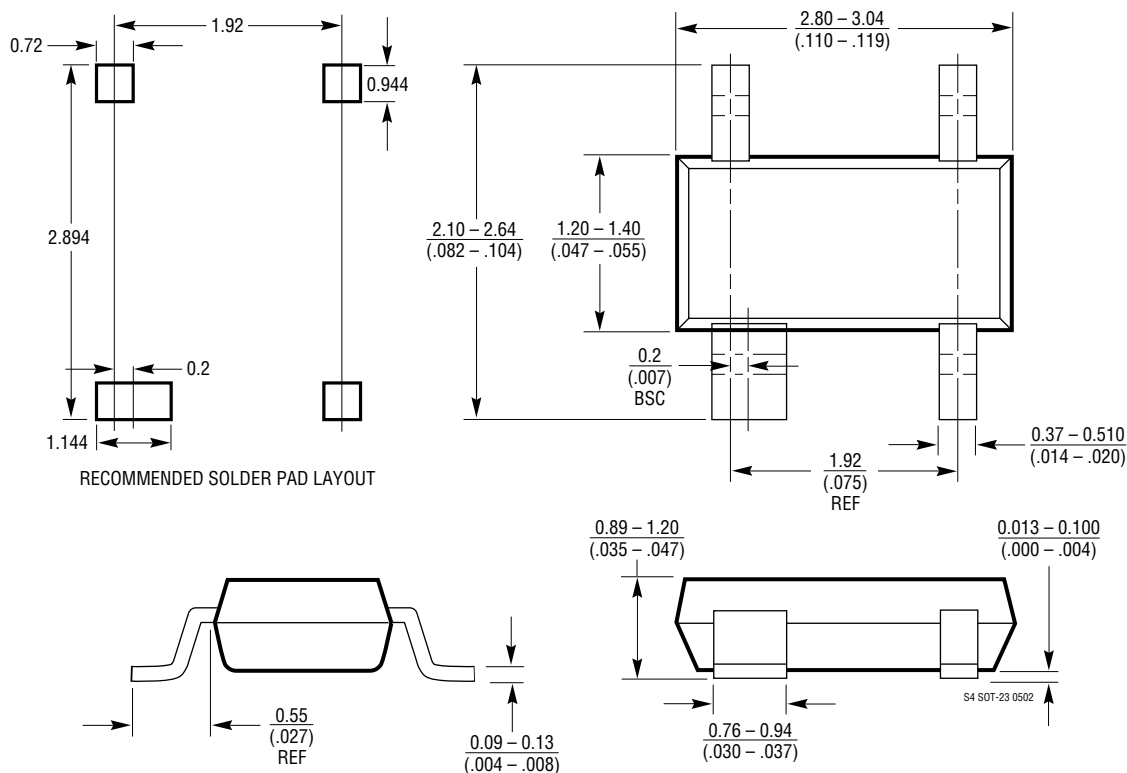
S3 Package 3-Lead Plastic SOT-23 (Reference LTC DWG # 05-08-1631)



- NOTE:
1. CONTROLLING DIMENSION: MILLIMETERS
 2. DIMENSIONS ARE IN $\frac{\text{MILLIMETERS}}{(\text{INCHES})}$
 3. DRAWING NOT TO SCALE
 4. DIMENSIONS ARE INCLUSIVE OF PLATING
 5. DIMENSIONS ARE EXCLUSIVE OF MOLD FLASH AND METAL BURR
 6. MOLD FLASH SHALL NOT EXCEED .254mm
 7. PACKAGE JEDEC REFERENCE IS TO-236 VARIATION AB

PACKAGE DIMENSIONS

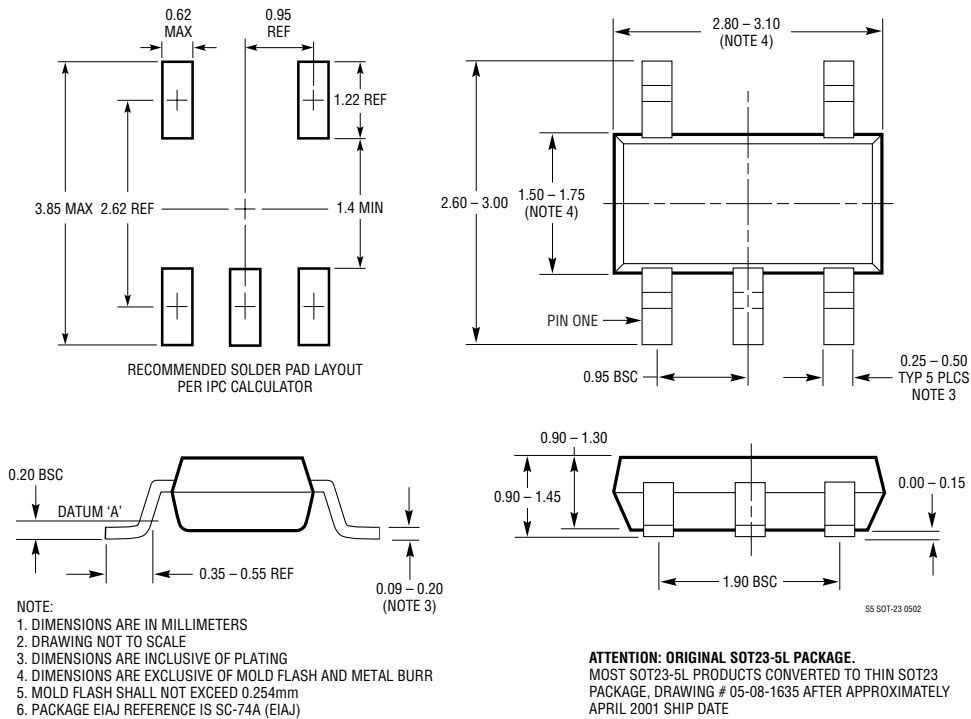
S4 Package 4-Lead Plastic SOT-23 (Reference LTC DWG # 05-08-1632)



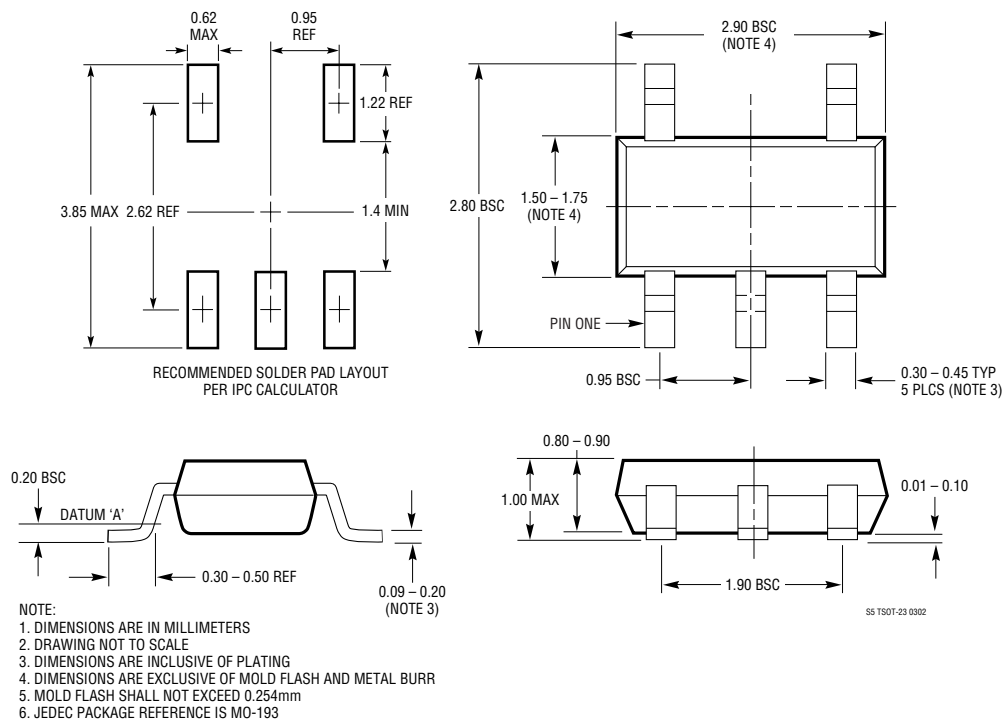
- NOTE:
1. CONTROLLING DIMENSION: MILLIMETERS
 2. DIMENSIONS ARE IN $\frac{\text{MILLIMETERS}}{\text{INCHES}}$
 3. DRAWING NOT TO SCALE
 4. DIMENSIONS ARE INCLUSIVE OF PLATING
 5. DIMENSIONS ARE EXCLUSIVE OF MOLD FLASH AND METAL BURR
 6. MOLD FLASH SHALL NOT EXCEED .254mm
 7. PACKAGE EIAJ REFERENCE IS SC-74A (EIAJ)

PACKAGE DIMENSIONS

S5 Package 5-Lead Plastic SOT-23 (Reference LTC DWG # 05-08-1633)

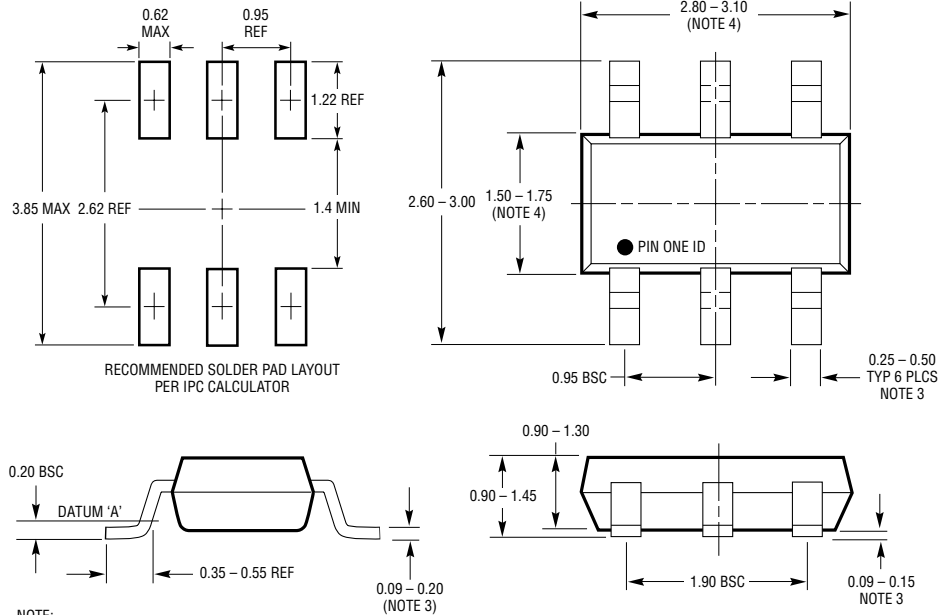


S5 Package 5-Lead Plastic TSOT-23 (Reference LTC DWG # 05-08-1635)

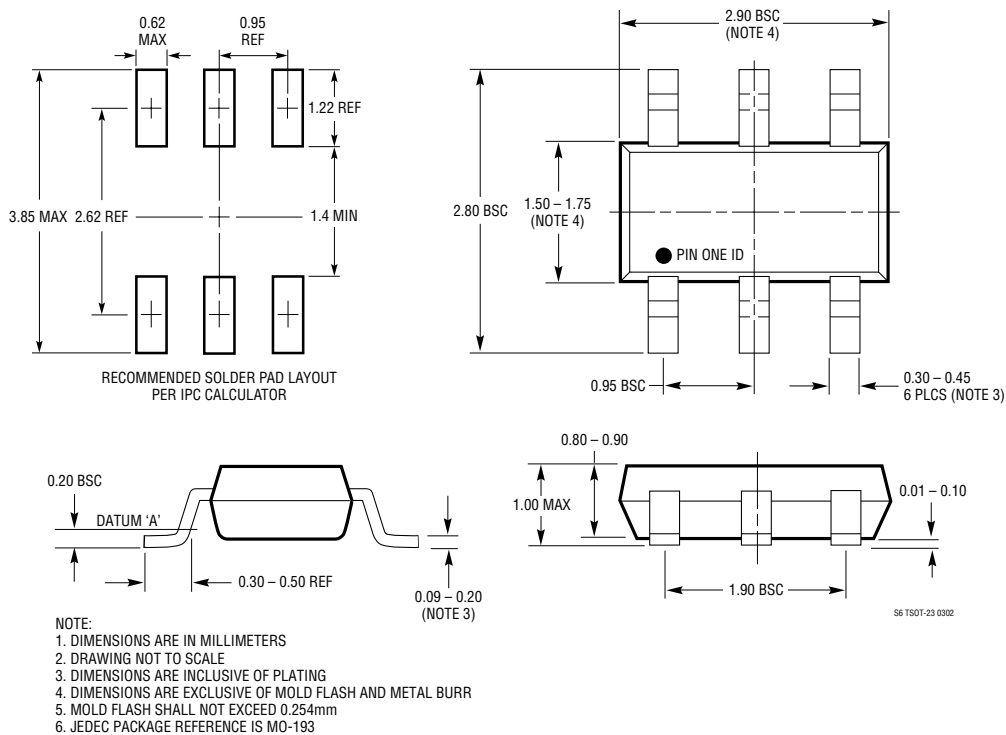


PACKAGE DIMENSIONS

S6 Package 6-Lead Plastic SOT-23 (Reference LTC DWG # 05-08-1634)

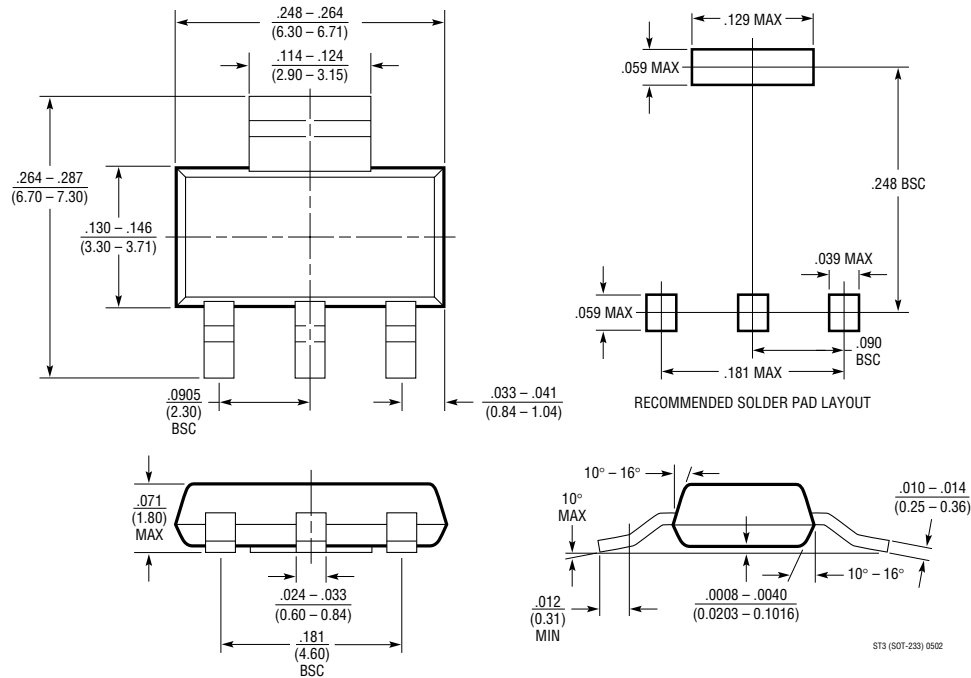


S6 Package 6-Lead Plastic TSOT-23 (Reference LTC DWG # 05-08-1636)

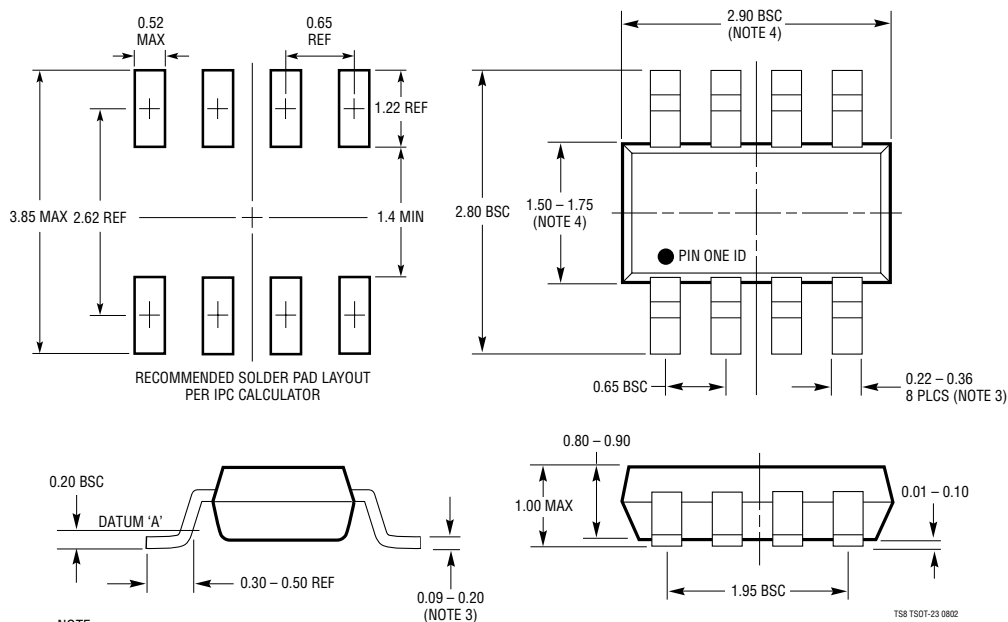


PACKAGE DIMENSIONS

ST Package 3-Lead Plastic SOT-223 (Reference LTC DWG # 05-08-1630)



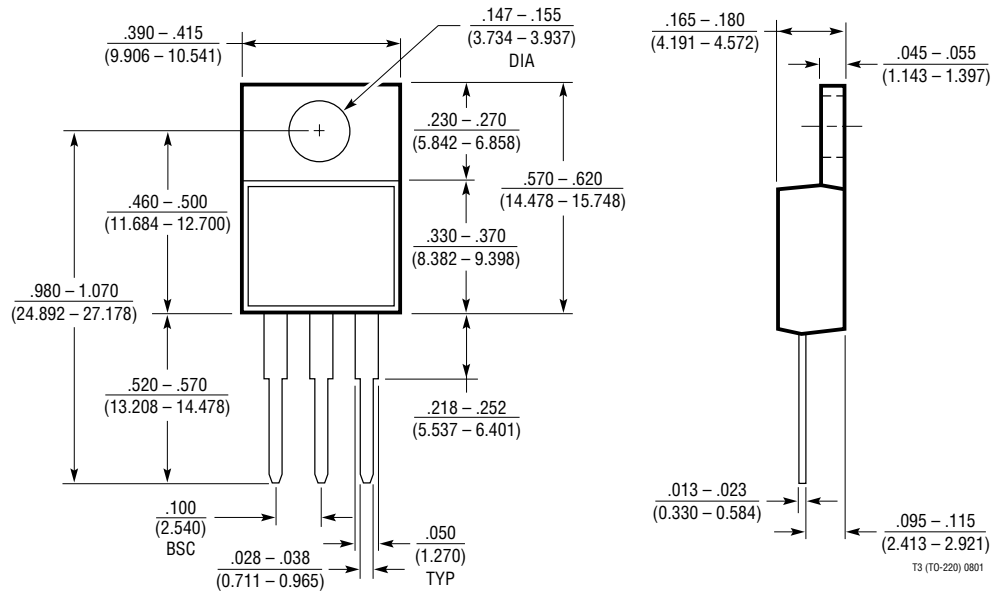
TS8 Package 8-Lead Plastic TSOT-23 (Reference LTC DWG # 05-08-1637)



- NOTE:
1. DIMENSIONS ARE IN MILLIMETERS
 2. DRAWING NOT TO SCALE
 3. DIMENSIONS ARE INCLUSIVE OF PLATING
 4. DIMENSIONS ARE EXCLUSIVE OF MOLD FLASH AND METAL BURR
 5. MOLD FLASH SHALL NOT EXCEED 0.254mm
 6. JEDEC PACKAGE REFERENCE IS MO-193

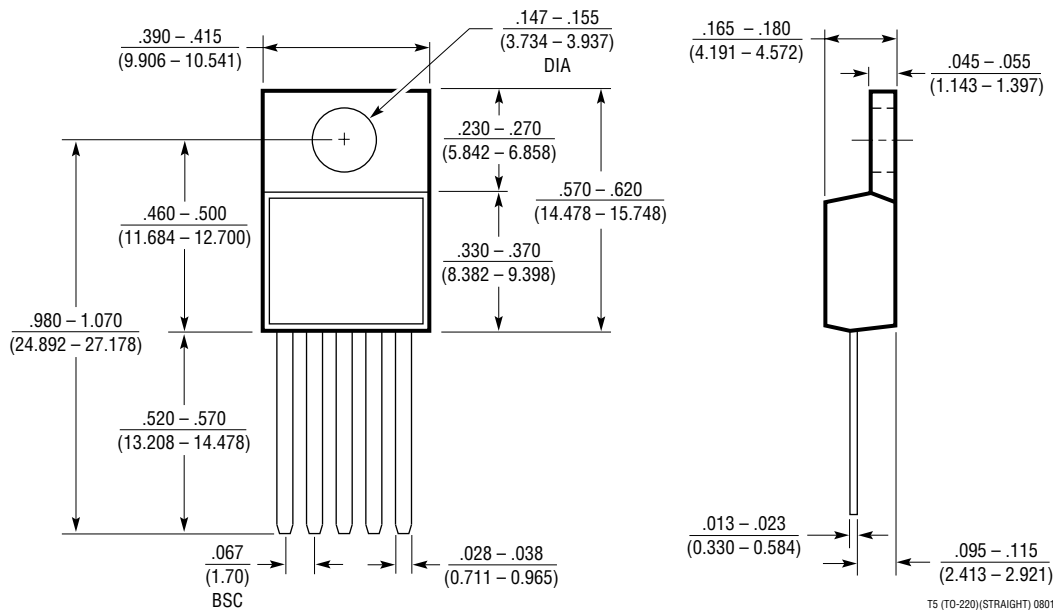
PACKAGE DIMENSIONS

T Package
3-Lead Plastic TO-220
 (Reference LTC DWG # 05-08-1420)



For Lead Bend Options See Page 69 of This Section

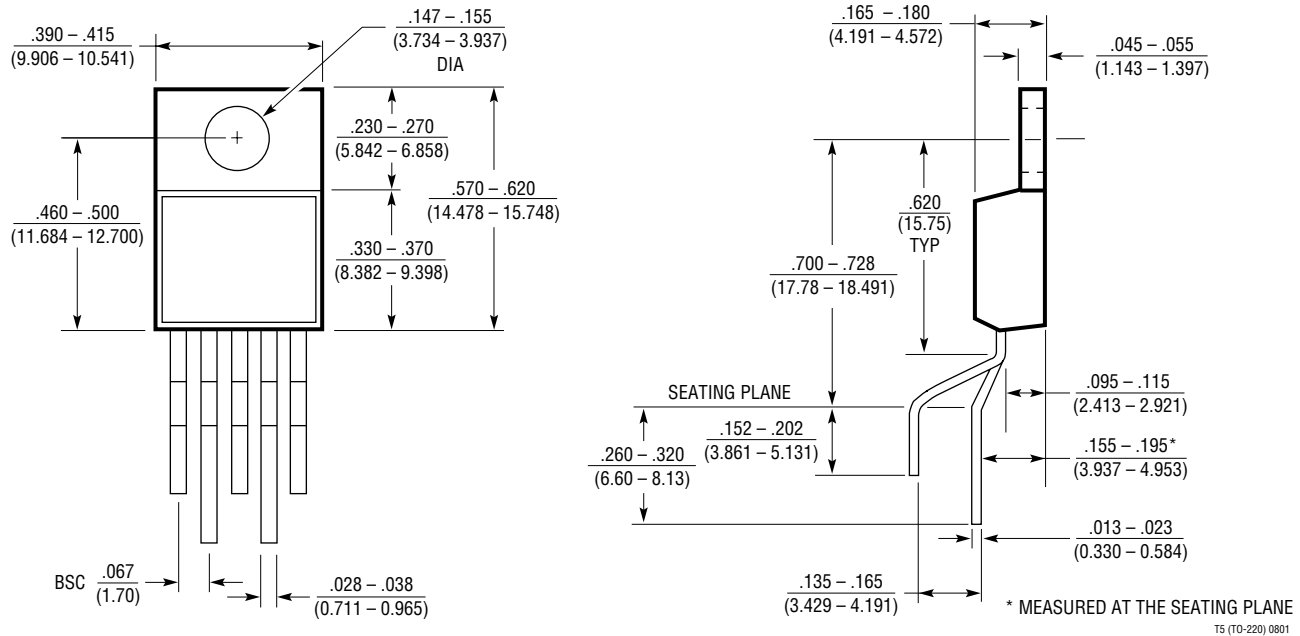
T Package
5-Lead Plastic TO-220 (Straight Lead)
(Nonstandard Flow 06)
 (Reference LTC DWG # 05-08-1421)



For Lead Bend Options See Page 69 of This Section

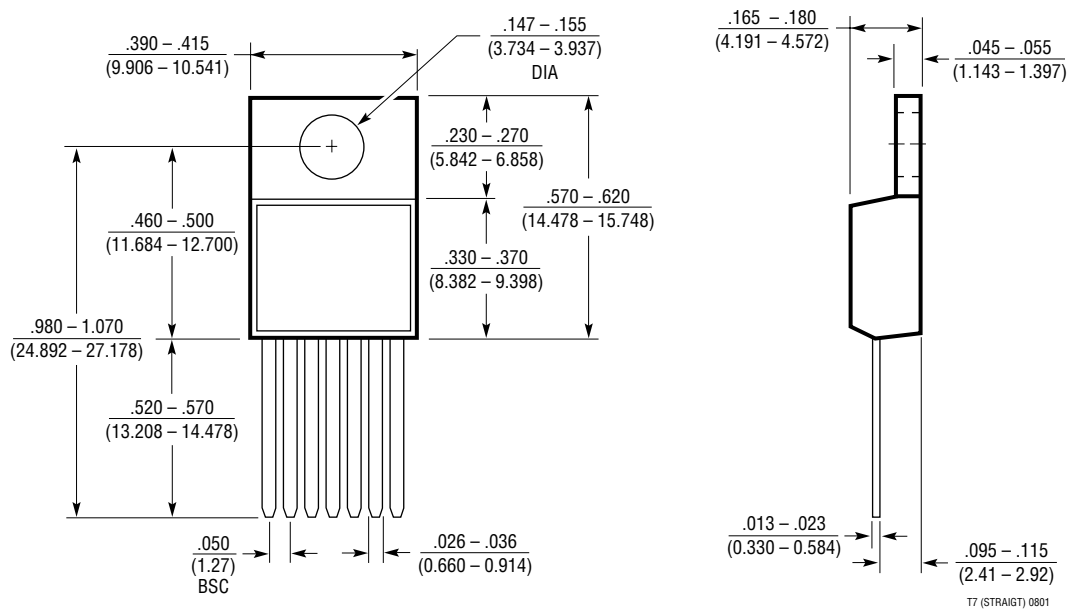
PACKAGE DIMENSIONS

T Package 5-Lead Plastic TO-220 (Standard) (Reference LTC DWG # 05-08-1421)



For Lead Bend Options See Page 69 of This Section

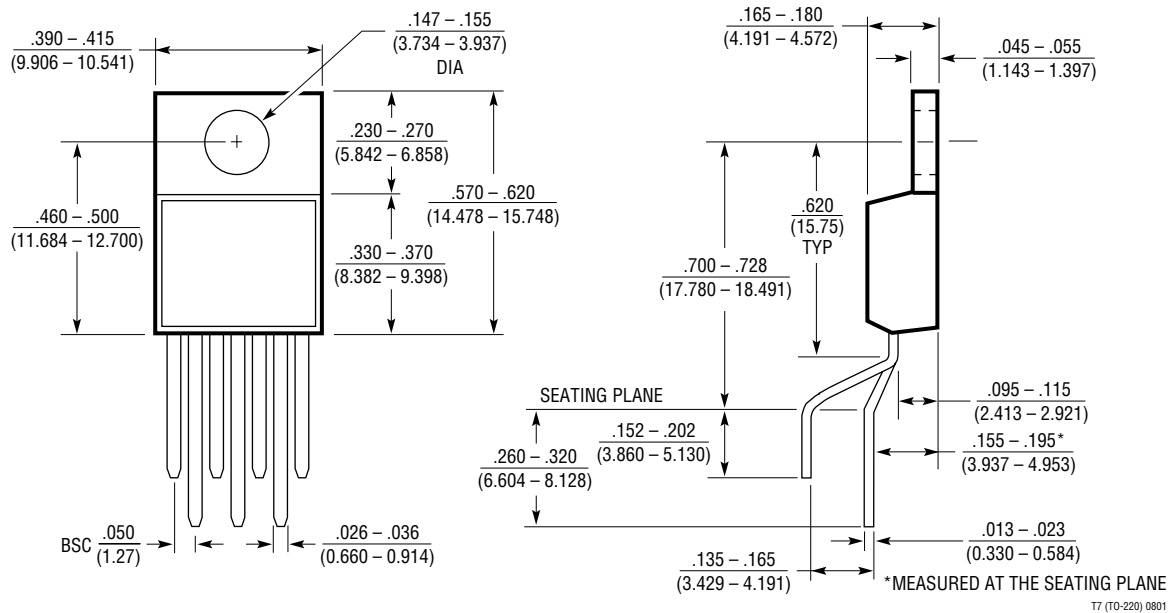
T7 Package 7-Lead Plastic TO-220 (Straight Lead) (Nonstandard Flow 06) (Reference LTC DWG # 05-08-1422)



For Lead Bend Options See Page 69 of This Section

PACKAGE DIMENSIONS

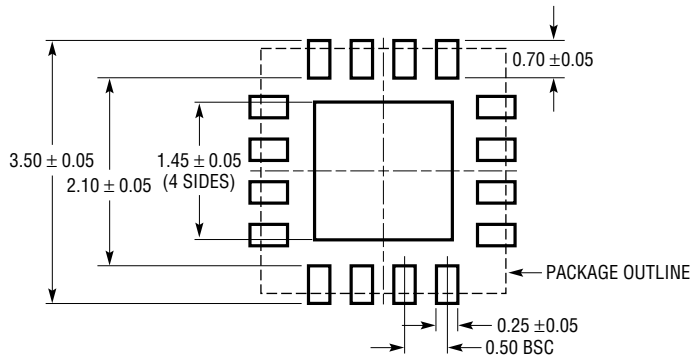
T7 Package 7-Lead Plastic TO-220 (Standard) (Reference LTC DWG # 05-08-1422)



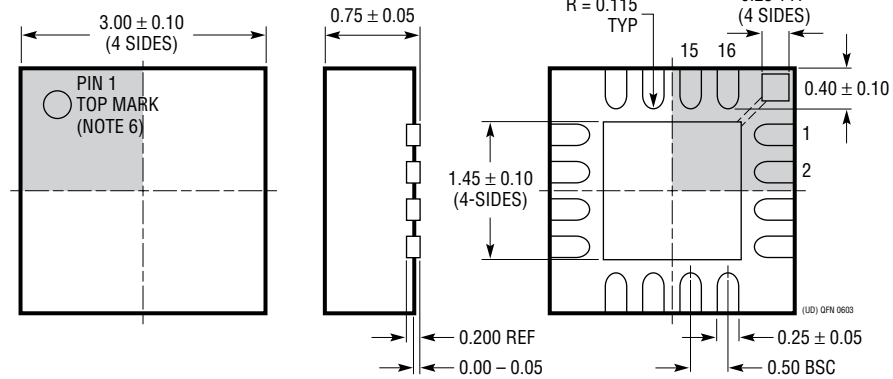
For Lead Bend Options See Page 69 of This Section

PACKAGE DIMENSIONS

UD Package 16-Lead Plastic QFN (3mm × 3mm) (Reference LTC DWG # 05-08-1691)



RECOMMENDED SOLDER PAD PITCH AND DIMENSIONS

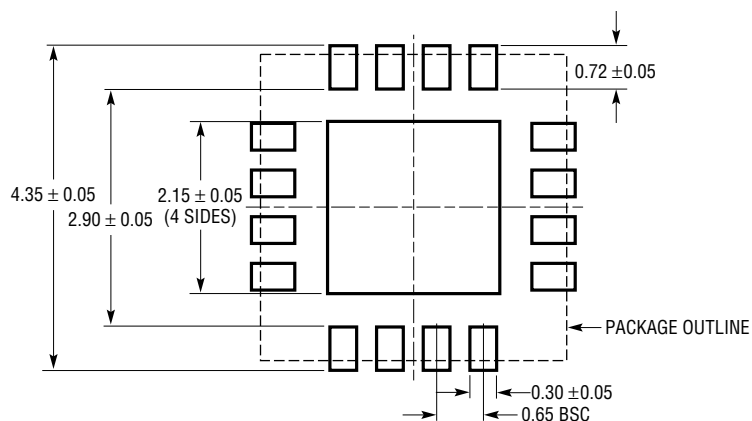


NOTE:

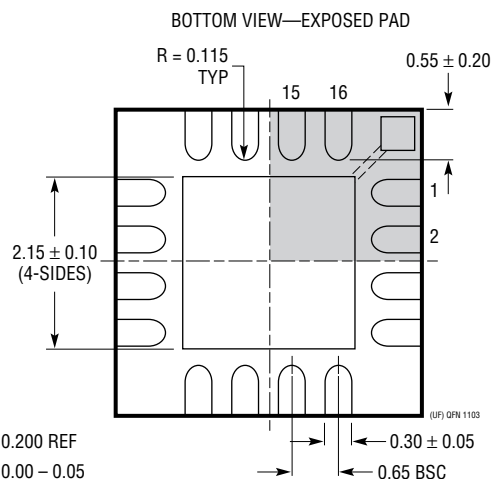
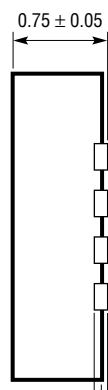
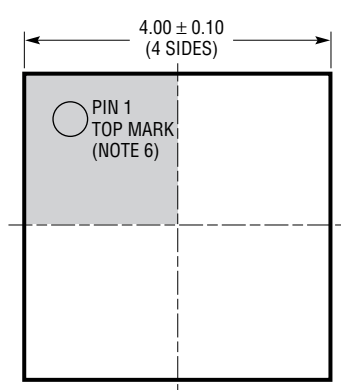
1. DRAWING CONFORMS TO JEDEC PACKAGE OUTLINE MO-220 VARIATION (WEED-2)
2. DRAWING NOT TO SCALE
3. ALL DIMENSIONS ARE IN MILLIMETERS
4. DIMENSIONS OF EXPOSED PAD ON BOTTOM OF PACKAGE DO NOT INCLUDE MOLD FLASH. MOLD FLASH, IF PRESENT, SHALL NOT EXCEED 0.15mm ON ANY SIDE
5. EXPOSED PAD SHALL BE SOLDER PLATED
6. SHADED AREA IS ONLY A REFERENCE FOR PIN 1 LOCATION ON THE TOP AND BOTTOM OF PACKAGE

PACKAGE DIMENSIONS

UF Package 16-Lead Plastic QFN (4mm × 4mm) (Reference LTC DWG # 05-08-1692)



RECOMMENDED SOLDER PAD PITCH AND DIMENSIONS

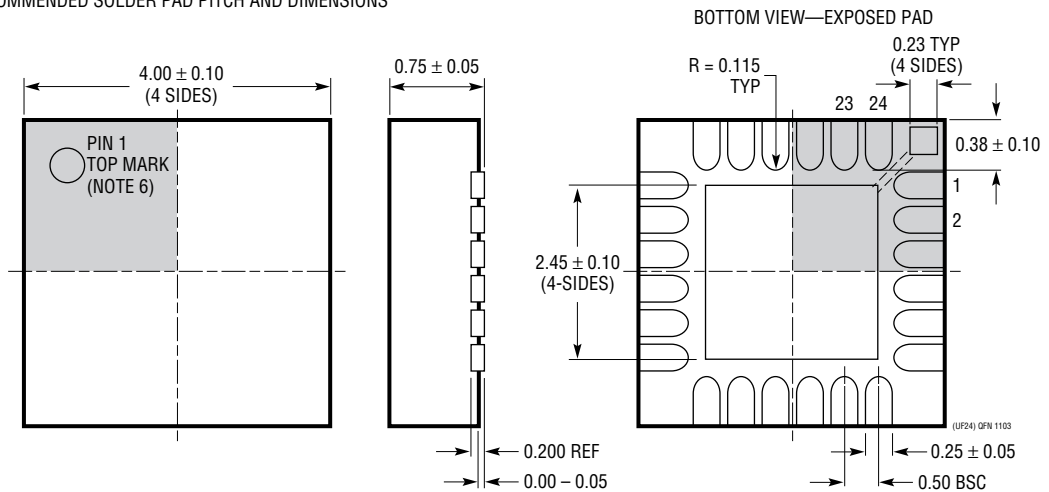
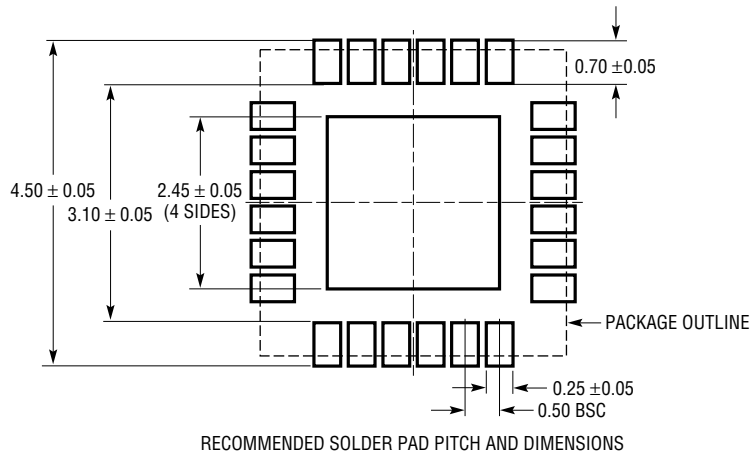


NOTE:

1. DRAWING CONFORMS TO JEDEC PACKAGE OUTLINE MO-220 VARIATION (WG6C)
2. DRAWING NOT TO SCALE
3. ALL DIMENSIONS ARE IN MILLIMETERS
4. DIMENSIONS OF EXPOSED PAD ON BOTTOM OF PACKAGE DO NOT INCLUDE MOLD FLASH. MOLD FLASH, IF PRESENT, SHALL NOT EXCEED 0.15mm ON ANY SIDE
5. EXPOSED PAD SHALL BE SOLDER PLATED
6. SHADED AREA IS ONLY A REFERENCE FOR PIN 1 LOCATION ON THE TOP AND BOTTOM OF PACKAGE

PACKAGE DIMENSIONS

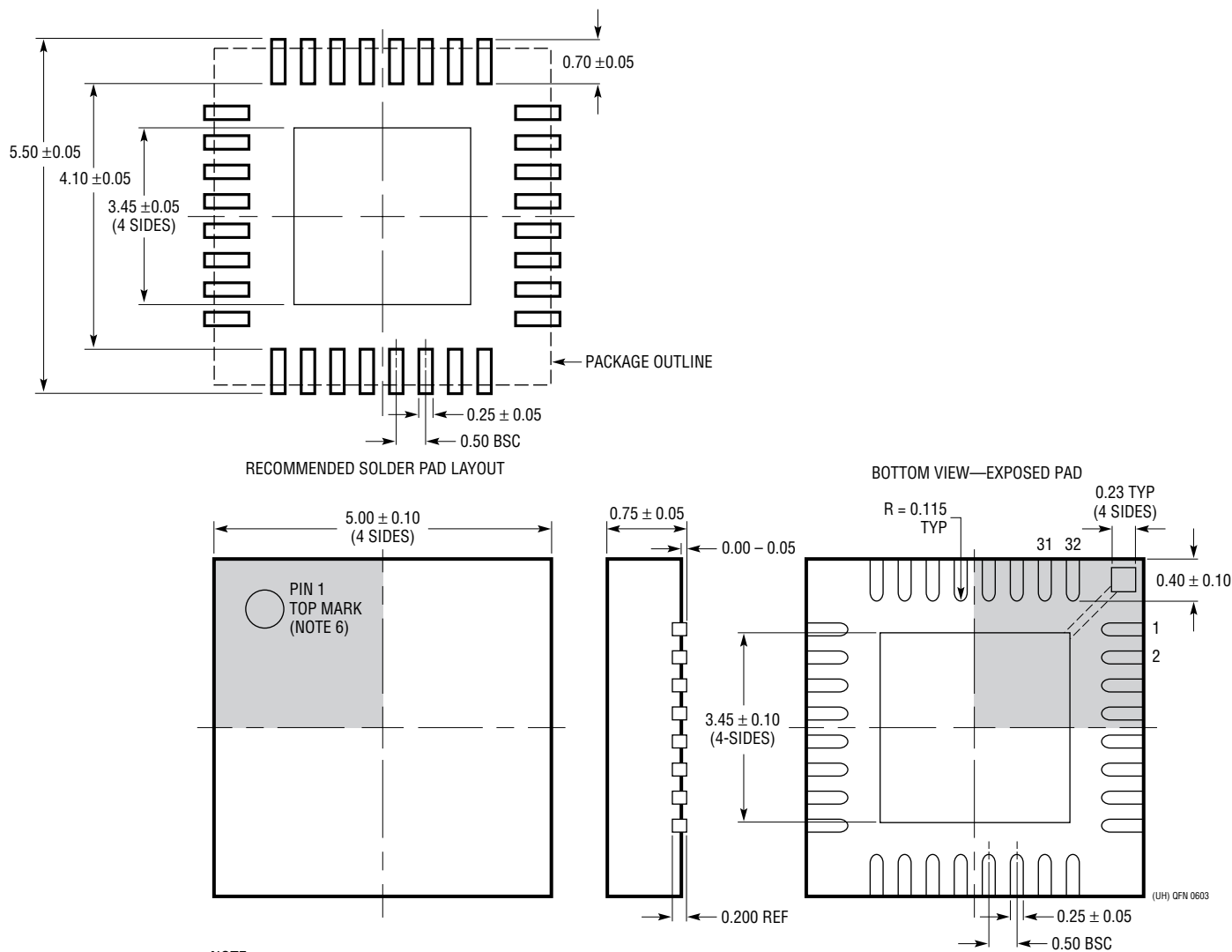
UF Package 24-Lead Plastic QFN (4mm × 4mm) (Reference LTC DWG # 05-08-1697)



NOTE:

1. DRAWING PROPOSED TO BE MADE A JEDEC PACKAGE OUTLINE MO-220 VARIATION (WGGD-X)—TO BE APPROVED
2. DRAWING NOT TO SCALE
3. ALL DIMENSIONS ARE IN MILLIMETERS
4. DIMENSIONS OF EXPOSED PAD ON BOTTOM OF PACKAGE DO NOT INCLUDE MOLD FLASH. MOLD FLASH, IF PRESENT, SHALL NOT EXCEED 0.15mm ON ANY SIDE, IF PRESENT
5. EXPOSED PAD SHALL BE SOLDER PLATED
6. SHADED AREA IS ONLY A REFERENCE FOR PIN 1 LOCATION ON THE TOP AND BOTTOM OF PACKAGE

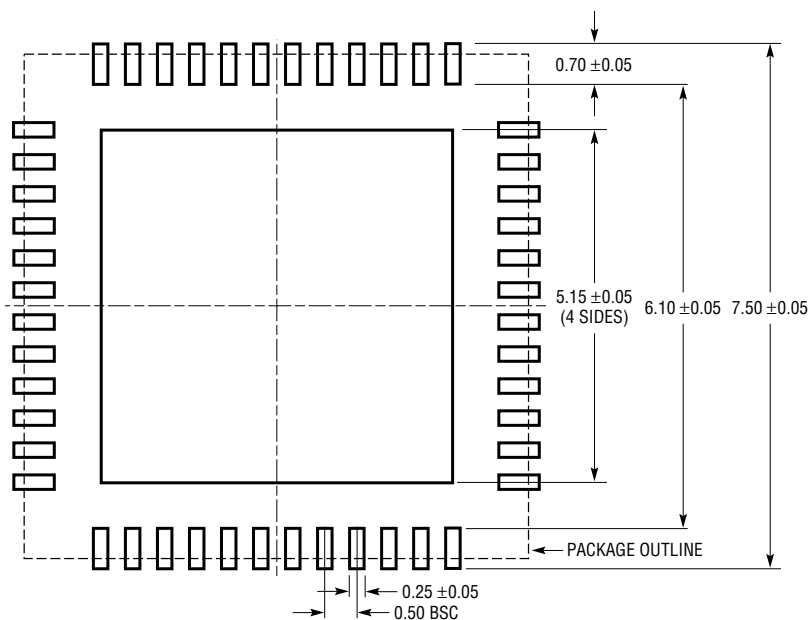
UH Package
32-Lead Plastic QFN (5mm × 5mm)
 (Reference LTC DWG # 05-08-1693)



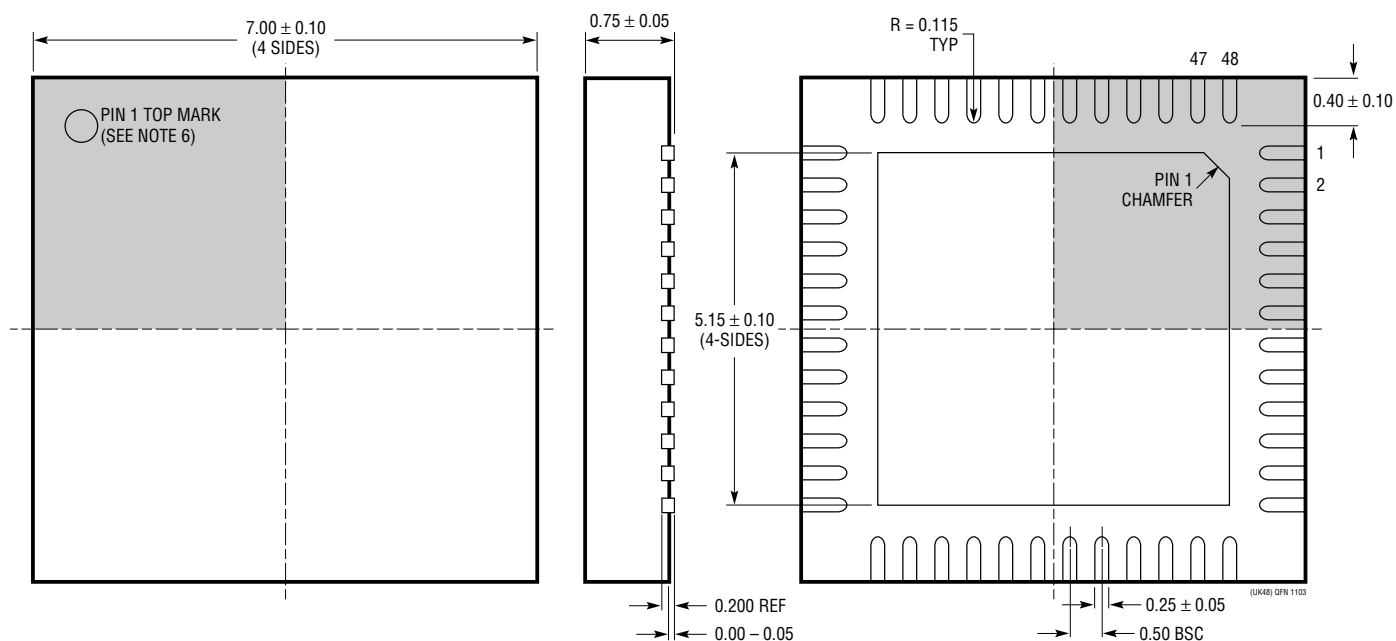
NOTE:

1. DRAWING PROPOSED TO BE A JEDEC PACKAGE OUTLINE
MO-220 VARIATION WHHD-(X) (TO BE APPROVED)
2. DRAWING NOT TO SCALE
3. ALL DIMENSIONS ARE IN MILLIMETERS
4. DIMENSIONS OF EXPOSED PAD ON BOTTOM OF PACKAGE DO NOT INCLUDE
MOLD FLASH. MOLD FLASH, IF PRESENT, SHALL NOT EXCEED 0.20mm ON ANY SIDE
5. EXPOSED PAD SHALL BE SOLDER PLATED
6. SHADED AREA IS ONLY A REFERENCE FOR PIN 1 LOCATION
ON THE TOP AND BOTTOM OF PACKAGE

UK Package
48-Lead Plastic QFN (7mm × 7mm)
 (Reference LTC DWG # 05-08-1704)



RECOMMENDED SOLDER PAD PITCH AND DIMENSIONS



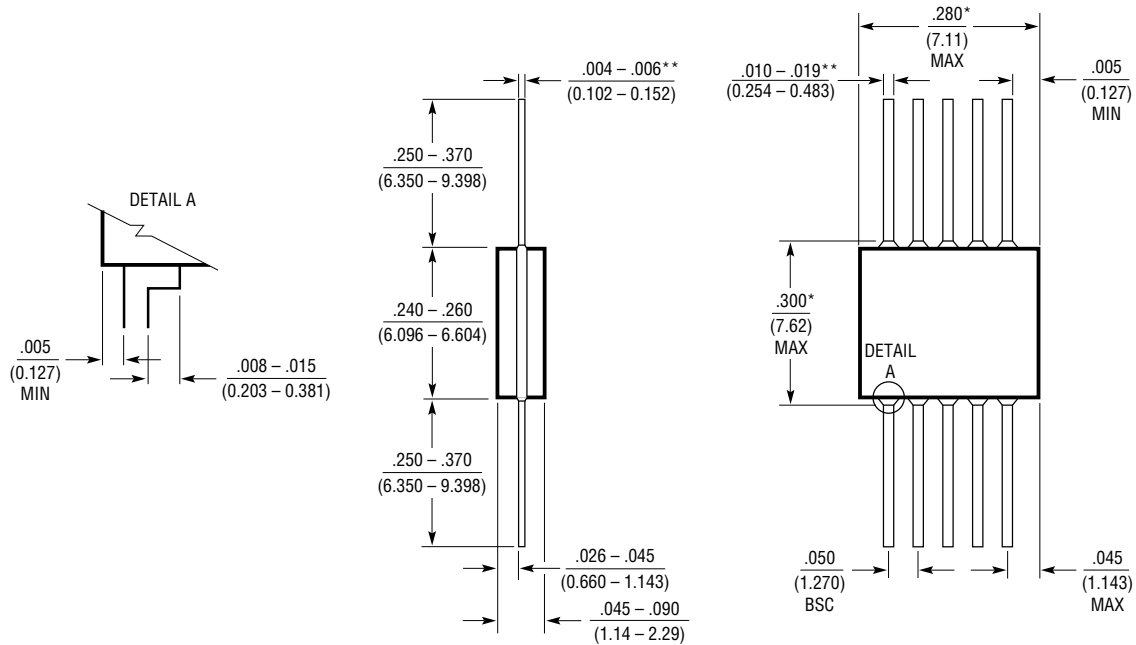
NOTE:

1. DRAWING CONFORMS TO JEDEC PACKAGE OUTLINE MO-220 VARIATION (WKKD-2)
2. DRAWING NOT TO SCALE
3. ALL DIMENSIONS ARE IN MILLIMETERS
4. DIMENSIONS OF EXPOSED PAD ON BOTTOM OF PACKAGE DO NOT INCLUDE
MOLD FLASH. MOLD FLASH, IF PRESENT, SHALL NOT EXCEED 0.20mm ON ANY SIDE. IF PRESENT
5. EXPOSED PAD SHALL BE SOLDER PLATED
6. SHADED AREA IS ONLY A REFERENCE FOR PIN 1 LOCATION ON THE TOP AND BOTTOM OF PACKAGE

BOTTOM VIEW—EXPOSED PAD

PACKAGE DIMENSIONS

W Package 10-Lead Flatpak Glass Sealed (Hermetic) (Reference LTC DWG # 05-08-1130)



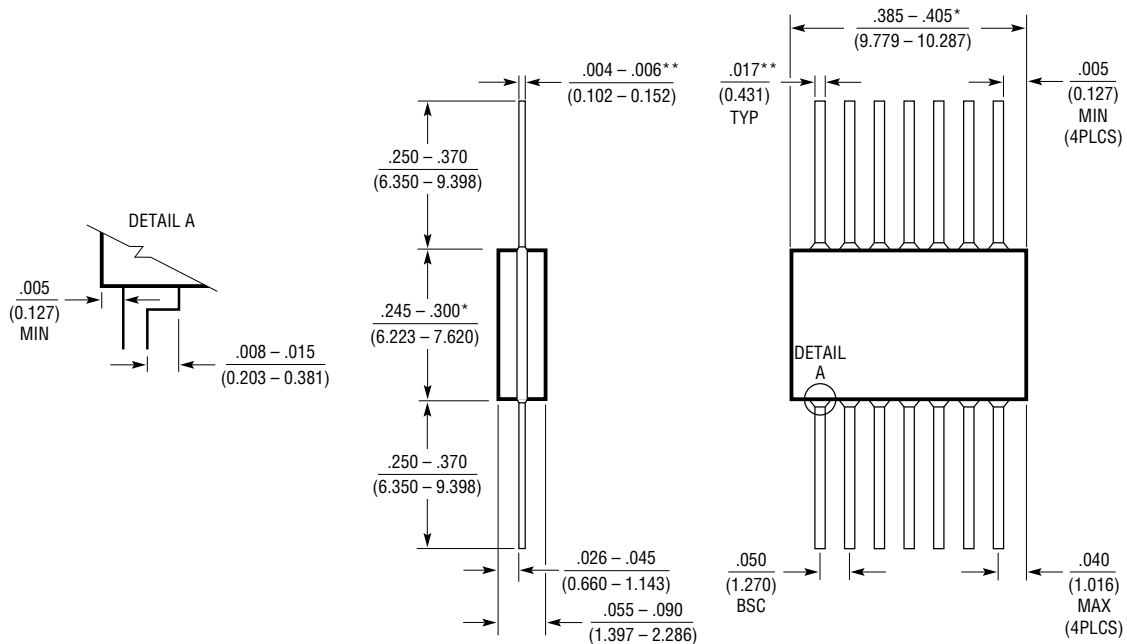
NOTES:

*THIS DIMENSION ALLOWS FOR OFF-CENTER LID, MENISCUS AND GLASS OVERRUN

**INCREASE DIMENSIONS BY 0.003 INCHES (0.076 mm) WHEN LEAD FINISH A IS APPLIED (SOLDER DIPPED)

W10 (GLASS) 0603

W Package 14-Lead Flatpak Glass Sealed (Hermetic) (Reference LTC DWG # 05-08-1140)



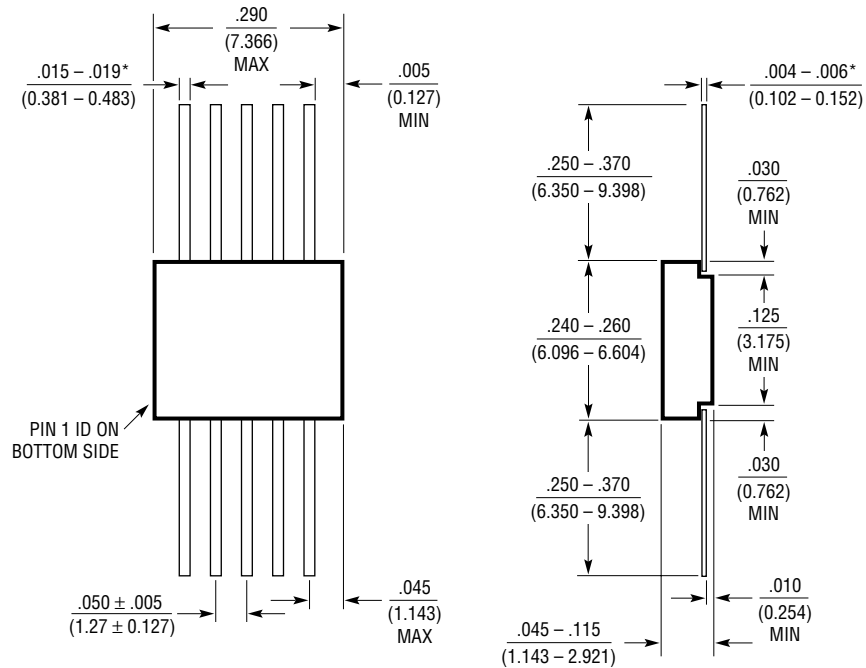
NOTES:

*THIS DIMENSION ALLOWS FOR OFF-CENTER LID, MENISCUS AND GLASS OVERRUN

**INCREASE DIMENSIONS BY 0.003 INCHES (0.076 mm) WHEN LEAD FINISH A IS APPLIED (SOLDER DIPPED)

W14 (GLASS) 0801

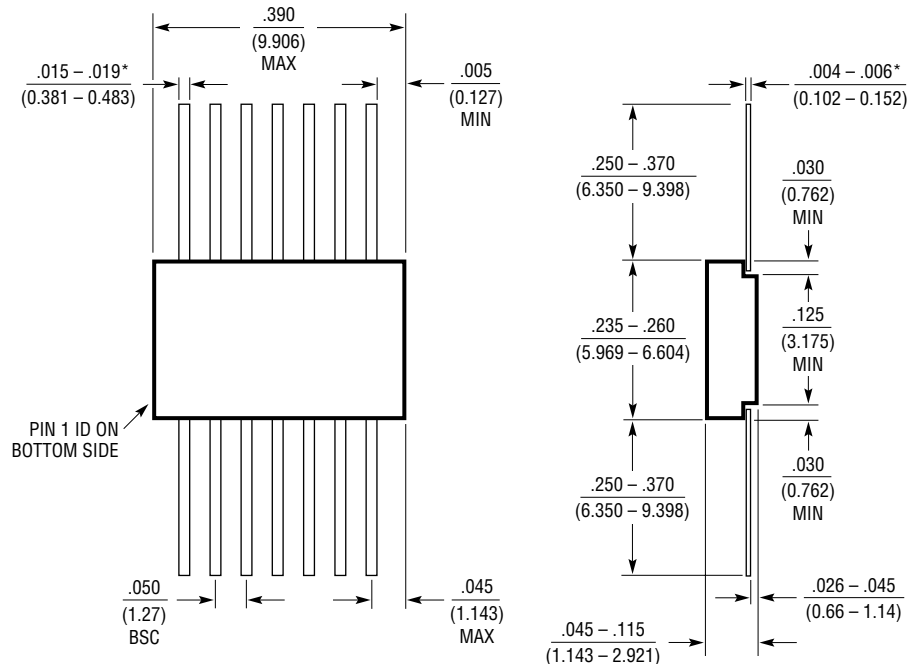
WB Package
10-Lead Flatpak Metal Sealed Bottom Brazed (Hermetic)
 (Reference LTC DWG # 05-08-1230)



*INCREASE DIMENSIONS BY .003 INCHES (0.076mm) WHEN LEAD FINISH A IS APPLIED (SOLDER DIPPED)

W10 (METAL) 0801

WB Package
14-Lead Flatpak Metal Sealed Bottom Brazed (Hermetic)
 (Reference LTC DWG # 05-08-1240)

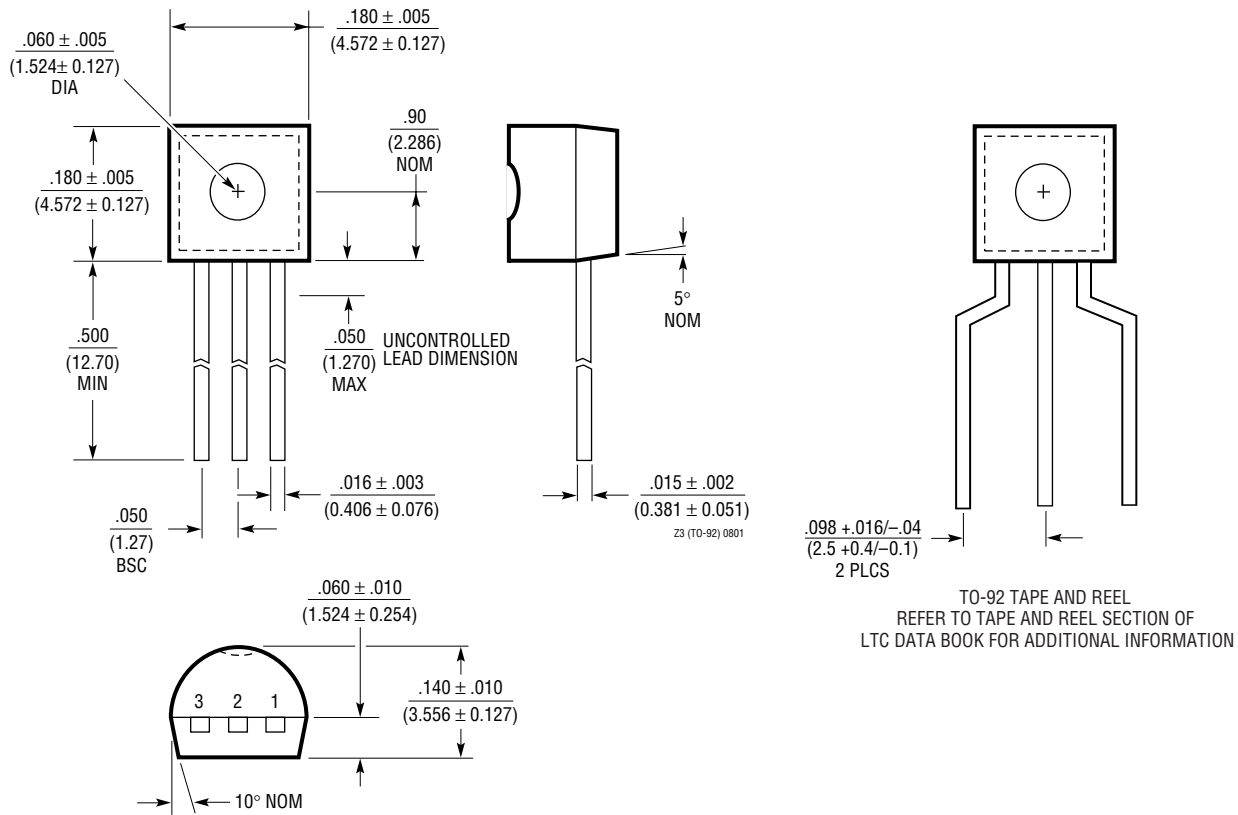


*INCREASE DIMENSIONS BY .003 INCHES (0.076mm) WHEN LEAD FINISH A IS APPLIED (SOLDER DIPPED)

W14 (METAL) 0801

PACKAGE DIMENSIONS

Z Package 3-Lead Plastic TO-92 (Similar to TO-226) (Reference LTC DWG # 05-08-1410)



Introduction

On the following pages are a variety of lead bend options available for TO-220 packages from Linear Technology Corporation. The special adders, flows, and minimums that have been established for these lead bend options are:

It is important to remember orders for these nonstandard flows require a minimum 90-day notification for cancellation or rescheduling. Also note that special flow orders for U.S. distribution must be approved in advance.

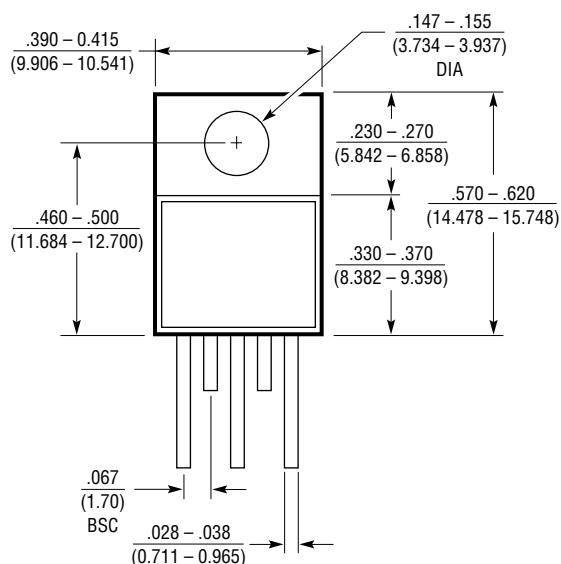
Flows 30 to 44 Special Lead Bends for TO-220

(Minimum Order: 1,000 units)

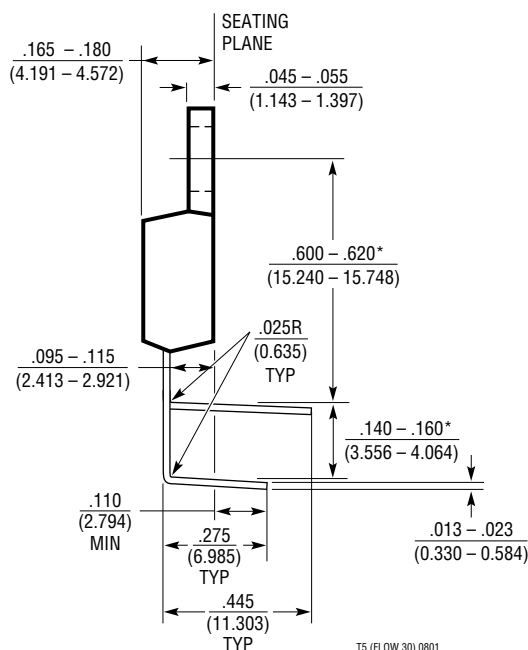
1,000 to 4,999 units	Special lead bends subject to additional charges and order conditions. Contact LTC, Sales/Marketing for more information.
5,000 to 9,999 units	
10,000 to 24,999 units	
> 25,000 units	

TO-220 5-Lead Package Outline (Flow 30)

(Reference LTC DWG # 05-08-1490)



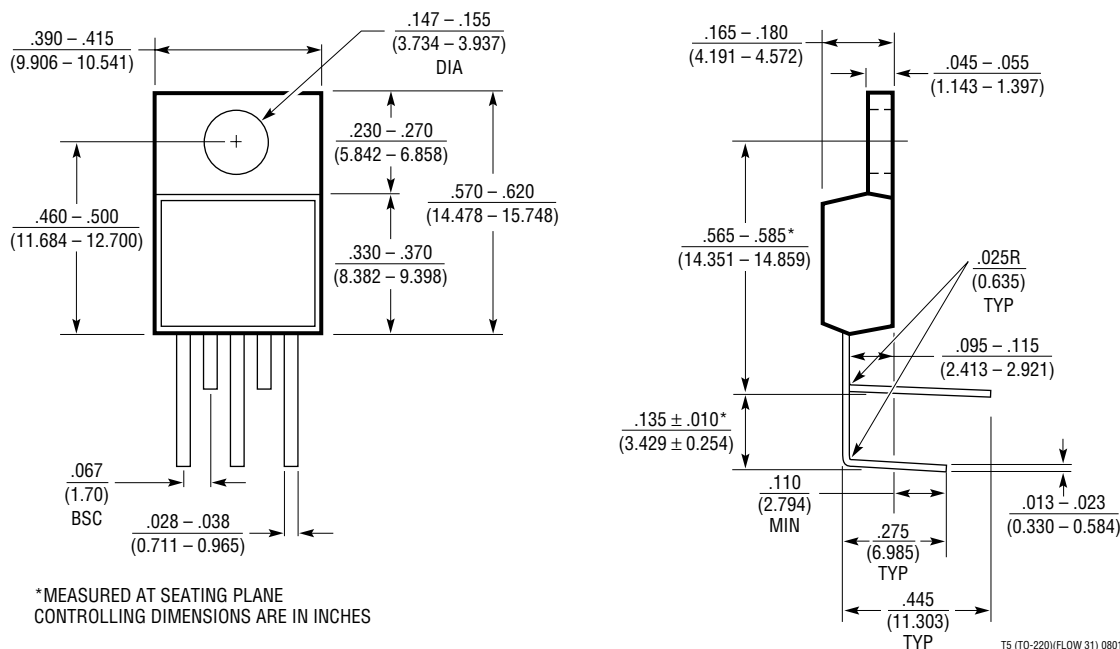
*MEASURED AT SEATING PLANE
 CONTROLLING DIMENSIONS ARE IN INCHES



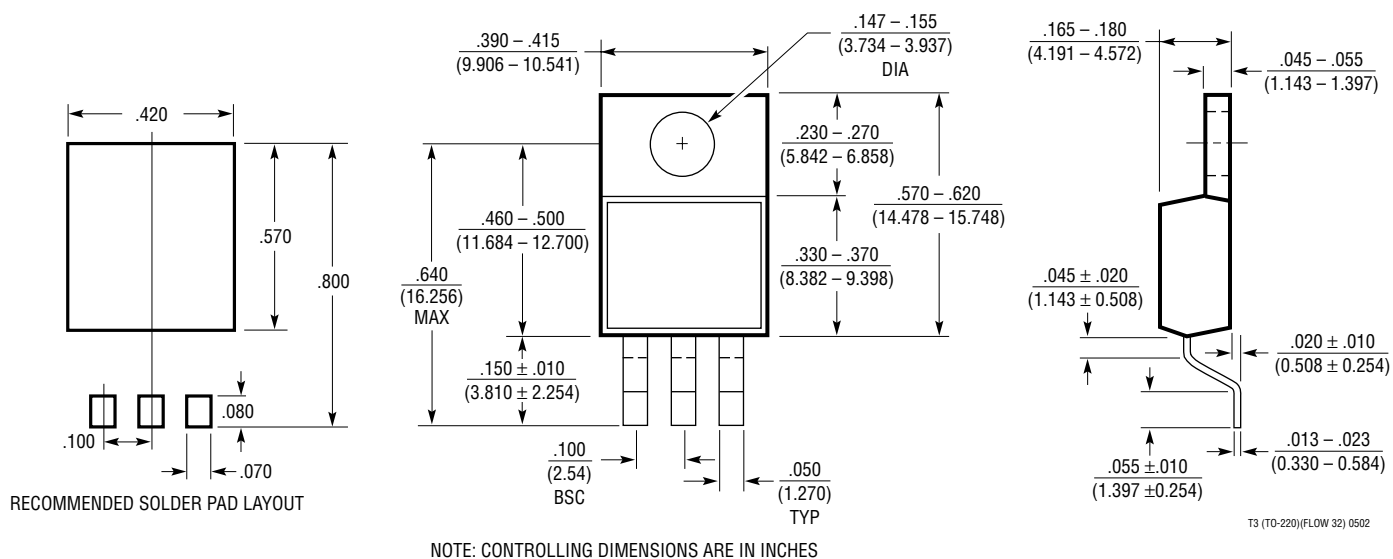
T5 (FLOW 30) 0801

TO-220 LEAD BEND OPTIONS

TO-220 5-Lead Package Outline (Flow 31)
(Reference LTC DWG # 05-08-1491)

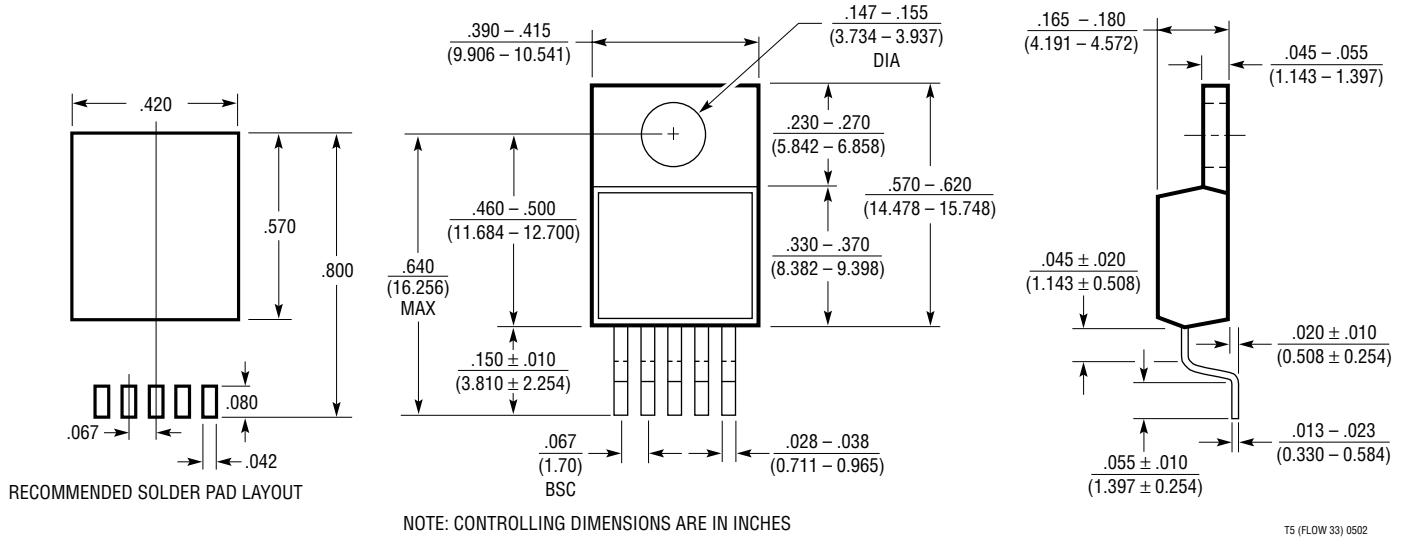


TO-220 3-Lead Package Outline (Flow 32)
(Reference LTC DWG # 05-08-1492)

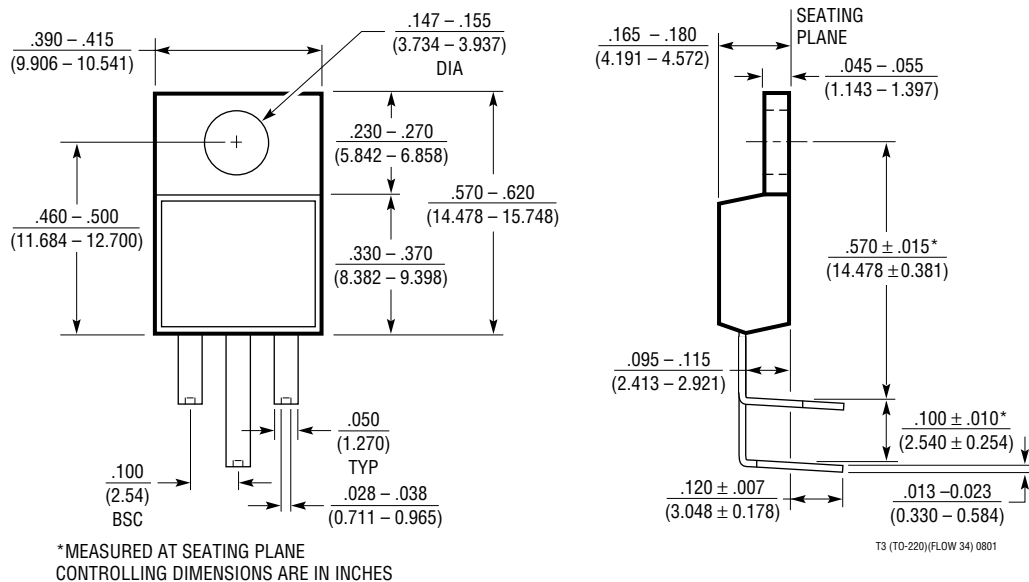


TO-220 LEAD BEND OPTIONS

TO-220 5-Lead Package Outline (Flow 33) (Reference LTC DWG # 05-08-1493)



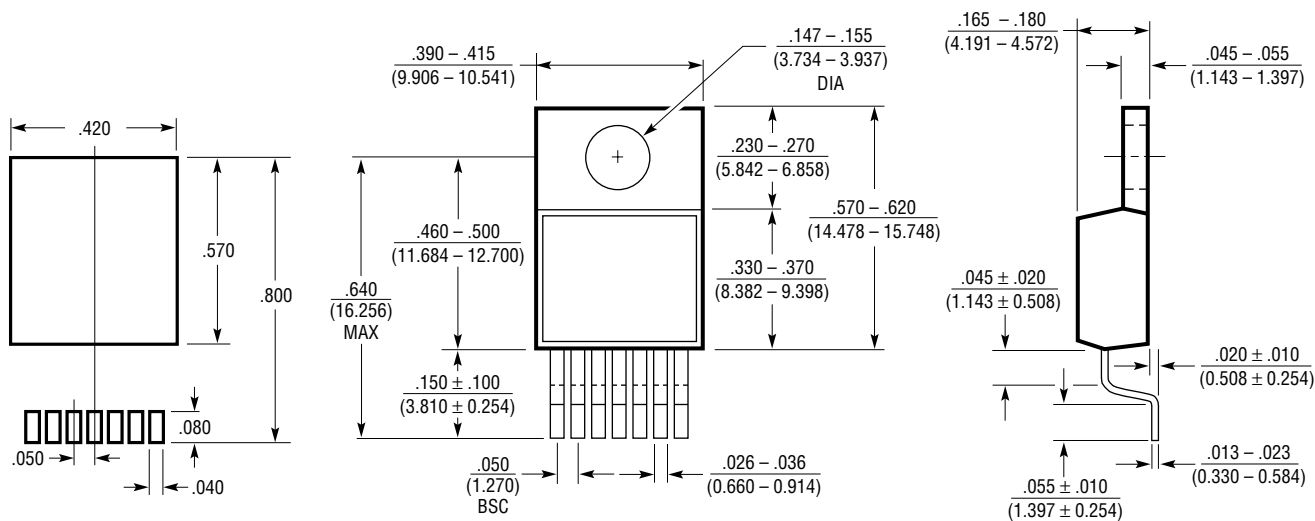
TO-220 3-Lead Package Outline (Flow 34) (Reference LTC DWG # 05-08-1494)



TO-220 LEAD BEND OPTIONS

TO-220 7-Lead Package Outline (Flow 35)

(Reference LTC DWG # 05-08-1495)

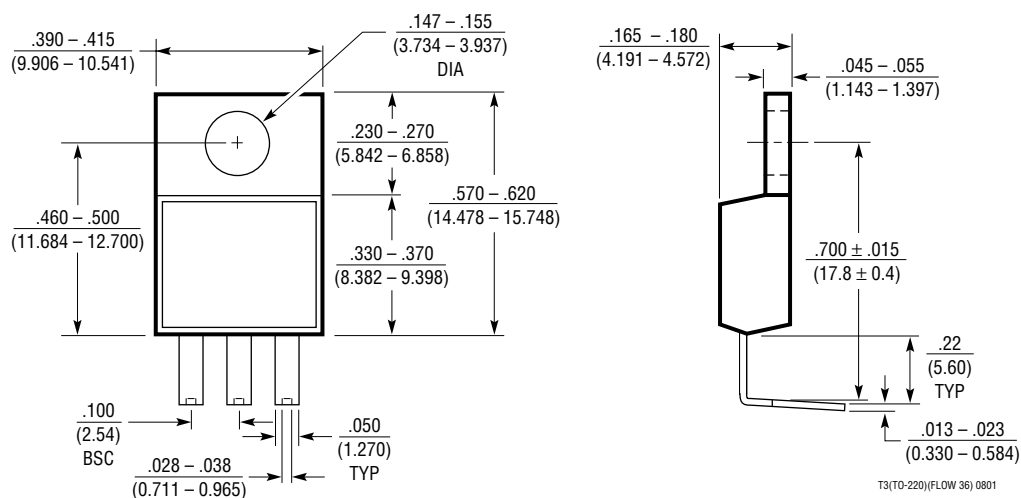


NOTE: CONTROLLING DIMENSIONS ARE IN INCHES

T7 (TO-220)(FLOW 35) 0502

TO-220 3-Lead Package Outline (Flow 36)

(Reference LTC DWG # 05-08-1496)

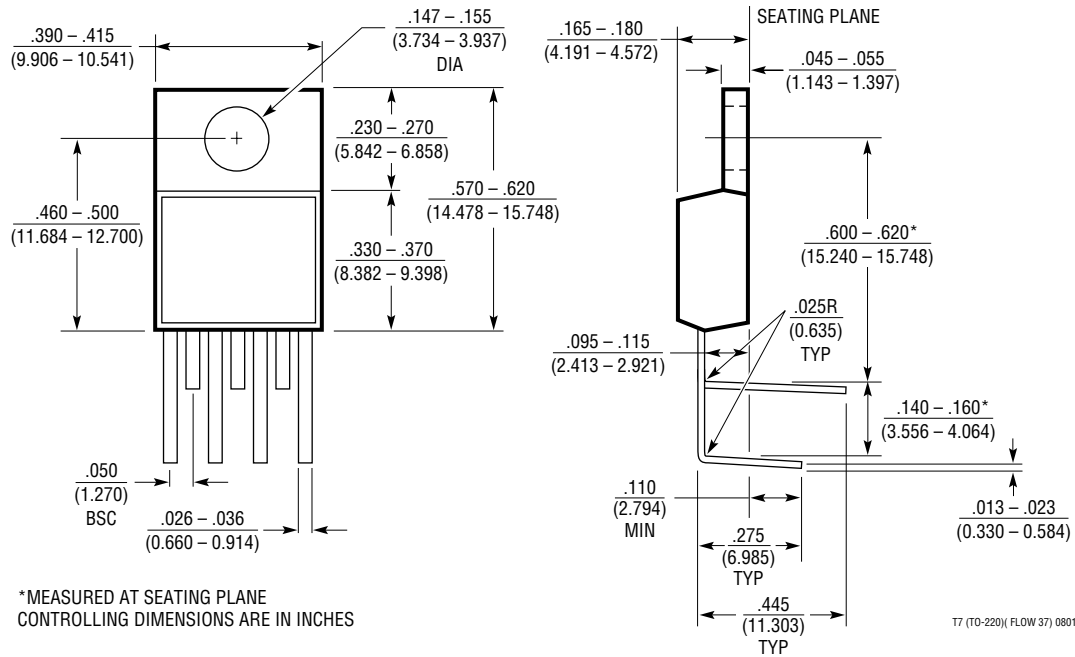


NOTE: CONTROLLING DIMENSIONS ARE IN INCHES

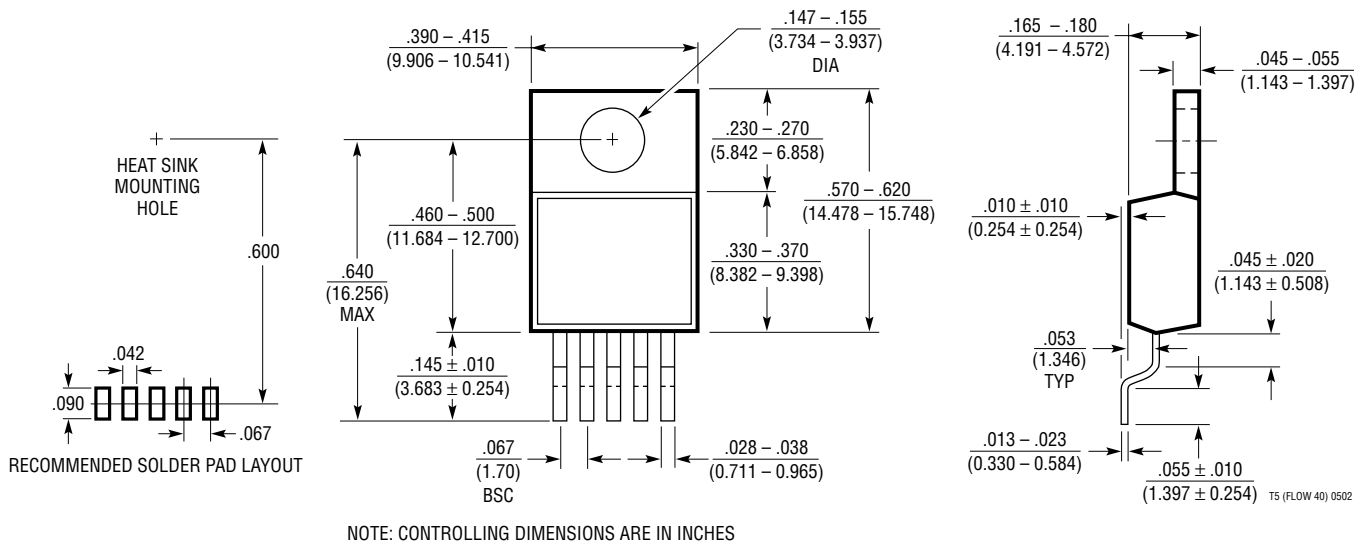
T3(TO-220)(FLOW 36) 0801

TO-220 LEAD BEND OPTIONS

TO-220 7-Lead Package Outline (Flow 37)
(Reference LTC DWG # 05-08-1497)



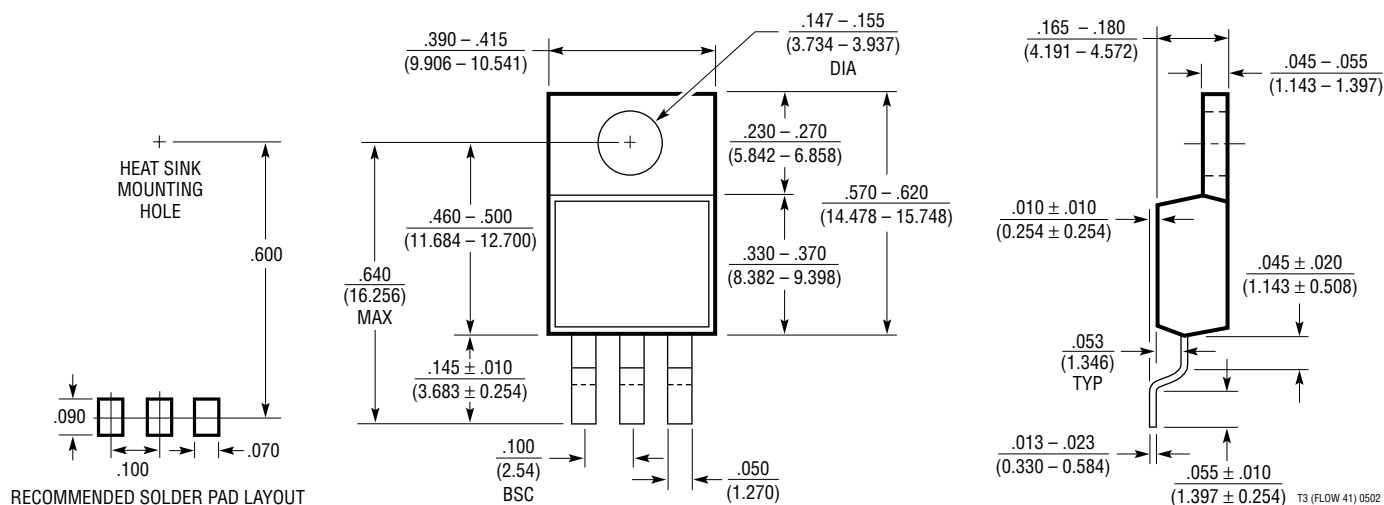
TO-220 5-Lead Package Outline (Flow 40)
(Reference LTC DWG # 05-08-1480)



TO-220 LEAD BEND OPTIONS

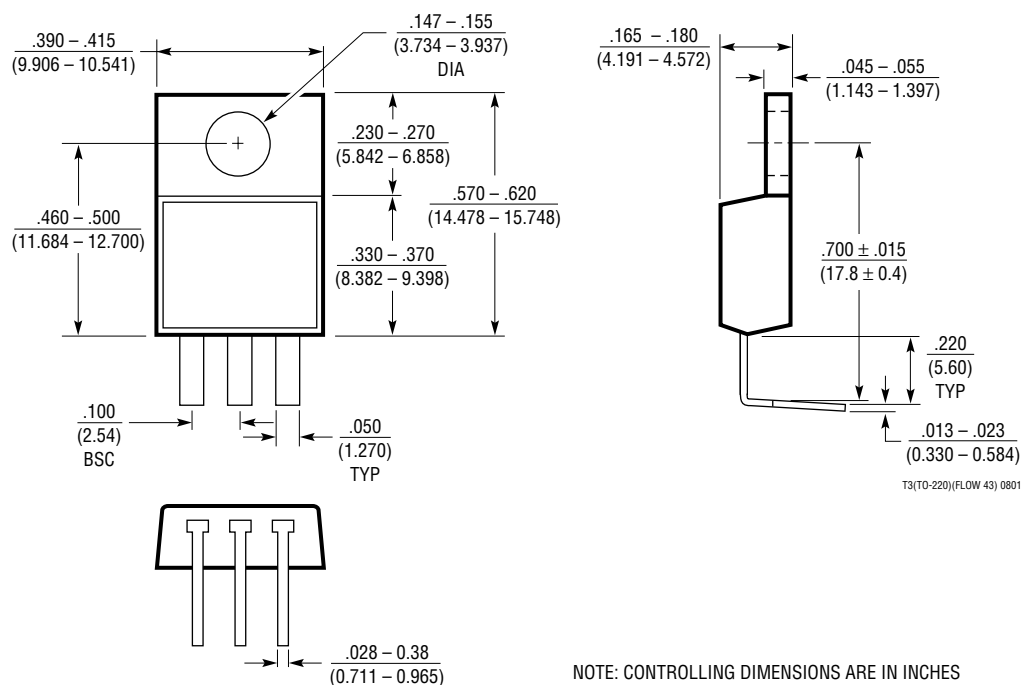
TO-220 3-Lead Package Outline (Flow 41)

(Reference LTC DWG # 05-08-1481)



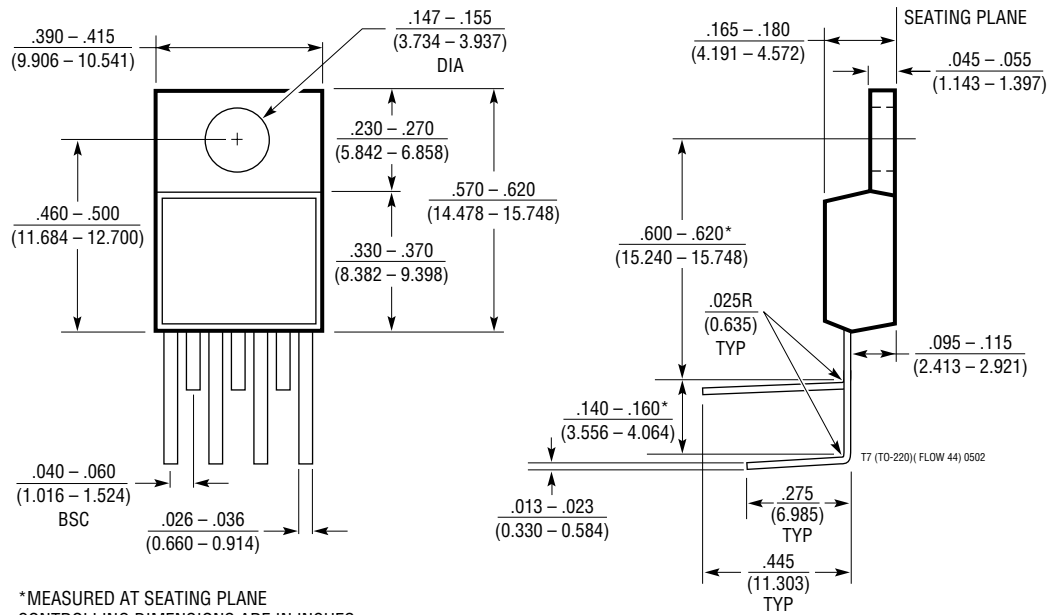
TO-220 3-Lead Package Outline (Flow 43)

(Reference LTC DWG # 05-08-1483)



TO-220 LEAD BEND OPTIONS

TO-220 7-Lead Package Outline (Flow 44)
(Reference LTC DWG # 05-08-1484)



Marking

Because of the limited space available for part marking on some SMT packages, abbreviated marking codes are used to identify the device. These codes, if used, are identified in the individual SMT package data sheets.

Lead Finish and Solderability

Standard lead finish is electroplated PbSn (15% Pb/85% Sn). LTC offers 100% matte tin lead finish upon request. Both are electroplated with < 0.05% carbon content. Solderability meets the requirements of MIL-STD-883C, Method 2003. Recommended minimum solder pad dimensions are given with each package. (Note: Consideration should be given to your process and power requirements.)

Wave and Reflow Soldering

Following are the recommended procedures for soldering surface mount packages to PC boards.

1. Wave Soldering

- Use solder plating boards.
- Dispense adhesive to hold components on board.
- Place components on board.
- Cure adhesive per adhesive manufacturer's specification.
- Preheat package temperature shall be between 100°C and 130°C.
- Foam flux using RMA (Rosin Mildly Activating) flux.
- Wave solder using a dual wave soldering system at 230°C to 250°C for 2 seconds per wave.
- Clean board.
- **Wave soldering is not recommended for SOT-223, QFN and DFN packages.**

2. Reflow Soldering (PbSn and Matte Tin Lead Finish)

Note: LTC offers products with either PbSn or pure matte tin lead finish. Both finishes are compatible with typical PbSn and SnAgCu pastes. See matte tin (Pb free) update at www.linear.com/about/pbfree.html.

- Screen solder paste on board.
- Mount components on board.
- Infrared or forced hot air convection reflow is recommended for best performance. Parameters:
 - Preheat peak temperature 135°C ± 15°C and 2°C to 4°C per second rise
 - Time above reflow temperature:
 - PbSn (37/63) Paste 183°C – 140 seconds
 - SnAgCu (95.5/4/0.5) Paste 217°C – 140 seconds
 - Peak package body temperature:
 - PbSn Paste 220°C to 245°C
 - SnAgCu Paste 245°C to 255°C
 - Dwell time at peak temperature 10 to 15 seconds
 - Cooling rate 2°C to 4°C per second
- Clean boards.
- For Vapor Phase Reflow (PbSn), recommended parameter ranges for:
 - Heating rate: 4°C per second max
 - Preheat temperature: 45°C to 80°C
 - Time above 200°C: 50 seconds to 90 seconds
 - Peak package temperature: 212°C to 219°C

3. Hand Soldering

- **Hand soldering of packages is not recommended.**

Dry Pack in Moisture Barrier Bags

In the event of a requirement for Dry Pack, LTC employs as a guideline the methods of IPC-SM-786A, Procedures for Characterization of Moisture/Reflow Sensitive ICs.

Thermal Information

Table 1 shows the range of junction-to-ambient thermal resistance of SO devices mounted on a PCB of FR4 material with copper traces, in still air at 25°C. θ_{JA} with a ceramic substrate is about 70% of the FR4 value. Maximum power dissipation may be calculated by the following formula:

$$P_{DMAX}(T_A) = \frac{T_{JMAX} - T_A}{\theta_{JA}}$$

where,

T_{JMAX} = Maximum operating junction temperature.

T_A = Desired ambient operating temperature.

θ_{JA} = Junction-to-ambient thermal resistance.

Table 1. Typical Thermal Resistance Values

SO-8	150°C/W to 200°C/W	SO-18	70°C/W to 100°C/W
SO-14	100°C/W to 140°C/W	SO-20	70°C/W to 90°C/W
SO-16 (0.150)	90°C/W to 130°C/W	SO-24	60°C/W to 80°C/W
SO-16 (0.300)	85°C/W to 100°C/W	SO-28	55°C/W to 75°C/W

Conditions: PCB mount on FR4 material, still air at 25°C, copper trace.

Thermal resistance for power packages (DD and SOT-223) depends greatly on the individual device type. Please consult the device data sheets for thermal information.

More current data, by device type, may be obtained by contacting LTC, Marketing Department.

Tape and Reel Packing (See Tape and Reel Section)

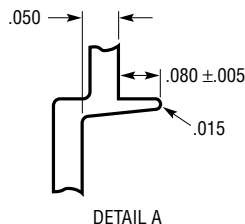
Plastic Tube Packing

LTC's Surface Mount products are packed in "antistatic" plastic tubes with the tube dimensions indicated in Figure 2. Unit quantities packaged per tube are listed below in Table 2.

Table 2. Devices Per Tube

LTC Package Code Designator	LTC Package Type	Actual Lead Count	Number of Units
DD	DFN (3mm × 3mm)	8, 10	121
DE, UE	DFN (4mm × 3mm)	12, 14	91
DH	DFN (5mm × 5mm)	16	73
DHC	DFN (5mm × 3mm)	16	73
DHD	DFN (5mm × 4mm)	16	73
F	TSSOP (4.4mm)	20	74
F, FE	TSSOP (4.4mm)	14/16	94
FW	TSSOP (6.1mm)	48	39
FW	TSSOP (6.1mm)	56	35
G	SSOP (5.3mm)	16	77
G	SSOP (5.3mm)	20	66
G	SSOP (5.3mm)	24	59
G	SSOP (5.3mm)	28	47
G	SSOP (5.3mm)	36	37
GN	SSOP (0.150)	16	100
GN	SSOP (0.150)	20, 24	55
GW	SSOP (7.62mm)	36	32
GW	SSOP (7.62mm)	44	27
MS8, MS8E	MSOP (0.118)	8	50
MS, MSE	MSOP (0.118)	10	50
M, Q, R	DD	3, 5, 7	50
S8	SO (0.150)	8	100
S	SO (0.150)	14	55
S	SO (0.150)	16	50
ST	SOT-223	3	78
SW	SO (0.300)	16	47
SW	SO (0.300)	18	40
SW	SO (0.300)	20	38
SW	SO (0.300)	24	32
SW	SO (0.300)	28	27
UD	QFN (3mm)	16	121
UF	QFN (4mm)	16, 20, 24	91
UH	QFN (5mm)	32	73
UHF	QFN (5mm × 7mm)	38	52
UK	QFN (7mm × 7mm)	48	52
UP	QFN (9mm × 9mm)	64	40

PLASTIC TUBE SPECIFICATIONS

[illegible]

$.025 \pm 0.005$ WALL
 $.170$ REF
 $.315$ REF
 $.265$
 $.070$
 $.155$
 LENGTH: 20.50 $+1/16$ $-1/32$
 SMP 09

NOTE: ALL DIMENSIONS ARE IN INCHES

Technical drawing of a mechanical part with dimensions and tolerances:

- Overall width: 3.65
- Inner width: 2.45
- Overall height: 9.0
- Top section height: 3.6
- Top section width: 1.05
- Top section radius: R0.4
- Top section tolerance: +0.05 / -0.05
- Bottom section width: 0.75
- Bottom section tolerance: +0.00 / -0.10
- Bottom section radius: 1.5 REF
- Bottom section radius: 1.3 REF
- Bottom section radius: 1.35
- Bottom section tolerance: +0.10 / -0.00
- Bottom section tolerance: SMP 27

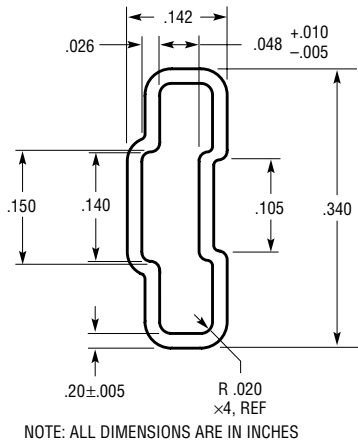
NOTE: ALL DIMENSIONS ARE IN MILLIMETERS
TYP RADIUS: 0.2
MATERIAL THICKNESS: 0.6
MSOP 8LD POLYCARBONATE TUBE TO BE ANTISTATIC
COMPLIANT PER LTC SPEC 01-99-0001

Technical drawing of a rectangular plate with a central slot. The drawing includes dimensions for overall size, slot size, wall thickness, and corner radii. Key dimensions include: overall width $.080 \pm .005$ (NOTE 2), overall height $.370$ (NOTE 2), slot width $.163 \pm .005$, slot height $.205$, and wall thickness $.024 \pm .005$ TYP WALL THICKNESS. Corner radii are specified as $.10 R$ MAX ALL CORNERS. Other dimensions include $.059 \pm .005$, $.220 \pm .007$, $.099 \pm .007$, $.107 \pm .005$, and $.025 \pm .002 - .005$.

1. UNITS ARE IN INCHES
2. CRITICAL DIMENSIONS
3. TUBES TO BE TRANSPARENT RIGID PVC
4. TUBE STRAIGHTNESS .030 INCH MAX PER LENGTH OF TUBE
5. FINISH TO BE TREATED WITH ANTISTATIC COATING
6. MARK "ANTISTATIC 5.3mm SSOP" AT LOCATION INDICATED ON DRAWING
7. ITW REFERENCE DRAWING NUMBER: O-GT0651-14
8. PLUG TYPE: BLACK END PLUG #50-3111 (NONTTESTED)
GREEN END PLUG #50-3116 (TESTED)
9. WHEN APPLICABLE, A BIDIRECTIONAL LABEL OF THE RECYCLE DATE AND
SYMBOL SHALL BE PRINTED IN GREEN ON THE PRINT SIDE AT THE TUBE RIGHT

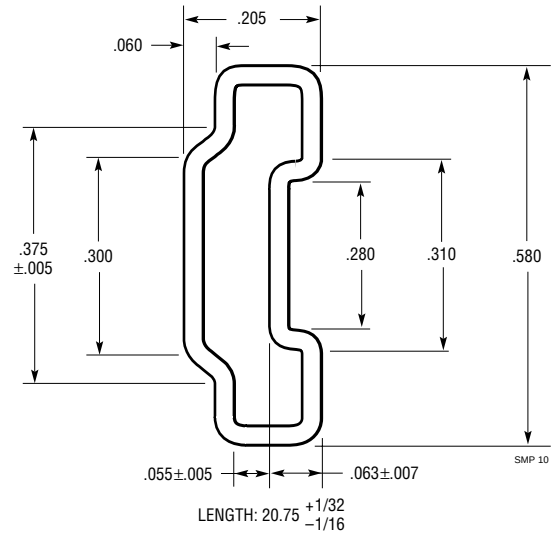
PLASTIC TUBE SPECIFICATIONS

ST
SOT-223 Package Shipping Tube



SMP 11

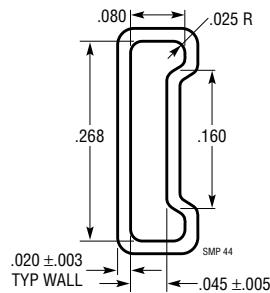
SW (0.300)
SO Package Shipping Tube



SMP 10

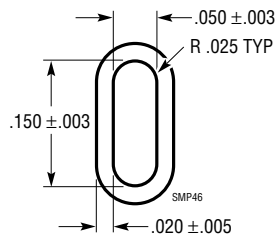
MATERIAL: ANITSTATIC TREATED RIGID TRANSPARENT PVC OR RIGID BLACK CONDUCTIVE
PRINTING: "LTC LOGO, LINEAR TECHNOLOGY CORP., ANTISTATIC" ON TOPSIDE OF TUBE

TSSOP
F, FE Package Shipping Tube



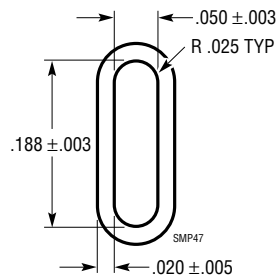
SMP 44

DD (4mm × 3mm), DE (4mm × 3mm)
UE (4mm × 3mm), UD (3mm × 3mm)
DFN/QFN Package Shipping Tube



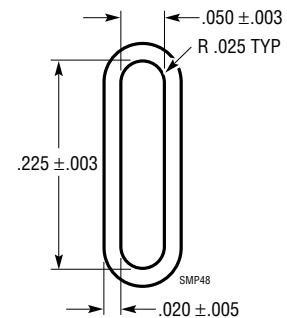
SMP46

UF (4mm × 4mm)
QFN Package Shipping Tube



SMP47

UH (5mm × 5mm)
QFN Package Shipping Tube



SMP48

TAPE AND REEL SPECIFICATIONS—SURFACE MOUNT

Tape and Reel Packing

Tape and reel packing is available for all SO, TSOT (thin SOT-23), SOT-23 3L/4L, SOT-223, SSOP, TSSOP, QFN, DFN and DD packages in accordance with EIA Specification 481-B with the following exceptions: **(TSOT pin 1 is oriented towards the round sprocket holes as was estab-**

lished for this package early. SOT-223 package tape width is 16mm). Table 1 lists the applicable tape widths, dimensions and quantities for all LTC small outline products. Consult factory for tape and reel pricing and minimum order requirements.

Table 1. Tape and Reel Specifications

LTC Package Code Designator	LTC Package Type	Number of Leads Offered	W Tape Width	P Component Pitch	P ₀ Hole Pitch	Reel Diameter	Units per Reel
DD	DFN (3mm × 3mm)	8	12mm	8mm	4mm	330mm (13")	2,500
DDB	DFN (3mm × 2mm)	8	12mm	4mm	4mm	330mm (13")	2,500
DC	DFN (2mm × 2mm)	6	12mm	8mm	4mm	330mm (13")	2,500
DE, UE	DFN (4mm × 3mm)	12, 14	12mm	8mm	4mm	330mm (13")	2,500
DH	DFN (5mm × 5mm)	16	12mm	8mm	4mm	330mm (13")	2,500
DHC	DFN (5mm × 3mm)	16	12mm	8mm	4mm	330mm (13")	2,500
DHD	DFN (5mm × 4mm)	16	12mm	8mm	4mm	330mm (13")	2,500
F	TSSOP (4.4mm)	14, 20, 28	16mm	8mm	4mm	330mm (13")	2,500
FE	TSSOP (4.4mm)	16, 20	16mm	8mm	4mm	330mm (13")	2,500
FW	TSSOP (6.1mm)	48, 56	24mm	12mm	4mm	330mm (13")	1,800
G	SSOP (5.3mm)	16	16mm	12mm	4mm	330mm (13")	2,000
G	SSOP (5.3mm)	20, 24	16mm	12mm	4mm	330mm (13")	1,800
G	SSOP (5.3mm)	28/36	24mm	12mm	4mm	330mm (13")	2,000
GN	SSOP (0.150)	16	12mm	8mm	4mm	330mm (13")	2,500
GN	SSOP (0.150)	20, 24	16mm	8mm	4mm	330mm (13")	2,500
GW	SSOP (7.62mm)	36, 44	24mm	12mm	4mm	330mm (13")	1,000
M, Q, R	DD	3, 5 or 7	24mm	16mm	4mm	330mm (13")	750
MS8, MS8E	MSOP (0.118)	8	12mm	8mm	4mm	330mm (13")	2,500
MS10, MSE	MSOP (0.118)	10	12mm	8mm	4mm	330mm (13")	2,500
S8	SO (0.150)	8	12mm	8mm	4mm	330mm (13")	2,500
S	SO (0.150)	14	16mm	8mm	4mm	330mm (13")	2,500
S	SO (0.150)	16	16mm	8mm	4mm	330mm (13")	2,500
ST	SOT-223	3	16mm	12mm	4mm	330mm (13")	2,000
SW	SO (0.300)	16	16mm	12mm	4mm	330mm (13")	1,000
SW	SO (0.300)	18	24mm	12mm	4mm	330mm (13")	1,000
SW	SO (0.300)	20	24mm	12mm	4mm	330mm (13")	1,000
SW	SO (0.300)	24	24mm	12mm	4mm	330mm (13")	1,000
SW	SO (0.300)	28	24mm	12mm	4mm	330mm (13")	1,000

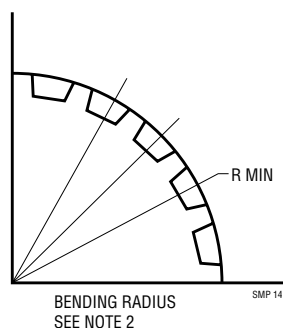
TAPE AND REEL SPECIFICATIONS—SURFACE MOUNT

Table 1. Tape and Reel Specifications (cont)

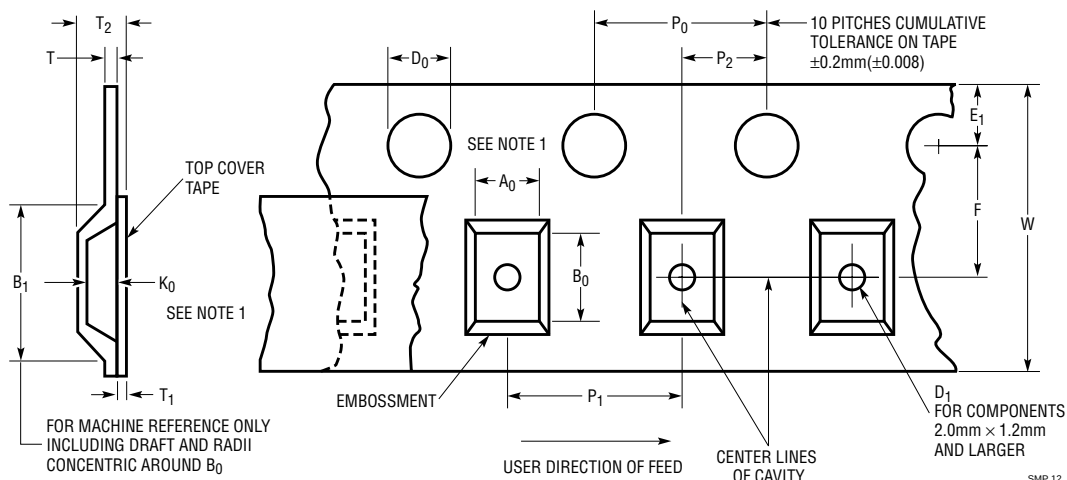
LTC Package Code Designator	LTC Package Type	Number of Leads Offered	W Tape Width	P Component Pitch	P ₀ Hole Pitch	Reel Diameter	Units per Reel
S3	SOT-23	3	8mm	4mm	4mm	180mm (7")	2,500
S4	SOT-143	4	8mm	4mm	4mm	180mm (7")	2,500
S5	SOT-23, TSOT	5	8mm	4mm	4mm	180mm (7")	2,500
S6	SOT-23, TSOT	6	8mm	4mm	4mm	180mm (7")	2,500
SC6	SC70	6	8mm	4mm	4mm	180mm (7")	2,500
TS8	TSOT	8	8mm	4mm	4mm	180mm (7")	2,500
UD	QFN (3mm × 3mm)	16	12mm	8mm	4mm	330mm (13")	2,500
UF	QFN (4mm × 4mm)	16, 20, 24	12mm	8mm	4mm	330mm (13")	2,500
UH	QFN (5mm × 5mm)	32	12mm	8mm	4mm	330mm (13")	2,500
UHF	QFN (5mm × 7mm)	38	16mm	8mm	4mm	330mm (13")	2,500
UK	QFN (7mm × 7mm)	48	16mm	12mm	4mm	330mm (13")	2,500
UP	QFN (9mm × 9mm)	64	16mm	12mm	4mm	330mm (13")	2,500

TAPE AND REEL SPECIFICATIONS—SURFACE MOUNT

Bending Radius



Embossed Carrier Dimensions (8mm, 12mm, 16mm, 24mm Tape Only)



Embossed Tape — Constant Dimensions

Tape Size	D_0	E_1	P_0	P_2	T Max	T_1 Max	$A_0 B_0 K_0$
8mm	1.5 (0.059)	1.75 ± 0.10	4.0 ± 0.10	2.0 ± 0.05	0.600	0.10	See Note 1
12mm		(0.069 ± 0.004)	(0.157 ± 0.004)	(0.079 ± 0.002)	(0.024)	(0.004)	
16mm		$+0.004$					
24mm		-0.0					

Embossed Tape Variable Dimensions

Tape Size	B_1 Max	D_1 Min	F	T_2 Max	R Min	W Max
8mm	4.35 (0.171)	1.0 (0.039)	3.5 ± 0.05	2.5 (0.098)	25 0.984	8.3
12mm (0.323)	8.2 (0.059)	1.5 (0.217 $\pm$ 0.002)	5.5 ± 0.05 (0.256)	6.5 (0.256)	30 (1.181)	12.3
16mm	12.1 (0.476)	1.5 (0.217 $\pm$ 0.002)	7.5 ± 0.10 (0.295 $\pm$ 0.004)	8.0 (0.315)	40 (1.575)	16.3
24mm	20.1 (0.791)	1.5 (0.217 $\pm$ 0.002)	11.5 ± 0.10 (0.453 $\pm$ 0.004)	12.0 (0.472)	50 (1.969)	24.3

Note 1: The cavity defined by A_0 , B_0 and K_0 shall surround the component with sufficient clearance that:

- the component does not protrude above the top surface of the carrier tape.
- the component can be removed from the cavity in a vertical direction without mechanical restriction after the top cover tape has been removed.

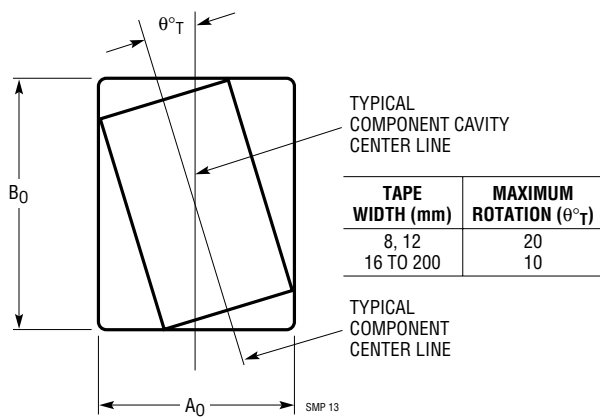
c) rotation of the component is limited to 20° maximum for 8mm and 12mm tapes and 10° maximum for 16mm and 24mm tapes.

d) lateral movement of the component is restricted to 0.5mm maximum for 8mm and 12mm wide tape and to 1.0mm maximum for 16mm and 24mm wide tape.

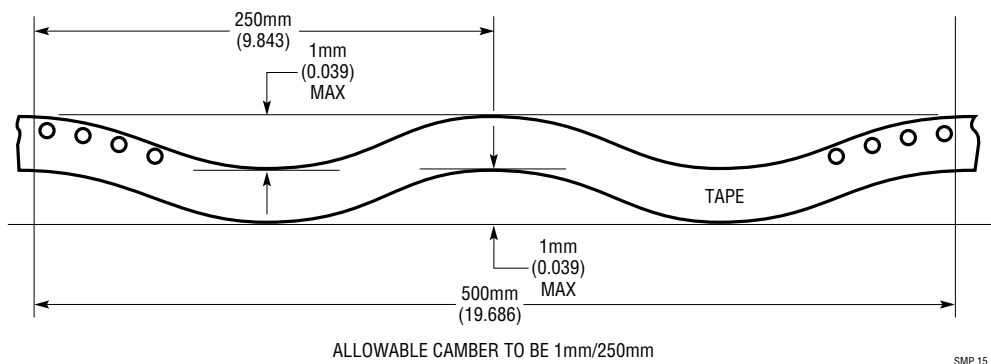
Note 2: The tape with or without components shall pass around R without damage.

TAPE AND REEL SPECIFICATIONS—SURFACE MOUNT

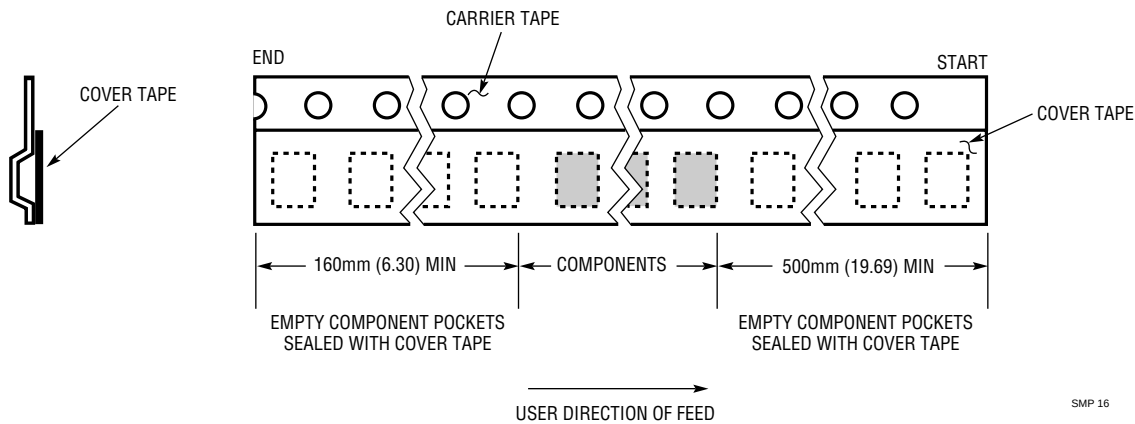
Component Rotation



Tape Camber (Top View)

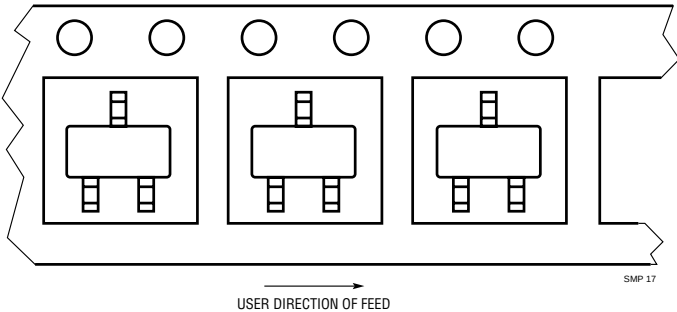


Tape Leader (Start/End) Specification

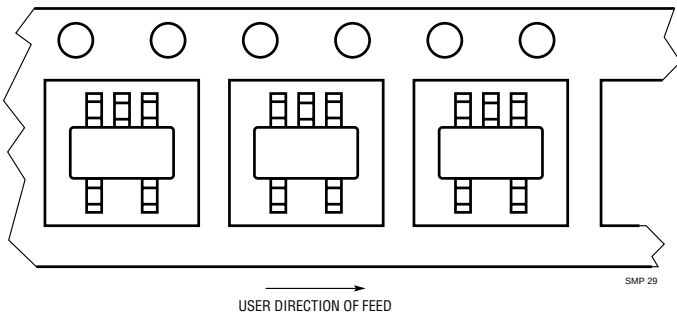


TAPE AND REEL SPECIFICATIONS—SURFACE MOUNT

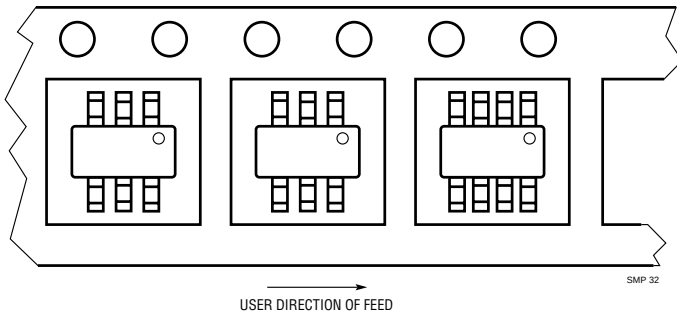
S3
SOT-23 Devices



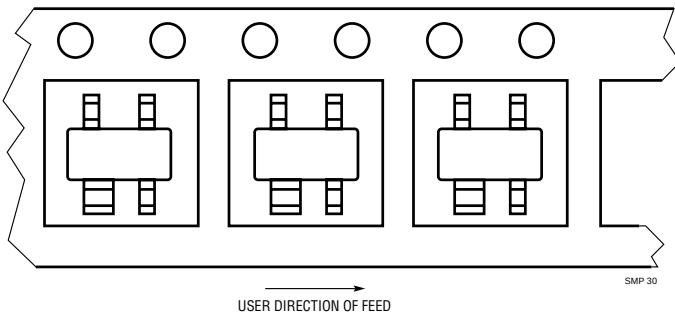
S5
TSOT, SOT-23 Devices



SC6, S6 and TS8
SC70, TSOT, SOT-23 Devices

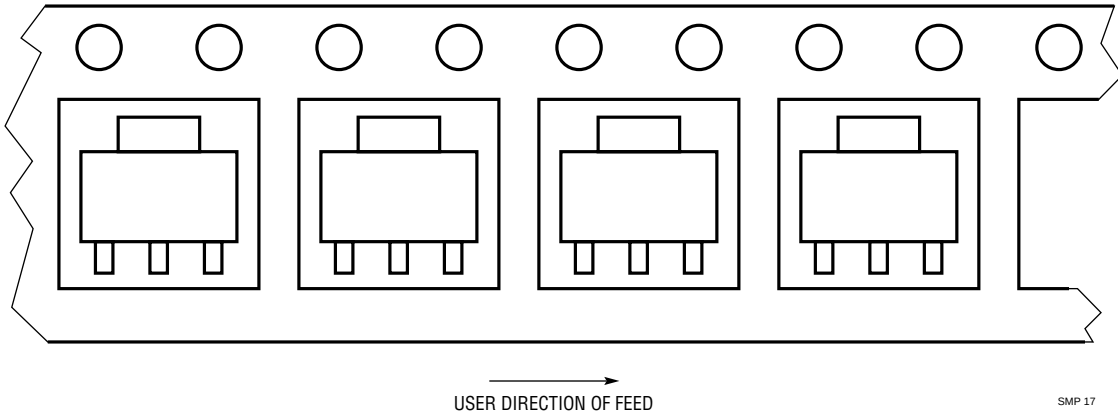


S4
SOT-143 Devices

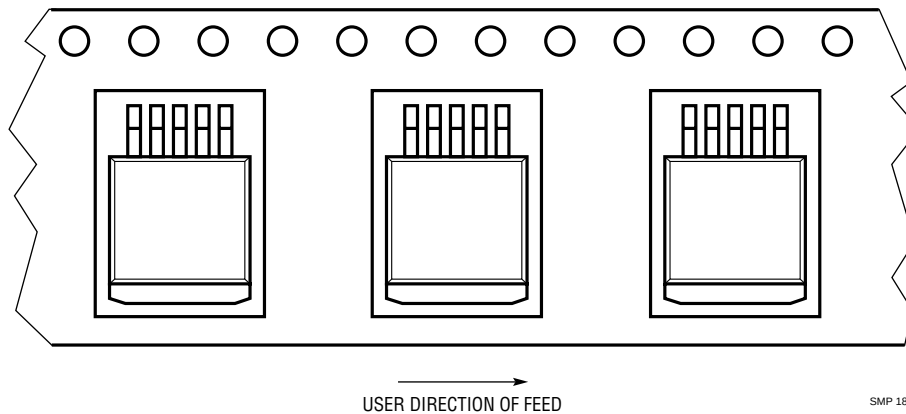


TAPE AND REEL SPECIFICATIONS—SURFACE MOUNT

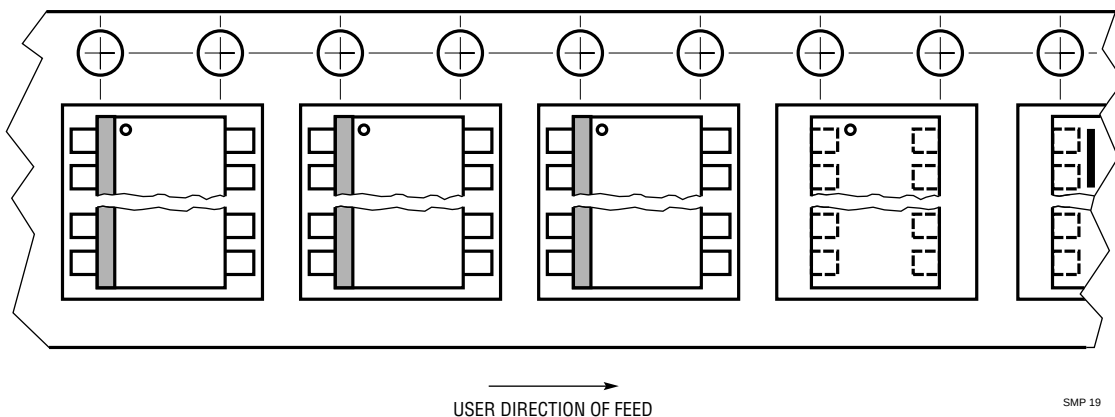
ST
SOT-223 Devices



M, Q, R
DD Pak Devices

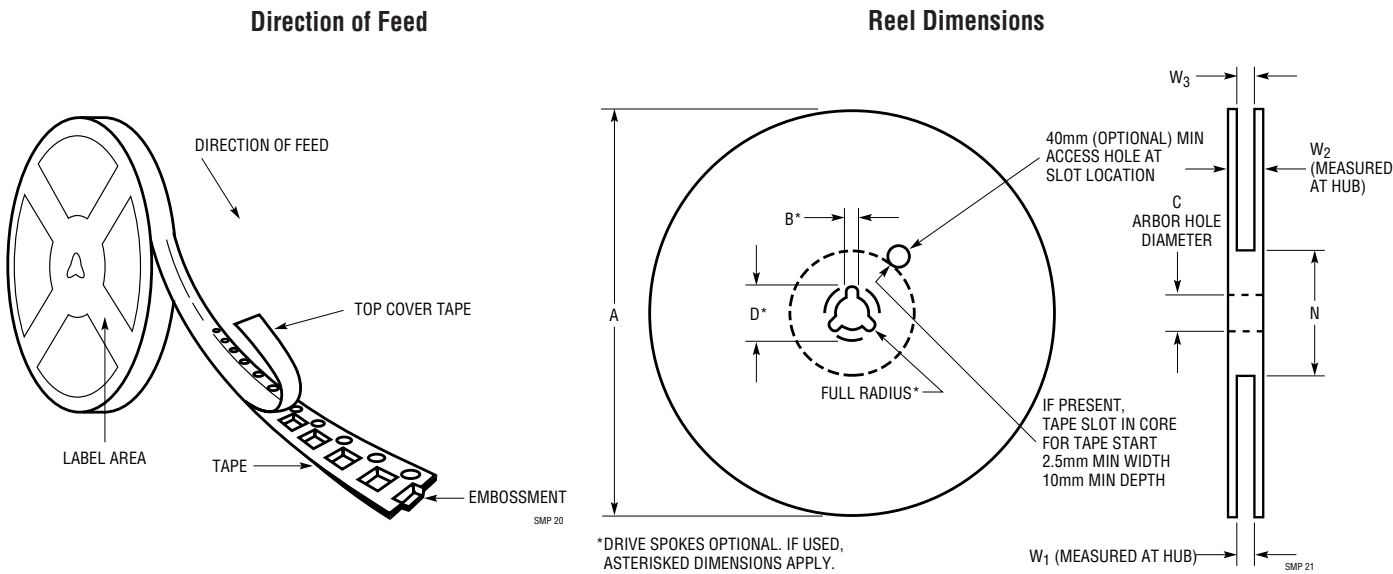


DD, DE, F, FE, FW, G, GN, GW, S8, S, SW, MS8, MS, MS8E, MSE,
SSOP, TSSOP, QFN and DFN Devices



TAPE AND REEL

REEL DIMENSIONS—SURFACE MOUNT



TAPE SIZE	A MAX	B MIN	C	D* MIN	N MIN	W ₁	W ₂ MAX	W ₃
8mm	180	1.5	13.0 ^{+0.5} _{-0.2}	20.2	60	8.4 ^{+1.5} _{-0.0}	14.4	Shall Accommodate Tape Width Without Interference
8mm	330	1.5	13.0 ^{+0.5} _{-0.2}	20.2	50	8.4 ^{+1.5} _{-0.0}	14.4	
12mm	180	1.5	13.0 ^{+0.5} _{-0.2}	20.2	60	12.4 ^{+2.0} _{-0.0}	18.4	
12mm	330	1.5	13.0 ^{+0.5} _{-0.2}	20.2	50	12.4 ^{+2.0} _{-0.0}	18.4	
16mm	360	1.5	13.0 ^{+0.5} _{-0.2}	20.2	50	16.4 ^{+2.0} _{-0.00}	22.4	
24mm	360	1.5	13.0 ^{+0.5} _{-0.2}	20.2	60	24.4 ^{+2.0} _{-0.00}	30.4	

Note 1: All dimensions in millimeters.

TAPE AND REEL SPECIFICATIONS—TO-92

TO-92 Tape Dimension

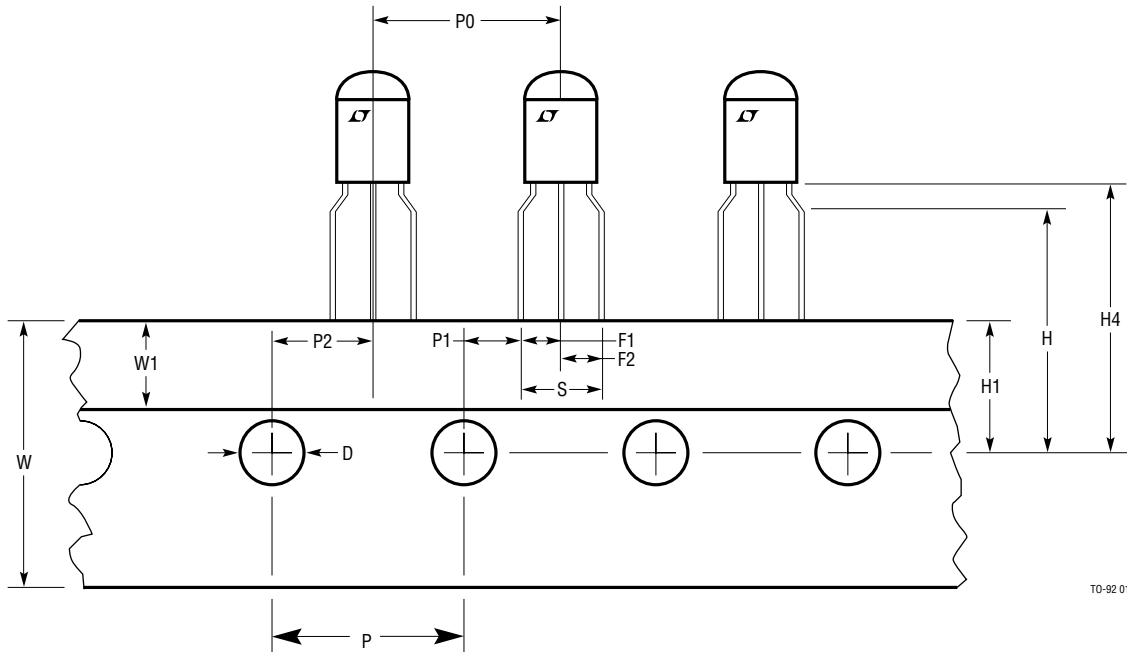
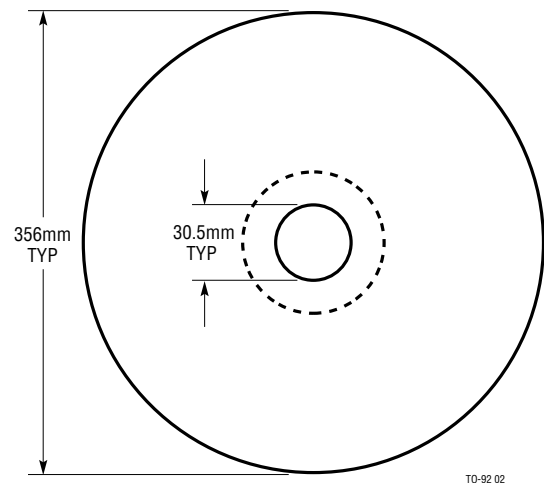


Table 1

SYMBOL	DESCRIPTION	DIMENSION (mm)
D	Sprocket Hole Diameter	4 ± 0.2
H	Length from Seating Plane	16 ± 0.5
H1	Sprocket Hole Location	9 ± 0.5
H4	Component Base Height	20 Max
P	Sprocket Hole Pitch	12.7 ± 0.2
P0	Pitch of Component	12.7 ± 0.5
P1	Lead Location	3.85 ± 0.5
P2	Center of Seating Plane Location	6.35 ± 0.4
S	Component Lead Spacing	$5 + 0.8 / - 0.2$
W	Carrier Tape Width	$18 + 1, - 0.5$
W1	Adhesive Tape Width	6.0 ± 1.0
F1, F2	Lead-to-Lead Distance	$2.5 + 0.4, - 0.1$

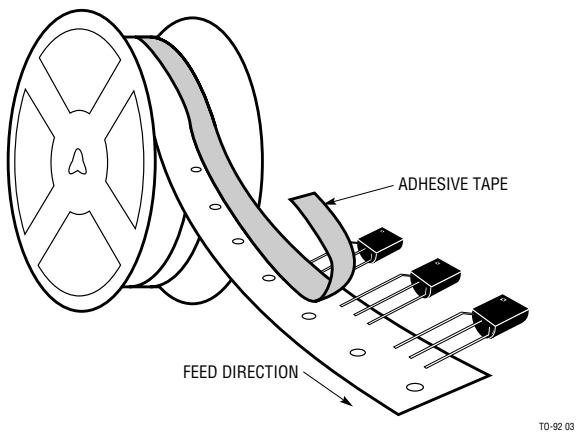
TO-92 Reel Dimensions



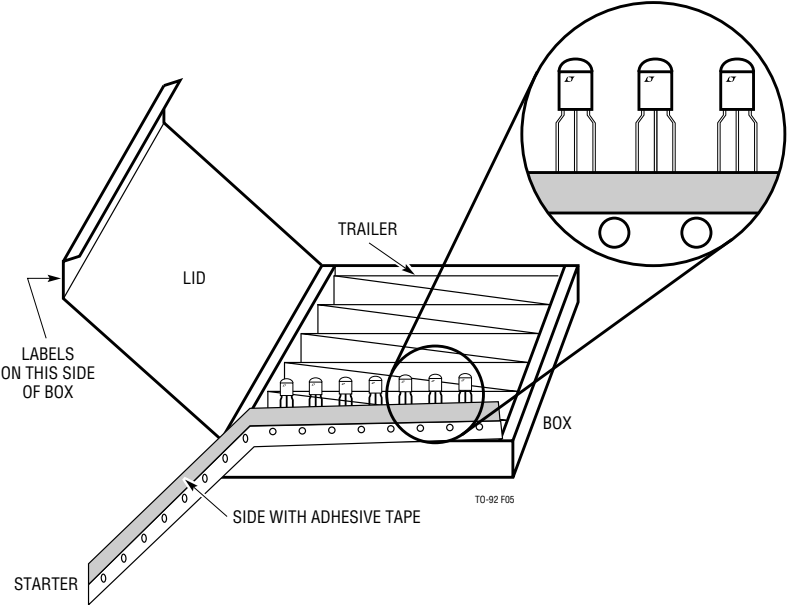
TAPE AND REEL

TAPE AND REEL SPECIFICATIONS—TO-92

Reel Pak Tape Orientation on Reel

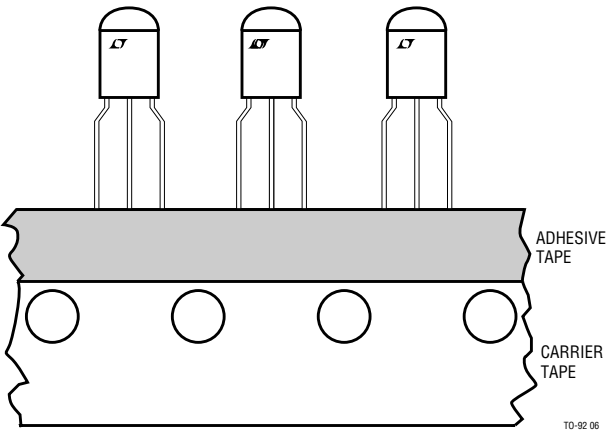


Ammo Pak Tape Orientation Inside Box



Package Orientation on Tape

STYLE E: Standard Flow TR
(Flat Side of Package Faces Toward the Adhesive Tape)



STYLE A: Special Flow TRA
(Rounded Side of Package Faces Toward the Adhesive Tape)

