

THREE-TERMINAL ADJUSTABLE OUTPUT POSITIVE VOLTAGE REGULATORS

The HT317A is adjustable 3-terminal positive voltage regulator capable of supplying in excess of 1.5 A over an output voltage range of 1.2 V to 37 V. These voltage regulator is exceptionally easy to use and require only two external resistors to set the output voltage. Further, it employ internal current limiting, thermal shutdown and safe area compensation, making them essentially blow-out proof.

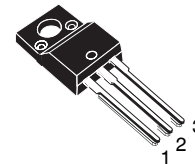
The HT317A serve a wide variety of applications to make a programmable output regulator, or by connecting a fixed resistor between the adjustment and output, the HT317A series can be used as a precision current regulator.

Futures

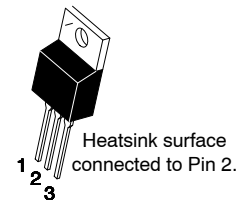
- Output Current in Excess of 1.5 Ampere
- Output Adjustable between 1.2 V and 37 V
- Internal Thermal Overload Protection
- Internal Short - Circuit Current Limiting Constant with Temperature
- Output Transistor Safe-Area Compensation
- Floating Operation for High Voltage Applications
- Standard 3-lead Transistor Packages
- Eliminates Stocking Many Fixed

ORDERING INFORMATION

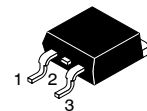
Device	Operating Temperature Range	Package	Packing
HT317ATZ	$T_A = -40^{\circ}$ to 125° C for all packages	TO-220	Tube
HT317ARMZ		TO-252	Tape & Reel
HT317ARSZ		TO-263	Tape & Reel
HT317ARDZ		SOT-223	Tape & Reel
HT317AREZ		ESOP8	Tape & Reel
HT317ATFZ		TO-220F	Tube



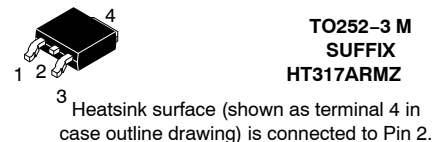
**TO-220F
TF SUFFIX
HT317ATFZ**



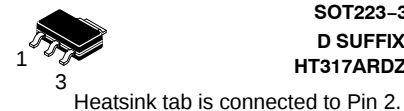
**TO-220
T SUFFIX
HT317ATZ**



**TO263-3 S
SUFFIX
HT317ARSZ**



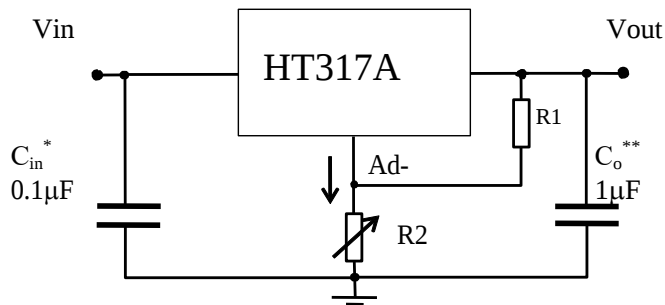
**TO252-3 M
SUFFIX
HT317ARMZ**



**SOT223-3
D SUFFIX
HT317ARDZ**

Pin 1. ADJ
2. Output
3. Input

Standard application



* = Cin is required if regulator is

located an appreciable distance from power supply filter.

** = Co is not needed for stability ; however, it does improve transient response.

$$V_{out} = 1.25V \left(1 + \frac{R2}{R1}\right) + I_{ADJ} * R2$$

Since IADJ is controlled to less than 100 µA, the error associated with this term is negligible in most applications.

Maximum ratings

Rating	Symbol	Value	Unit
Input - Output Voltage Differential	Vi - Vo	40	Vdc
Power Dissipation and Thermal Characteristics	PD	Internally Limited	
Operating Junction Temperature Rang	TJ	-40 to +150	°C
Storage Junction Temperature Rang	Tstg	-65 to +150	°C

* Stresses beyond those listed under "absolute maximum ratings" may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other conditions beyond those indicated under "recommended operating conditions" is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

Electrical characteristics

($V_i - V_o = 5.0V$, $I_o = 0.5 A$, $T_J = T_{low}$ to T_{high} (see Note 1); $I_{max} = 1.5 A$ and $P_{max} = 20 W$ unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
Line Regulation ($T_A = +25^\circ C$) $3.0V \leq V_i - V_o \leq 40 V$	Regline	-	0.01	0.04	%/V
Load Regulation ($T_J = +25^\circ C$) $10mA \leq I_o \leq I_{max}$, $V_{in} \leq 5V$ $V_{in} \geq 5 V$	Regload	- -	5.0 0.1	25 0.5	mV %/V _o
Thermal Regulation ($T_A = +25^\circ C$) 20 ms Pulse	-	-	0.03	0.07	%/W
Adjustment Pin Current	I _{Adj}	-	50	100	μA
Adjustment Pin Current Change $2.5 \leq V_i - V_o \leq 40 V$ $10mA \leq I_L \leq I_{max}$, $P_D \leq P_{max}$	ΔI _{Adj}	-	0.2	5.0	μA
Reference Voltage (Note 4) $3.0 \leq V_i - V_o \leq 40 V$ $10mA \leq I_L \leq I_{max}$, $P_D \leq P_{max}$	V _{ref}	1.2	1.25	1.3	V
Line Regulation (Note 3) $3.0 V \leq V_i - V_o \leq 40 V$	Regline	-	0.02	0.07	%/V
Load Regulation (Note 3) $10mA \leq I_o \leq I_{max}$, $V_{in} \leq 5V$ $V_{in} \geq 5 V$	Regload	- -	20 0.3	70 1.5	mV %/V
Temperature Stability ($T_{low} \leq T_J \leq T_{high}$)	T _s	-	0.7	-	
Minimum Load Current to Maintain Regulation ($V_i - V_o = 40 V$)	I _{Lmin}	-	3.5	10	mA
Maximum Output Current $V_i - V_o \leq 15 V$, $P \leq 20 W$ $V_i - V_o = 40 V$, $P \leq 20W$, $T_A = +25^\circ C$	I _{max}	1.5 0.15	2.2 0.4	- -	A
RMS Noise, % of V _o $T_A = +25^\circ C$, $10 Hz \leq f \leq 10 kHz$	N	-	0.003	-	%/V _o
Ripple Rejection, $V_o = 10 V$, $f = 120 Hz$ (Note 5) Without Cadj Cadj = 10 μF	RR	- 66	65 80	- -	dB
Long-Term Stability, $T_J = T_{high}$ (Note 6) $T_A = +25^\circ C$ for Endpoint Measurements	S	-	0.3	1.0	%/1.0 k Hrs.
Thermal Resistance Junction to Case	R _{θJC}	-	5.0	-	°C/W

Notes: (1) $T_{low} = -40^\circ C$, $T_{high} = +125^\circ C$

(2) $I_{max} = 0.5 A$, P_{max}

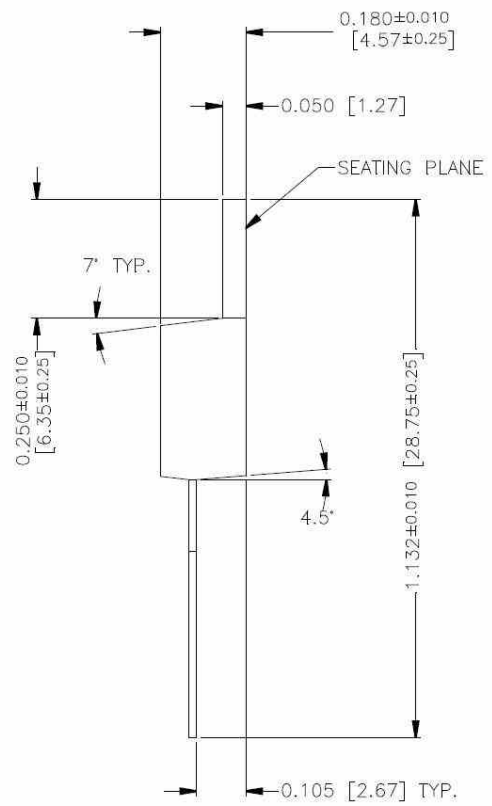
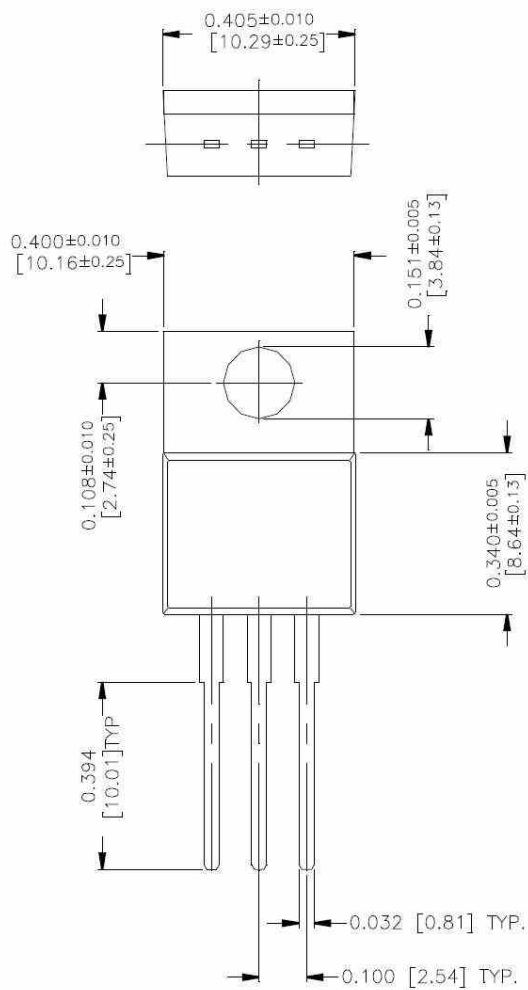
(3) Load and line regulation are specified at constant junction temperature. Changes in V_o due to heating effects must be taken into account separately. Pulse testing with low duty cycle is used.

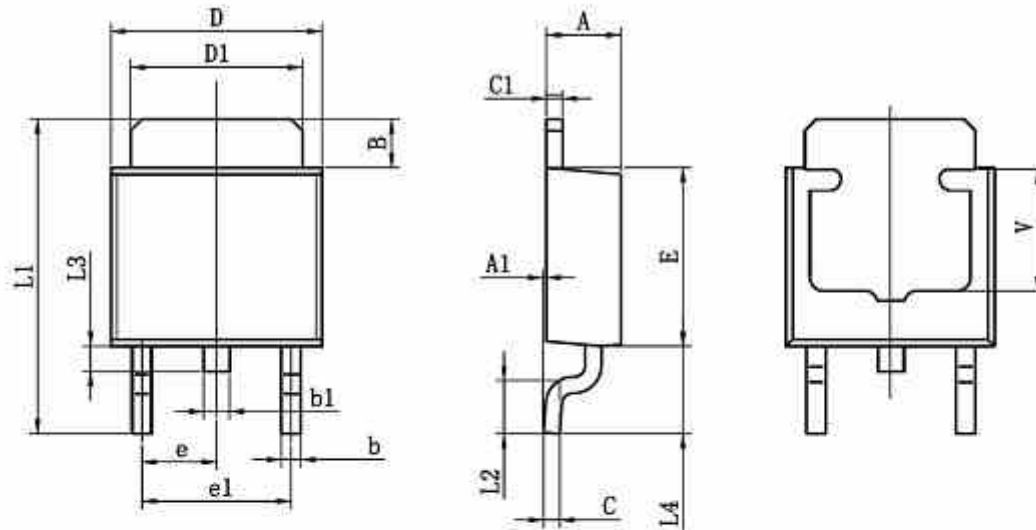
(4) Selected devices with tightened tolerance reference voltage available.

(5) Cadj, when used, connected between the adjustment pin and ground.

(6) Since Long - Term Stability cannot be measured on each device before shipment, this specification is an engineering estimate of average stability from lot to lot.

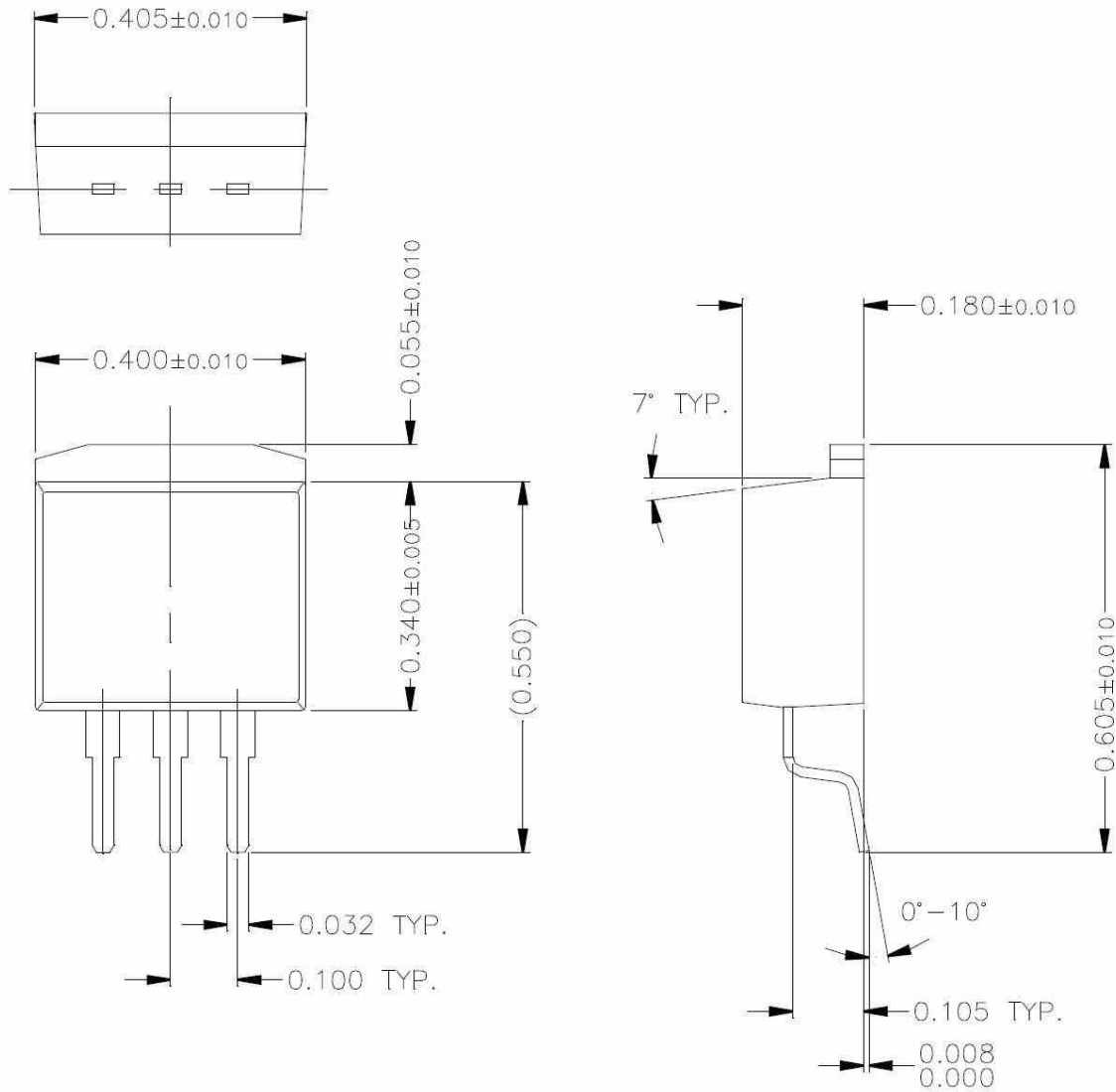
TO-220 PKG OUTLINE DIMENSIONS



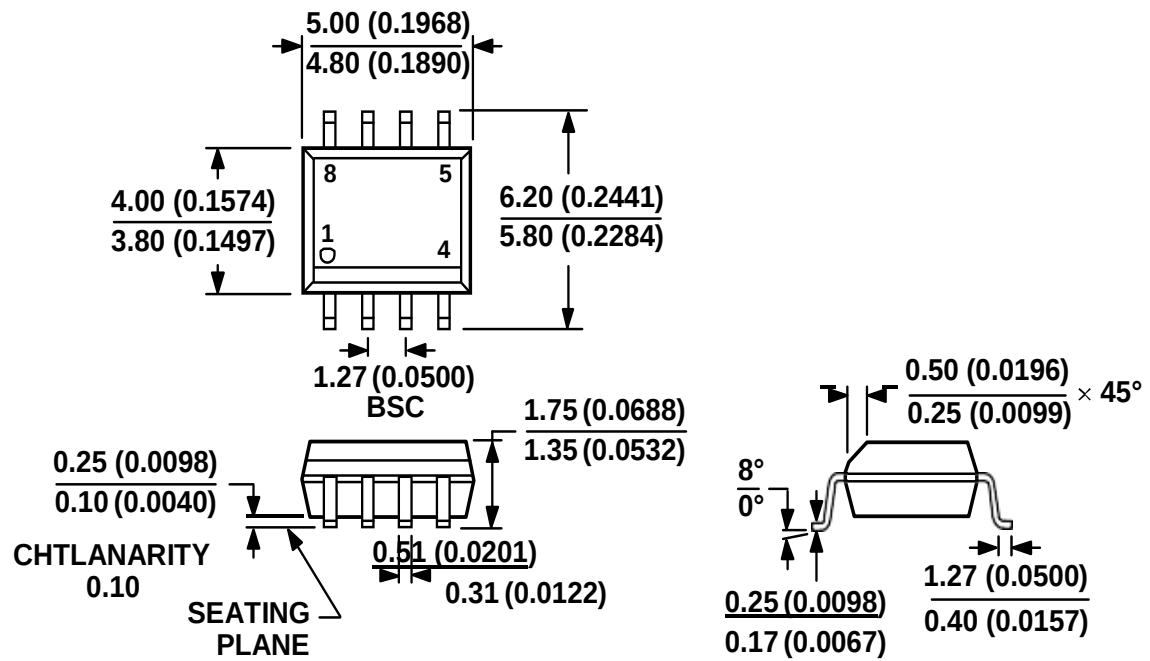
TO-252 PACKAGE OUTLINE DIMENSIONS


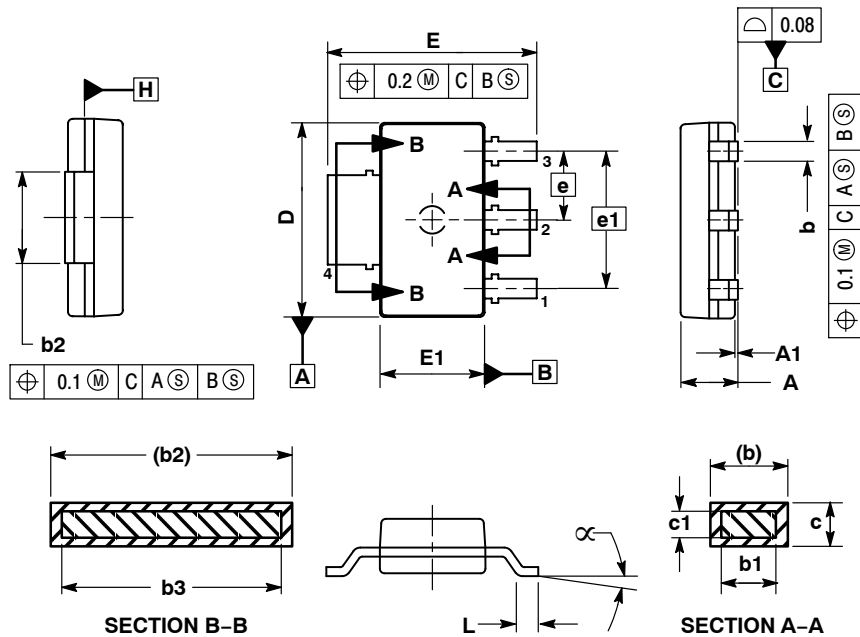
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
B	1.350	1.650	0.053	0.065
b	0.500	0.700	0.020	0.028
b1	0.700	0.900	0.028	0.035
c	0.430	0.580	0.017	0.023
c1	0.430	0.580	0.017	0.023
D	6.350	6.650	0.250	0.262
D1	5.200	5.400	0.205	0.213
E	5.400	5.700	0.213	0.224
e	2.300TYP		0.091TYP	
e1	4.500	4.700	0.177	0.185
L1	9.500	9.900	0.374	0.390
L2	1.400	1.780	0.055	0.070
L3	0.650	0.950	0.026	0.037
L4	2.550	2.900	0.100	0.114
V	3.80REF		0.150REF	

TO-263-3L PKG OUTLINE DIMENSIONS



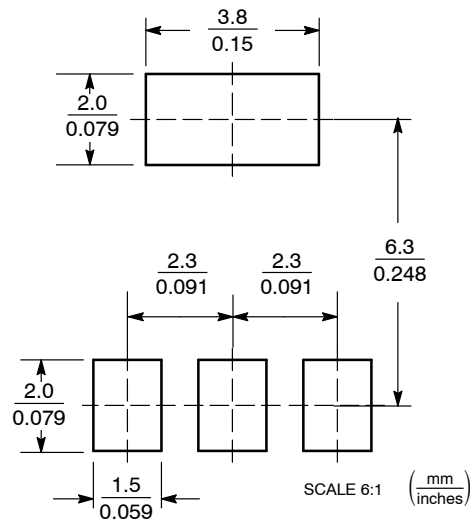
SOP8

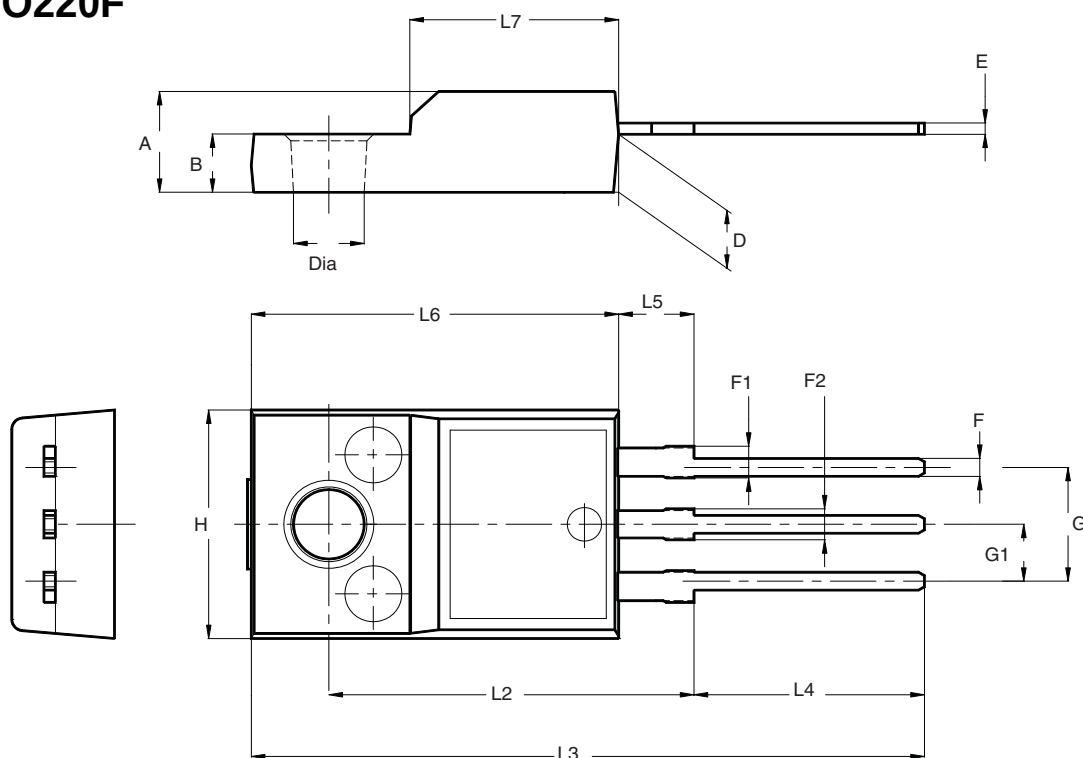


SOT-223

NOTES:

1. DIMENSIONS ARE IN MILLIMETERS.
2. INTERPRET DIMENSIONS AND TOLERANCES PER ASME Y14.5M, 1994.
3. DIMENSION E1 DOES NOT INCLUDE INTERLEAD FLASH OR PROTRUSION. INTERLEAD FLASH OR PROTRUSION SHALL NOT EXCEED 0.23 PER SIDE.
4. DIMENSIONS b AND b2 DO NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.08 TOTAL IN EXCESS OF THE b AND b2 DIMENSIONS AT MAXIMUM MATERIAL CONDITION.
5. TERMINAL NUMBERS ARE SHOWN FOR REFERENCE ONLY.
6. DIMENSIONS D AND E1 ARE TO BE DETERMINED AT DATUM PLANE H.

MILLIMETERS		
DIM	MIN	MAX
A	---	1.80
A1	0.02	0.11
b	0.60	0.88
b1	0.60	0.80
b2	2.90	3.10
b3	2.90	3.05
c	0.24	0.35
c1	0.24	0.30
D	6.30	6.70
E	6.70	7.30
E1	3.30	3.70
e	[2.30]	
e1	[4.60]	
L	0.25	---
α	0°	10°

SOLDERING FOOTPRINT*


TO220F


Dim.	mm		
	Min.	Typ.	Max.
A	4.4		4.6
B	2.5		2.7
D	2.5		2.75
E	0.45		0.7
F	0.75		1
F1	1.15		1.70
F2	1.15		1.70
G	4.95		5.2
G1	2.4		2.7
H	10		10.4
L2		16	
L3	28.6		30.6
L4	9.8		10.6
L5	2.9		3.6
L6	15.9		16.4
L7	9		9.3
Dia	3		3.2