MT3244

N-Channel Power MOSFET

40V, 290A, 1.6mΩ

MT Semiconductor®

http://www.mtsemi.com

Features

- Max $R_{DS(on)}$ = 1.6mΩ at V_{GS} = 10V, I_D = 145A
- Fast Switching Speed
- High Performance Trench Technology for Extremely Low $R_{DS(on)}$
- High Power and Current Handling Capability
- RoHS Compliant

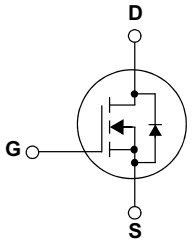
General Description

This N-Channel MOSFET is produced using MOS-TECH Semiconductor's advanced PowerTrench process that has been especially tailored to minimize the on-state resistance and yet maintain superior switching performance.

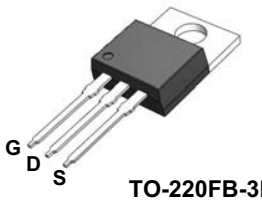
Applications

- High Frequency Synchronous Buck Converters for Computer Processor Power
- High Frequency Isolated DC-DC Converters with Synchronous Rectification for Telecom and Industrial Use

Simplified Schematic



MARKING DIAGRAM & PIN ASSIGNMENT



TO-220FB-3L

MOSFET Maximum Ratings T_C = 25°C unless otherwise noted

Symbol	Parameter		Rating	Unit
Common Ratings (T_C=25°C Unless Otherwise Noted)				
V_{DSS}	Drain-Source Voltage		40	V
V_{GSS}	Gate-Source Voltage		±20	
T_J	Maximum Junction Temperature		150	°C
T_{STG}	Storage Temperature Range		-55 to 150	°C
I_S	Diode Continuous Forward Current	T_C=25°C	290	A
Mounted on Large Heat Sink				
I_{DM}	Pulsed Drain Current *	T_C=25°C	1000**	A
I_D	Continuous Drain Current	T_C=25°C	290	A
		T_C=100°C	200	
P_D	Maximum Power Dissipation	T_C=25°C	214	W
		T_C=100°C	107	
$R_{\theta JC}$	Thermal Resistance-Junction to Case		0.7	°C/W
$R_{\theta JA}$	Thermal Resistance-Junction to Ambient		62.5	°C/W
E_{AS}	Avalanche Energy,Single Pulsed	L=0.5mH	1325***	mJ

Note : * Repetitive rating ; pulse width limiited by junction temperature
** Drain current is limited by junction temperature
*** VD=24V

Package Marking and Ordering Information

Device Marking	Device	Package	Reel Size	Tape Width	Quantity
MT3244	MT3244	TO-220FB-3L	-	-	50

Electrical Characteristics (T_C = 25°C Unless Otherwise Noted)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_{DS}=250μA	40	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=30V, V_{GS}=0V	-	-	1	μA
		T_J=85°C	-	-	30	
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_{DS}=250μA	1.0	-	3.0	V
I_{GSS}	Gate Leakage Current	V_{GS}=±20V, V_{DS}=0V	-	-	±100	nA
$R_{DS(ON)}$ *	Drain-Source On-state Resistance	V_{GS}=10V, I_{DS}=145A	-	1.6	2.0	mΩ
		V_{GS}=4.5V, I_{DS}=145A		2.0	3.0	mΩ
Diode Characteristics						
V_{SD} *	Diode Forward Voltage	I_{SD}=145 A, V_{GS}=0V	-	0.8	1.0	V
t_{rr}	Reverse Recovery Time	I_{DS}=145A, dI_{SD}/dt=100A/μs	-	38	-	ns
Q_{rr}	Reverse Recovery Charge		-	80	-	nC

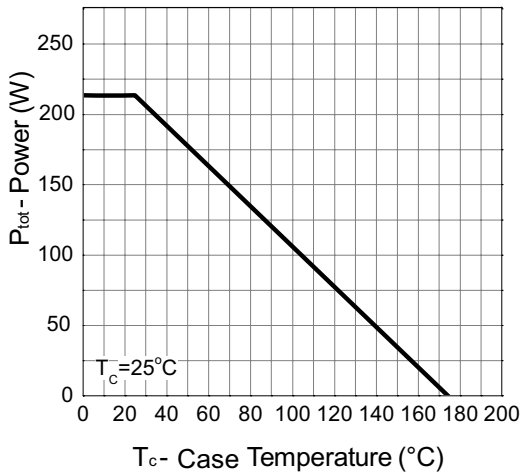
Electrical Characteristics (Cont.) (T_C = 25°C Unless Otherwise Noted)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Dynamic Characteristics						
R_G	Gate Resistance	V_{GS}=0V,V_{DS}=0V,F=1MHz	-	0.5	-	Ω
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=25V, Frequency=1.0MHz	-	11506	-	pF
C_{oss}	Output Capacitance		-	1236	-	
C_{rss}	Reverse Transfer Capacitance		-	762	-	
$t_{d(ON)}$	Turn-on Delay Time	V_{DD}=15V, R_G=3.3Ω, I_{DS}=145A, V_{GS}=10 V,	-	52	-	ns
T_r	Turn-on Rise Time		-	120	-	
$t_{d(OFF)}$	Turn-off Delay Time		-	90	-	
T_f	Turn-off Fall Time		-	78	-	
Gate Charge Characteristics						
Q_g	Total Gate Charge	V_{DS}=24V, V_{GS}=10 V, I_{DS} =145A	-	247	-	nC
Q_{gs}	Gate-Source Charge		-	27	-	
Q_{gd}	Gate-Drain Charge		-	58	-	

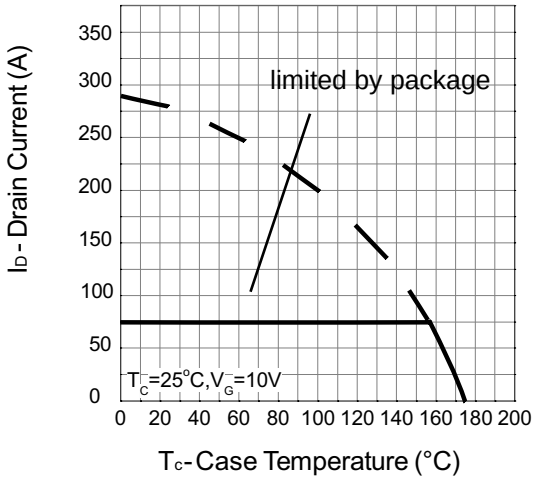
Note * : Pulse test ; pulse width ≤300μs, duty cycle≤2%.

Typical Operating Characteristics

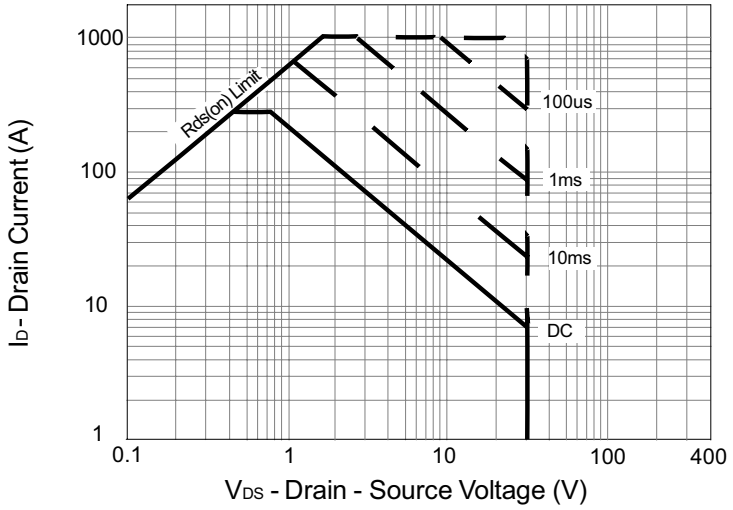
Power Dissipation



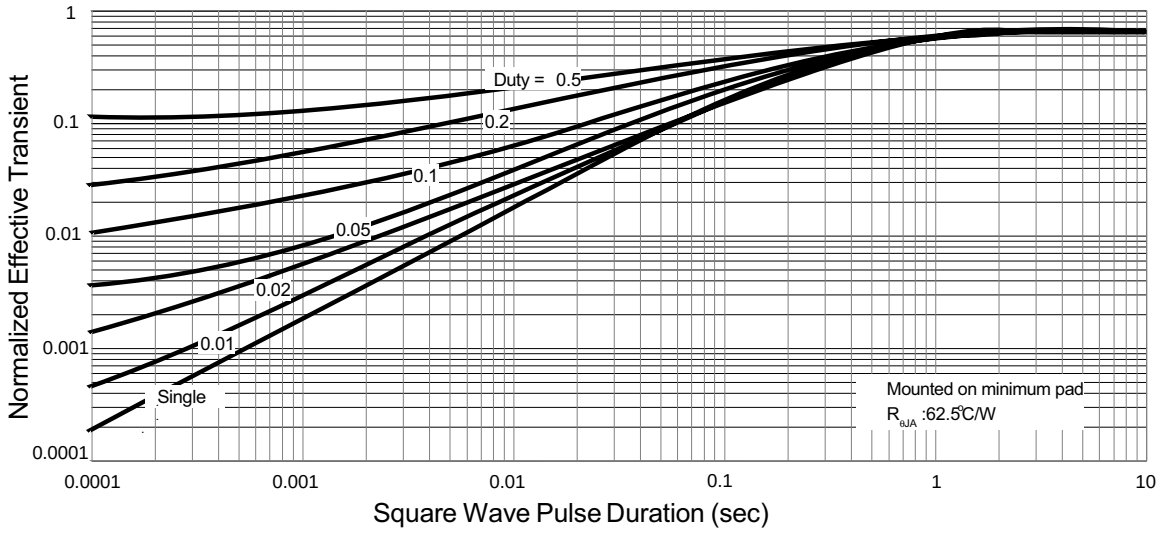
Drain Current



Safe Operation Area

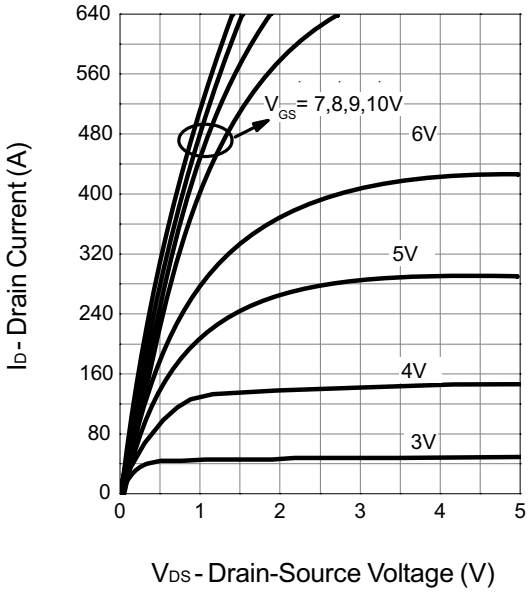


Thermal Transient Impedance

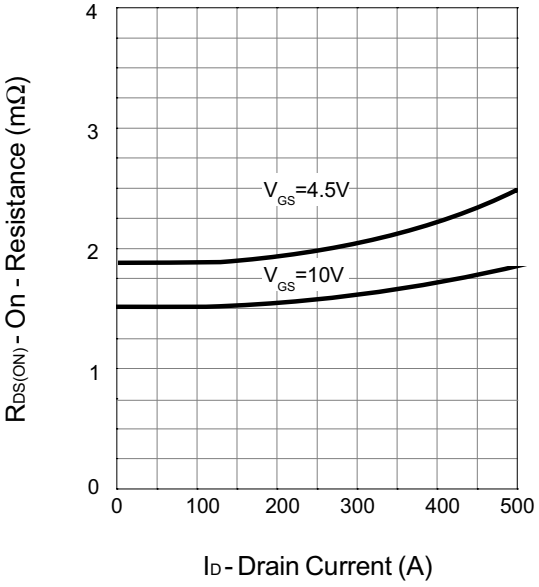


Typical Operating Characteristics (Cont.)

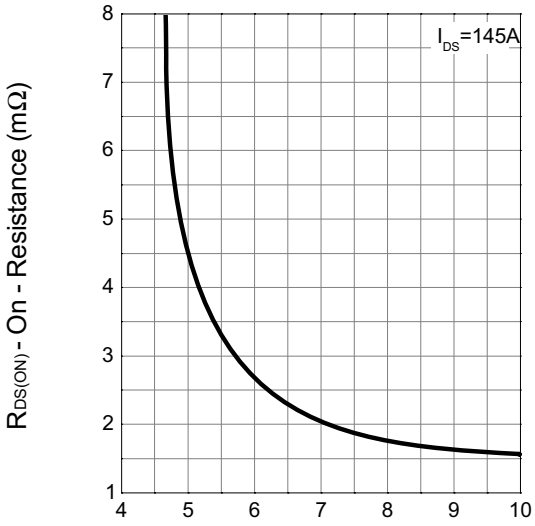
Output Characteristics



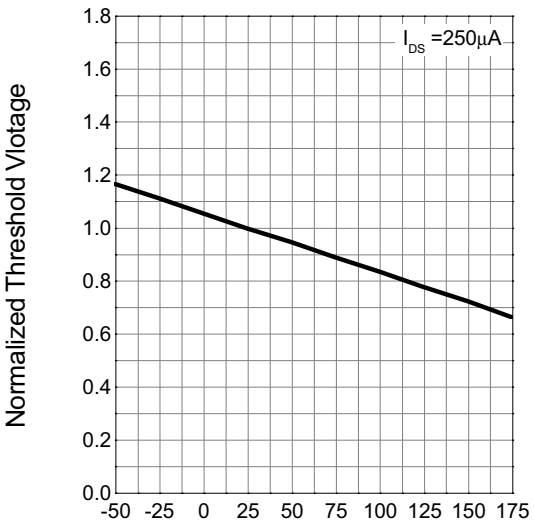
Drain-Source On Resistance



Drain-Source On Resistance

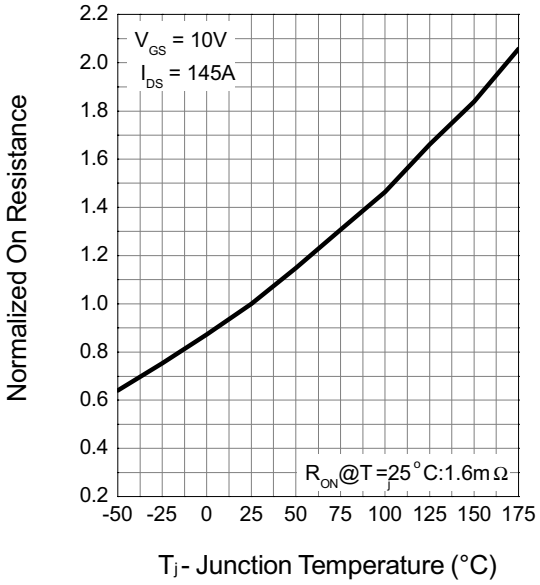


Gate Threshold Voltage

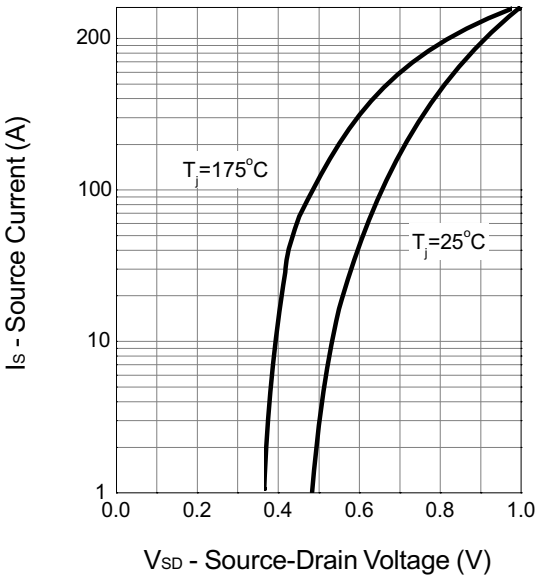


Typical Operating Characteristics (Cont.)

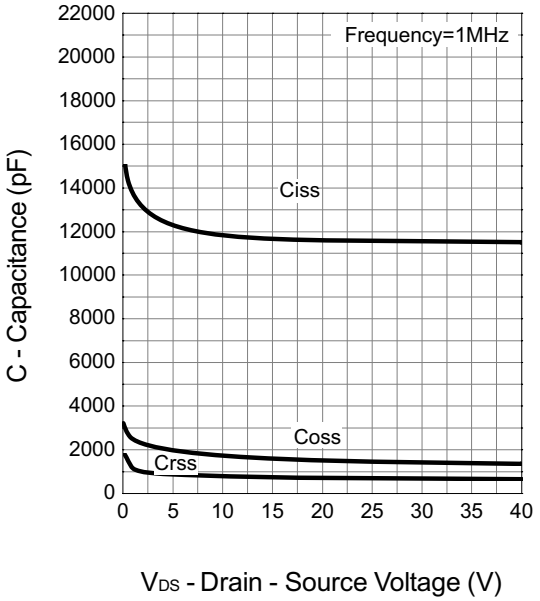
Drain-Source On Resistance



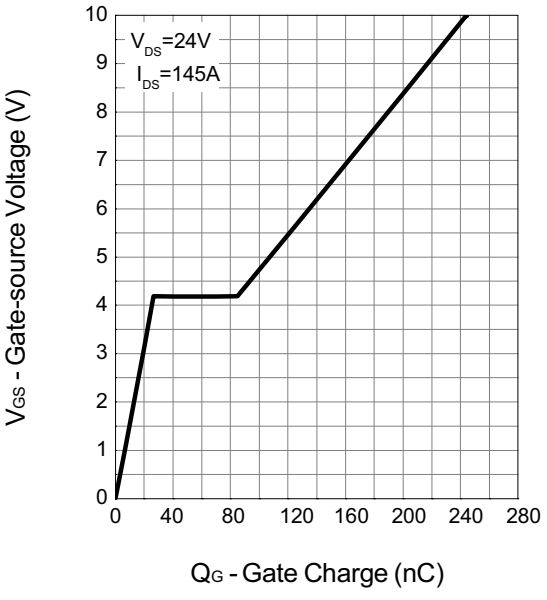
Source-Drain Diode Forward



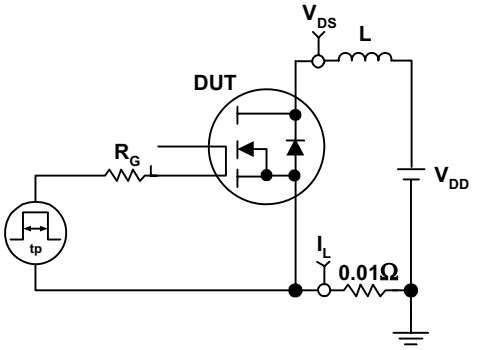
Capacitance

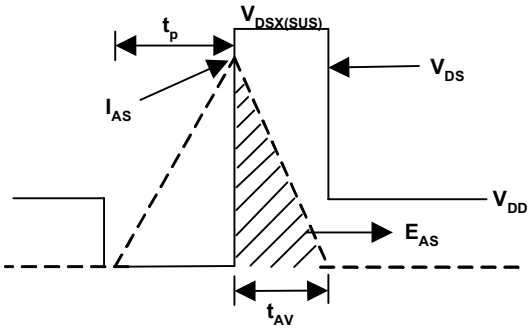


Gate Charge

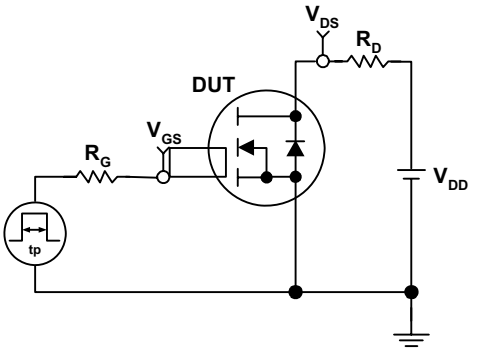


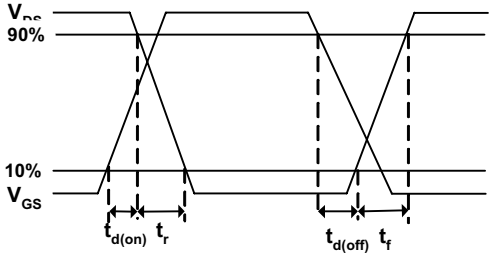
Avalanche Test Circuit and Waveforms





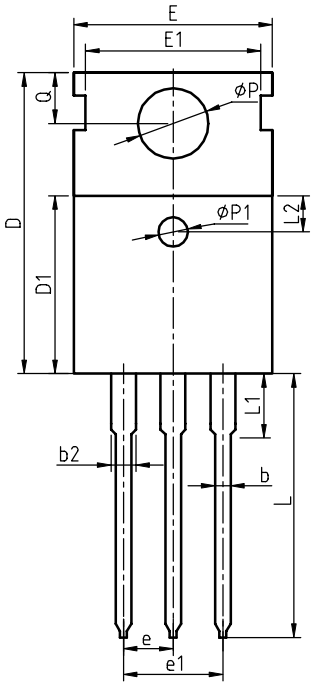
Switching Time Test Circuit and Waveforms

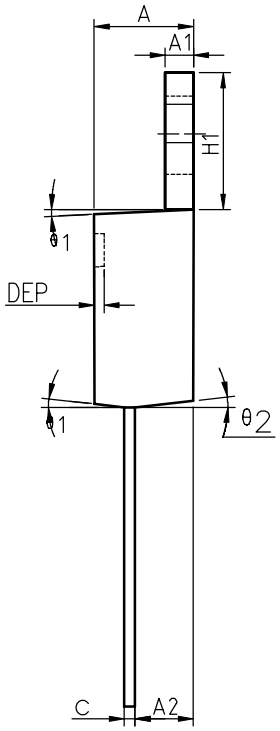


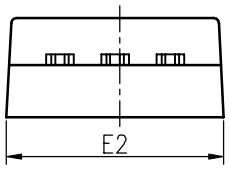


Package Information

TO-220FB-3L







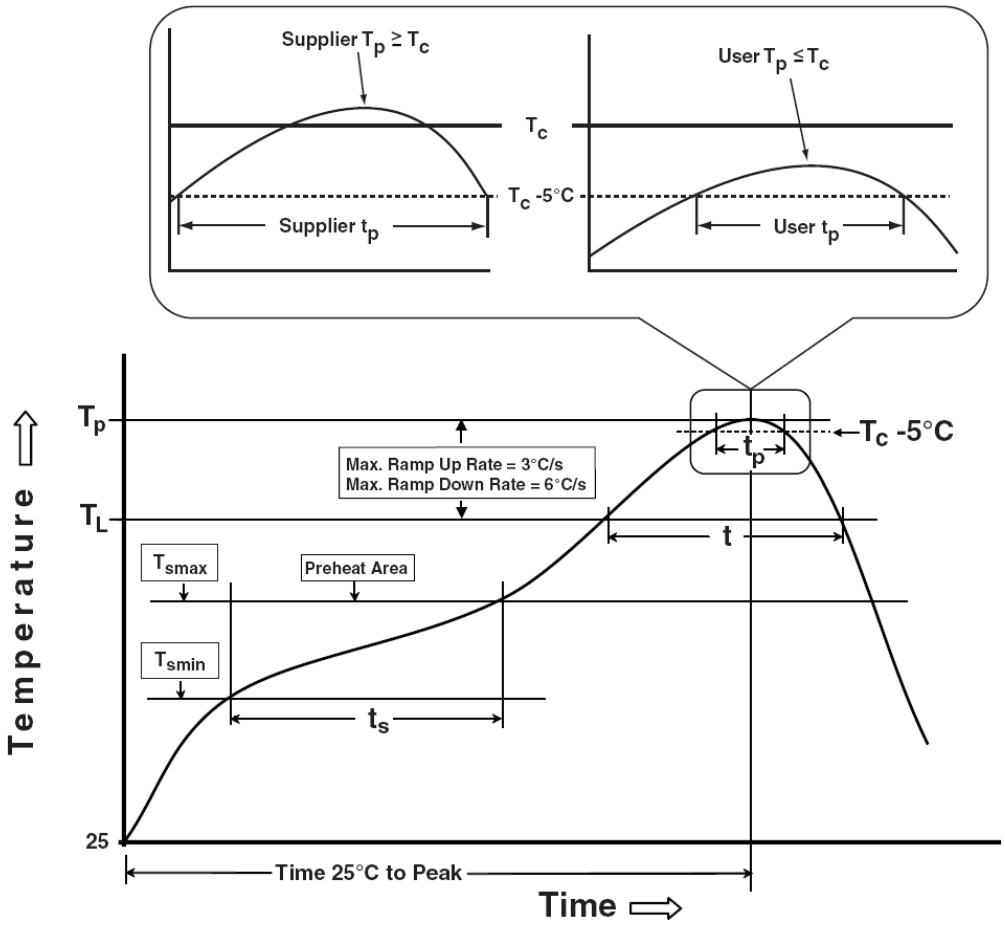
COMMON DIMENSIONS

SYMBOL	MIN	NOM	MAX	MIN	NOM	MAX
A	4.40	4.57	4.70	0.173	0.180	0.185
A1	1.27	1.30	1.33	0.050	0.051	0.052
A2	2.35	2.40	2.50	0.093	0.094	0.098
b	0.77	0.80	0.90	0.030	0.031	0.035
b2	1.17	1.27	1.36	0.046	0.050	0.054
c	0.48	0.50	0.56	0.019	0.020	0.022
D	15.40	15.60	15.80	0.606	0.614	0.622
D1	9.00	9.10	9.20	0.354	0.358	0.362
DEP	0.05	0.10	0.20	0.002	0.004	0.008
E	9.80	10.00	10.20	0.386	0.394	0.402
E1	-	8.70	-	-	0.343	-
E2	9.80	10.00	10.20	0.386	0.394	0.402
e		2.54	BSC		0.100	BSC
e1		5.08	BSC		0.200	BSC
H1	6.40	6.50	6.60	0.252	0.256	0.260
L	12.75	13.50	13.65	0.502	0.531	0.537
L1	-	3.10	3.30	-	0.122	0.130
L2		2.50	REF		0.098	REF
P	3.50	3.60	3.63	0.138	0.142	0.143
P1	3.50	3.60	3.63	0.138	0.142	0.143
Q	2.73	2.80	2.87	0.107	0.110	0.113
θ1	5°	7°	9°	5°	7°	9°
θ2	1°	3°	5°	1°	3°	5°
θ3	1°	3°	5°	1°	3°	5°

Devices Per Unit

Package Type	Unit	Quantity
TO-220FB-3L	Tube	50

Classification Profile



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Keep safety first in your circuit designs!

1. MOS-TECH Semiconductor Corp. puts the maximum effort into making semiconductor products better and more reliable, but there is always the possibility that trouble may occur with them. Trouble with semiconductors may lead to personal injury, fire or property damage.
   Remember to give due consideration to safety when making your circuit designs, with appropriate measures such as (i) placement of substitutive, auxiliary circuits, (ii) use of nonflammable material or (iii) prevention against any malfunction or mishap.