MT3240B/B

N-Channel Low Qg® MOSFET
40V, 208A, 2.5mΩ

MT Semiconductor®

http://www.mtsemi.com

Features

- Max R_{DS}(on)=2.5mΩ at V_{GS}=10V,I_D=40A
- High performance trench technology for extremely low R_{DS}(on)
- Low Gate Charge
- High power and current handing capability

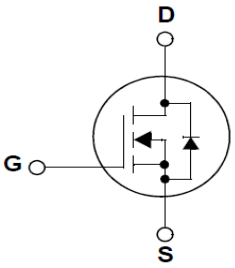
General Description

This N-Channel MOSFET has been designed specifically to improve the overall efficiency of DC/DC converters using either synchronous or conventional switching PWM controllers. It has been optimized for low gate charge, low R_{DS}(ON) and fast switching speed.

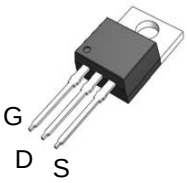
Applications

- DC-DC primary bridge
- DC-DC Synchronous rectification
- Power Managemement for Inverter Systems

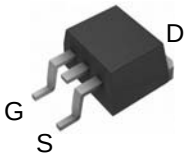
Simplified Schematic



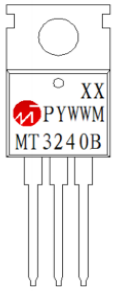
MARKING DIAGRAM & PIN ASSIGNMENT

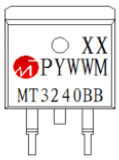


TO-220FB-3L



TO-263-2L





Package Code

MT3240B: TO-220FB-3L

MT3240BB: TO-263-2L

Date Code PYWWM

Lot No XX

MOSFET Maximum Ratings T_C = 25°C unless otherwise noted

Symbol	Parameter	Ratings	Units
V_{DSS}	Drain to Source Voltage	40	V
V_{GS}	Gate to Source Voltage	±20	V
I_D	Drain Current Continuous (T_C = 25°C, V_{GS} = 10V) (Note 1)	208	A
	Continuous (T_C = 25°C, V_{GS} = 4.5V) (Note 1)	108	A
	Continuous (T_{amb} = 25°C, V_{GS} = 10V, with $R_{\theta JA}$ = 62°C/W)	35	A
	Pulsed	Figure 4	A
E_{AS}	Single Pulse Avalanche Energy (Note 2)	1.4	J
P_D	Power dissipation	217	W
	Derate above 25°C	0.69	W/°C
T_J, T_{STG}	Operating and Storage Temperature	-55 to 175	°C

Thermal Characteristics

$R_{\theta JC}$	Thermal Resistance Junction to Case TO-220	0.69	°C/W
$R_{\theta JA}$	Thermal Resistance Junction to Ambient TO-220 (Note 3)	62.5	°C/W

Package Marking and Ordering Information

Device Marking	Device	Package	Reel Size	Tape Width	Quantity
MT3240B	MT3240B	TO-220FB-3L	Tube	N/A	50 units
MT3240BB	MT3240BB	TO-263-2L	Tube	N/A	50 units

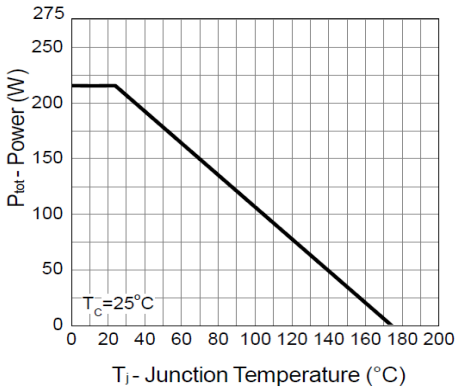
Electrical Characteristics T_C = 25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
Off Characteristics						
B_{VDSS}	Drain to Source Breakdown Voltage	I_D = 250μA, V_{GS} = 0V	40	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 24V, V_{GS} = 0V	-	-	1	μA
		V_{DS} = 24V, V_{GS} = 0V, T_C = 150°C	-	-	250	
I_{GSS}	Gate to Source Leakage Current	V_{GS} = ±20V	-	-	±100	nA
On Characteristics						
$V_{GS(TH)}$	Gate to Source Threshold Voltage	V_{GS} = V_{DS}, I_D = 250μA	-	3.0	-	V
$r_{DS(ON)}$	Drain to Source On Resistance	I_D = 40A, V_{GS} = 10V	-	2.5	-	mΩ
		I_D = 40A, V_{GS} = 4.5V	-	-	-	
		I_D = 40A, V_{GS} = 10V, T_J = 175°C	-	-	-	
Dynamic Characteristics						
C_{ISS}	Input Capacitance	V_{DS} = 15V, V_{GS} = 0V, f = 1MHz	-	5712	-	pF
C_{OSS}	Output Capacitance		-	1465	-	pF
C_{RSS}	Reverse Transfer Capacitance		-	596	-	pF
R_G	Gate Resistance	V_{GS} = 0V, V_{DS}=0V,f = 1MHz	-	1	-	Ω
$Q_{g(TOT)}$	Total Gate Charge at 10V	V_{GS} = 0V to 10V; V_{DD} = 15V, I_D = 40A, I_g = 1.0mA	-	158	-	nC
$Q_{g(5)}$	Total Gate Charge at 5V	V_{GS} = 0V to 5V	-	30	38	nC
$Q_{g(TH)}$	Threshold Gate Charge	V_{GS} = 0V to 1V	-	3.0	4.0	nC
Q_{gs}	Gate to Source Gate Charge		-	30	-	nC
Q_{gs2}	Gate Charge Threshold to Plateau		-	6.0	-	nC
Q_{gd}	Gate to Drain “Miller” Charge		-	66	-	nC
Switching Characteristics (V_{GS} = 10V)						
t_{ON}	Turn-On Time	V_{DD} = 15V, I_D = 40A, V_{GS} = 4.5V, R_{GS} = 4.7Ω	-	35	-	ns
$t_{d(ON)}$	Turn-On Delay Time		-	20	-	ns
t_r	Rise Time		-	20	-	ns
$t_{d(OFF)}$	Turn-Off Delay Time		-	44	-	ns
t_f	Fall Time		-	45	-	ns
t_{OFF}	Turn-Off Time		-	62	-	ns
Drain-Source Diode Characteristics						
V_{SD}	Source to Drain Diode Voltage	I_{SD} = 40A	-	-	1.25	V
		I_{SD} = 20A	-	-	1.0	V
t_{rr}	Reverse Recovery Time	I_{SD} = 40A, dI_{SD}/dt = 100A/μs	-	-	32	ns
Q_{RR}	Reverse Recovered Charge	I_{SD} = 40A, dI_{SD}/dt = 100A/μs	-	-	18	nC

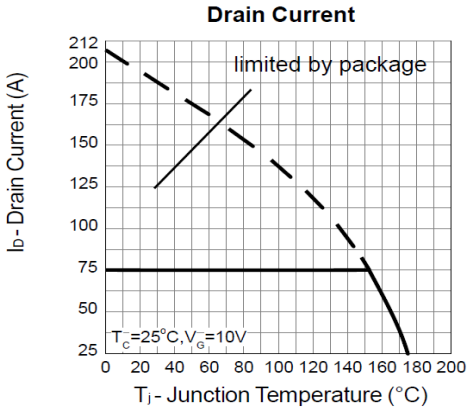
Notes:
1: Package current limitation is 80A.
2: Starting T_J = 25°C, L =0.3MH I_{AS} = 64A, V_{DD} = 37V, V_{GS} = 10V.
3: Pulse width = 100s.

Typical Operating Characteristics

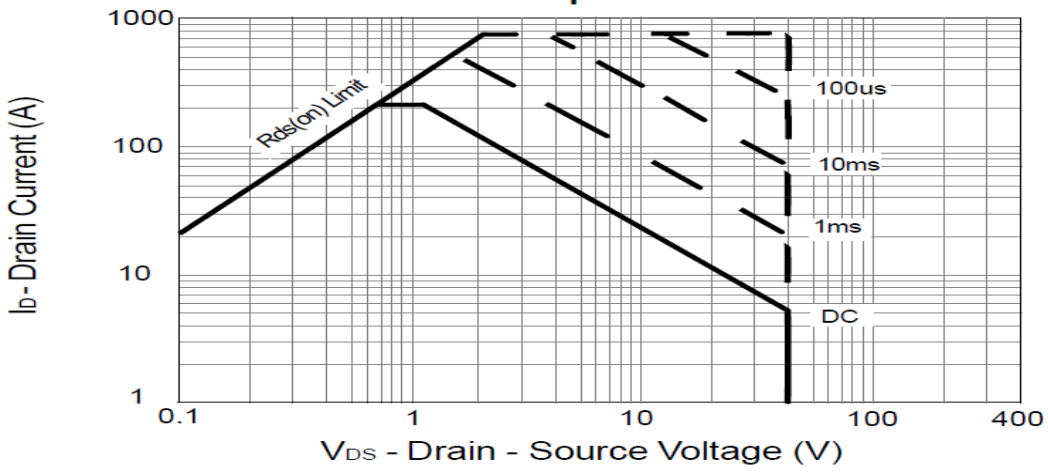
Power Dissipation



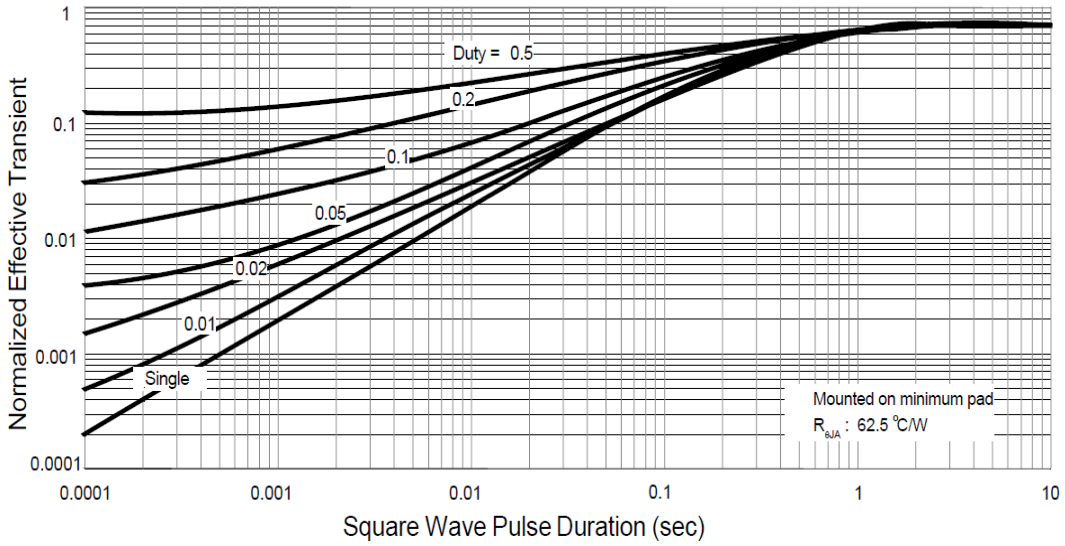
Drain Current



Safe Operation Area

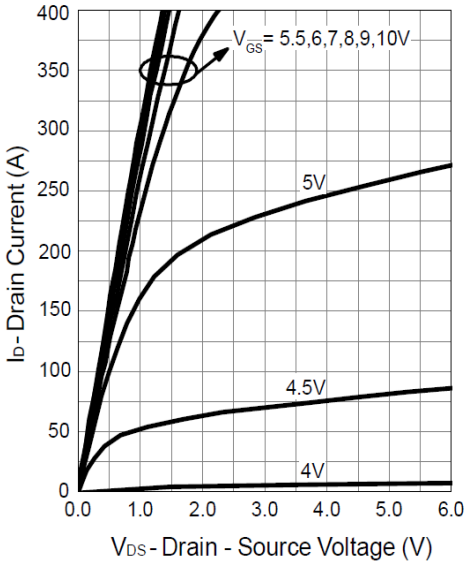


Thermal Transient Impedance

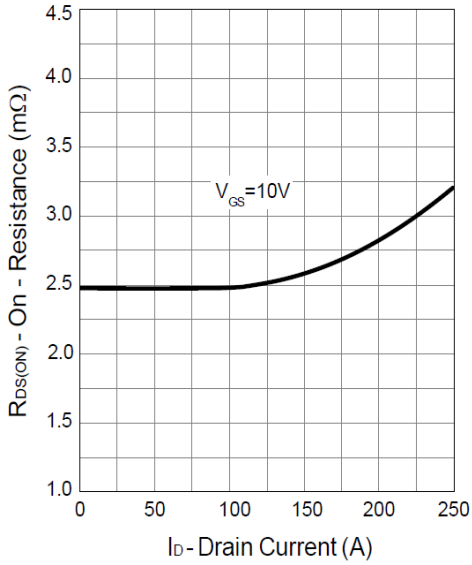


Typical Operating Characteristics (Cont.)

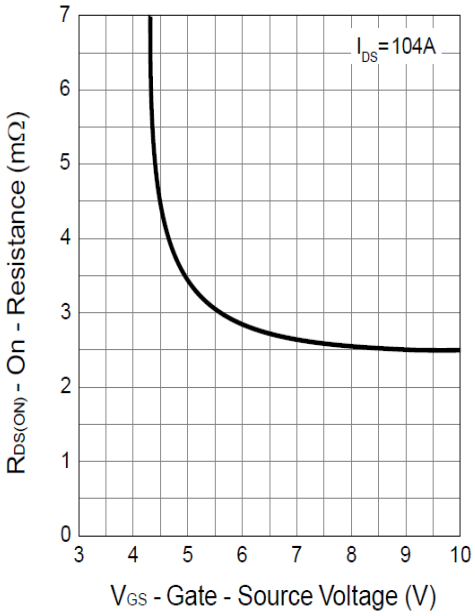
Output Characteristics



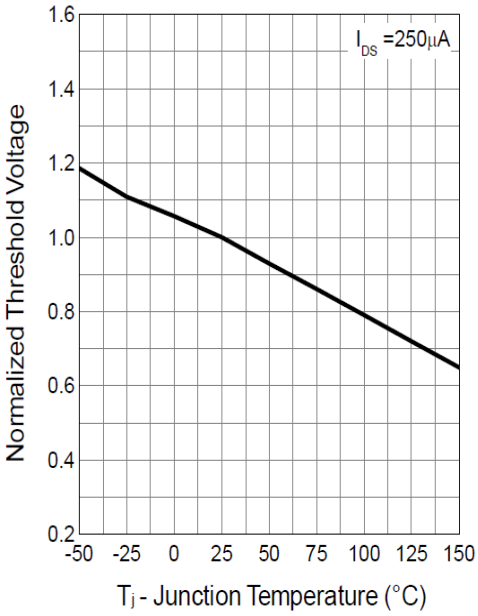
Drain-Source On Resistance



Gate-Source On Resistance

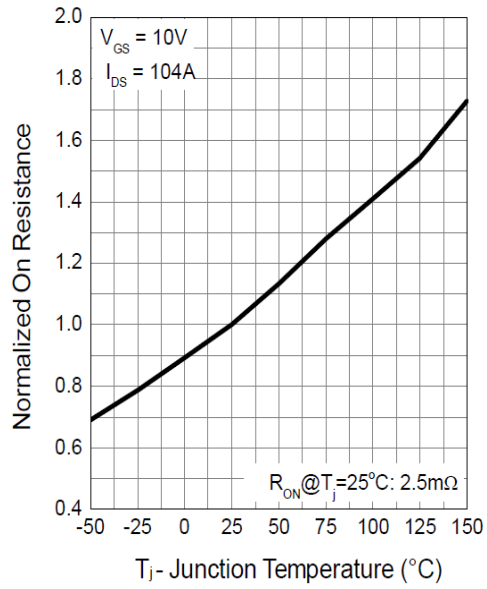


Gate Threshold Voltage

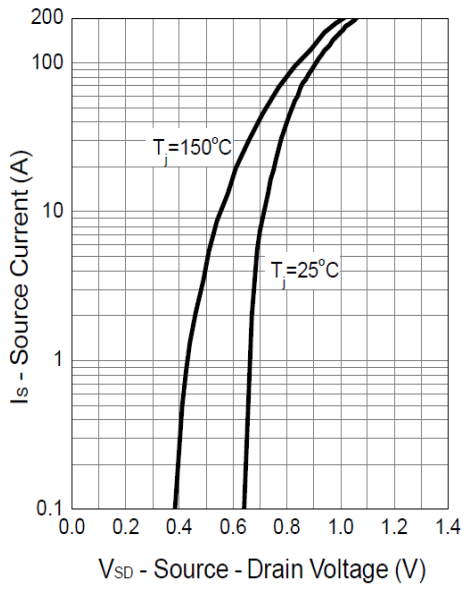


Typical Operating Characteristics (Cont.)

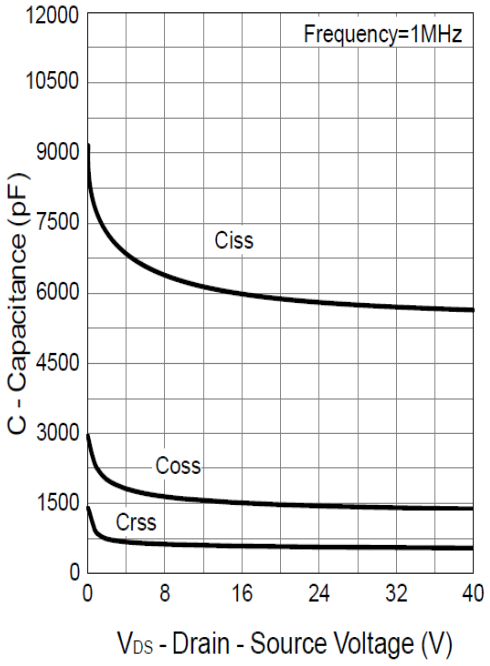
Drain-Source On Resistance



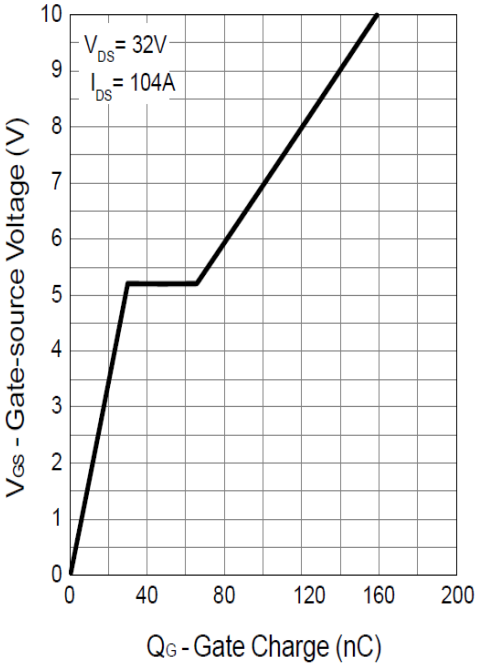
Source-Drain Diode Forward



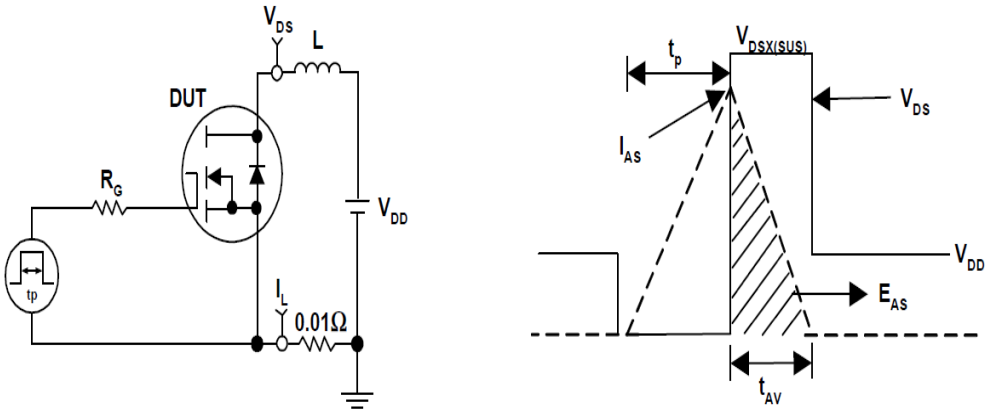
Capacitance



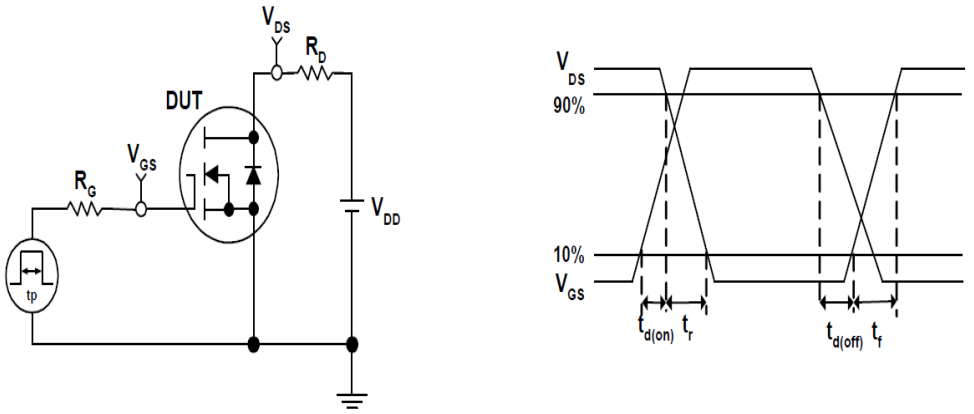
Gate Charge



Avalanche Test Circuit and Waveforms

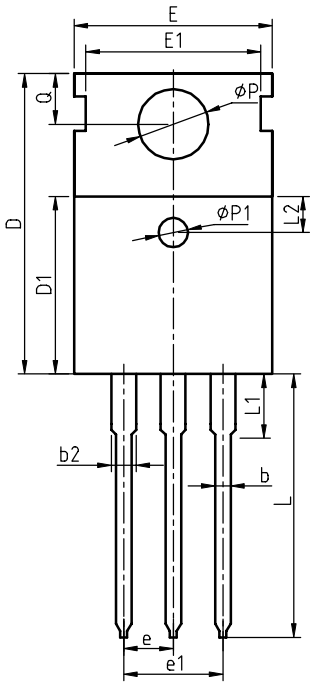


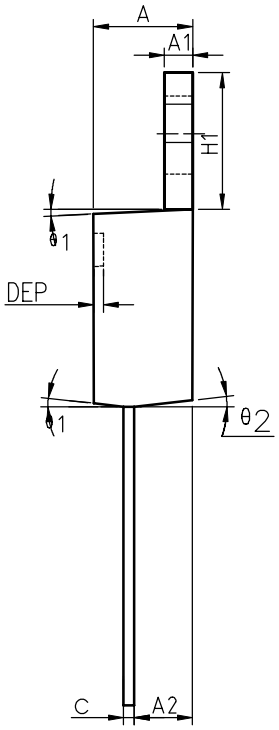
Avalanche Test Circuit and Waveforms

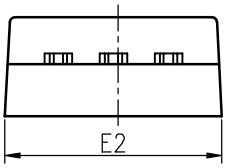


Package Information

TO-220FB-3L



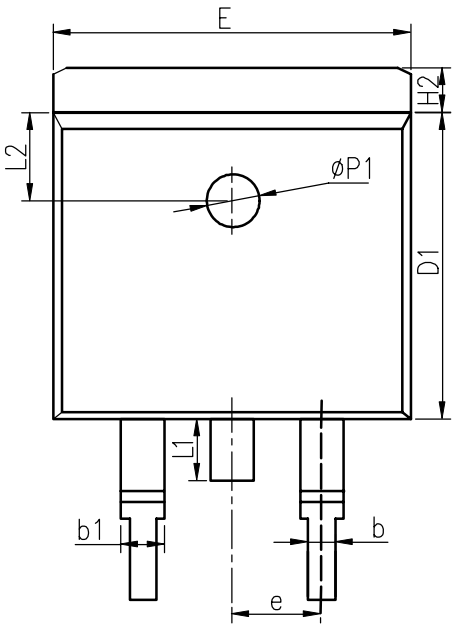


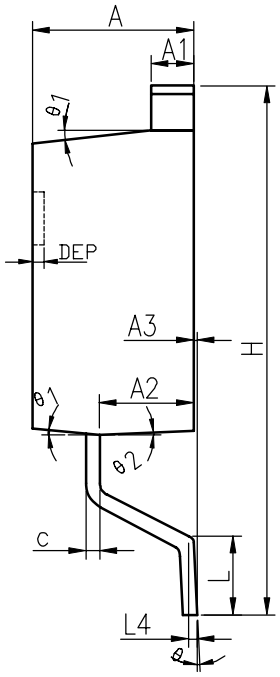


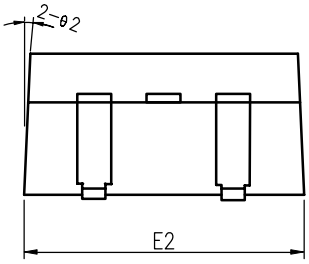
COMMON DIMENSIONS

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°

TO-263-2L







COMMON DIMENSIONS

SYMBOL	MM			INCH		
	MIN	NOM	MAX	MIN	NOM	MAX
A	4.40	4.57	4.70	0.173	0.180	0.185
A1	1.22	1.27	1.32	0.048	0.050	0.052
A2	2.59	2.69	2.79	0.102	0.106	0.110
A3	0.00	0.10	0.20	0.000	0.004	0.008
b	0.77	0.813	0.90	0.030	0.032	0.035
b1	1.20	1.270	1.36	0.047	0.050	0.054
c	0.34	0.381	0.47	0.013	0.015	0.019
D1	8.60	8.70	8.80	0.339	0.343	0.346
E	10.00	10.16	10.26	0.394	0.400	0.404
E2	10.00	10.10	10.20	0.394	0.398	0.402
e	2.54 BSC			0.100 BSC		
H	14.70	15.10	15.50	0.579	0.594	0.610
H2	1.17	1.27	1.40	0.046	0.050	0.055
L	2.00	2.30	2.60	0.079	0.091	0.102
L1	1.45	1.55	1.70	0.057	0.061	0.067
L2	2.50 REF			0.098 REF		
L4	0.25 BSC			0.010 BSC		
	0°	5°	8°	0°	5°	8°
1	5°	7°	9°	5°	7°	9°
2	1°	3°	5°	1°	3°	5°
ΦP1	1.40	1.50	1.60	0.055	0.059	0.063
DEP	0.05	0.10	0.20	0.002	0.004	0.008

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   2）植埋于人体使用的装置。
   3）用于治疗（切除患部、给药等）的装置。
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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.