

## DESCRIPTION

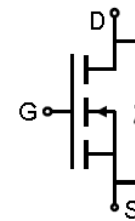
The TDM3742 uses advanced trench technology to provide excellent RDS(ON) and low gate charge. This device is suitable for use as a load switch or in PWM applications.

## GENERAL FEATURES

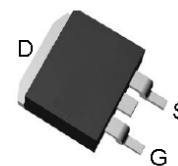
- 80V/196A  
RDS(ON) < 3.6mΩ @ VGS=10V
- High Power and current handling capability
- Lead free product is available
- Surface Mount Package

## Application

- Synchronous Rectification in SMPS
- Hard Switching and High Speed Circuit
- Power Tools
- UPS
- Motor Control



Schematic diagram



Top View of TO-263-3

### ABSOLUTE MAXIMUM RATINGS(T<sub>A</sub>=25°C unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V <sub>DS</sub>	80	V
Gate-Source Voltage	V <sub>GS</sub>	+20	V
Drain Current @ Continuous(Silicon Limited)	I <sub>D</sub> (T <sub>C</sub> =25°C)	196	A
	I <sub>D</sub> (T <sub>C</sub> =100°C)	139	A
Drain Current @ Continuous(Package Limited)	I <sub>D</sub> (T <sub>C</sub> =25°C)	180	A
Drain Current @ Current-Pulsed	I <sub>DM</sub> (T <sub>C</sub> =25°C)	500	A
Maximum Power Dissipation	P <sub>D</sub> (T <sub>C</sub> =25°C)	272	W
Avalanche Energy, Single Pulse	E <sub>AS</sub> (L=0.5mH,T <sub>C</sub> =25°C)	306	mJ
Operating Junction and Storage Temperature Range	T <sub>J</sub> ,T <sub>STG</sub>	-55 To 175	°C

### THERMAL CHARACTERISTICS

Thermal Resistance,Junction-to-Ambient (Note 2)	R <sub>θJA</sub>	60	°C/W
Thermal Resistance,Junction-to-Case	R <sub>θJC</sub>	0.55	°C/W

**N-Channel Enhancement Mode MOSFET**
**TDM3742**
**ELECTRICAL CHARACTERISTICS** ( $T_A=25^{\circ}\text{C}$  unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
<b>STATIC CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A$	80	-	-	V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=80V, V_{GS}=0V, T_j=25^{\circ}\text{C}$	-	-	1	$\mu A$
Gate-Body Leakage Current	$I_{GSS}$	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	$\pm 100$	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	2	3	4	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=20A$	-	2.9	3.6	$m\Omega$
Transconductance	$g_{fs}$	$V_{DS}=5V, I_D=20A$	-	70	-	S
Gate Resistance	$R_G$	$V_{DS}=0V, V_{GS}=0V, F=1.0\text{MHz}$	-	1.3	-	$\Omega$
<b>DYNAMIC CHARACTERISTICS</b>						
Input Capacitance	$C_{iss}$	$V_{DS}=40V, V_{GS}=0V, F=1.0\text{MHz}$	-	3635	-	PF
Output Capacitance	$C_{oss}$		-	1317	-	PF
Reverse Transfer Capacitance	$C_{rss}$		-	91	-	PF
Turn-on Delay Time	$t_{d(on)}$	$V_{DS}=40V, V_{GS}=10V, R_G=10\Omega, I_D=20A$	-	13	-	nS
Turn-on Rise Time	$t_r$		-	18	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	44	-	nS
Turn-Off Fall Time	$t_f$		-	25	-	nS
Total Gate Charge	$Q_g$	$V_{DS}=40V, I_D=20A, V_{GS}=10V$	-	74	-	nC
Gate-Source Charge	$Q_{gs}$		-	17	-	nC
Gate-Drain Charge	$Q_{gd}$		-	31	-	nC
<b>REVERSE DIODE CHARACTERISTICS</b>						
Diode Forward Voltage	$V_{SD}$	$V_{GS}=0V, I_S=20A$	-	0.9	1.2	V
Body Diode Reverse Recovery Time	$T_{rr}$	$I_F=20A, di/dt=400A/\mu s$	-	44	-	nS
Body Diode Reverse Recovery Charge	$Q_{rr}$		-	155	-	nC

Typical Operating Characteristics

Fig 1. Typical Output Characteristics

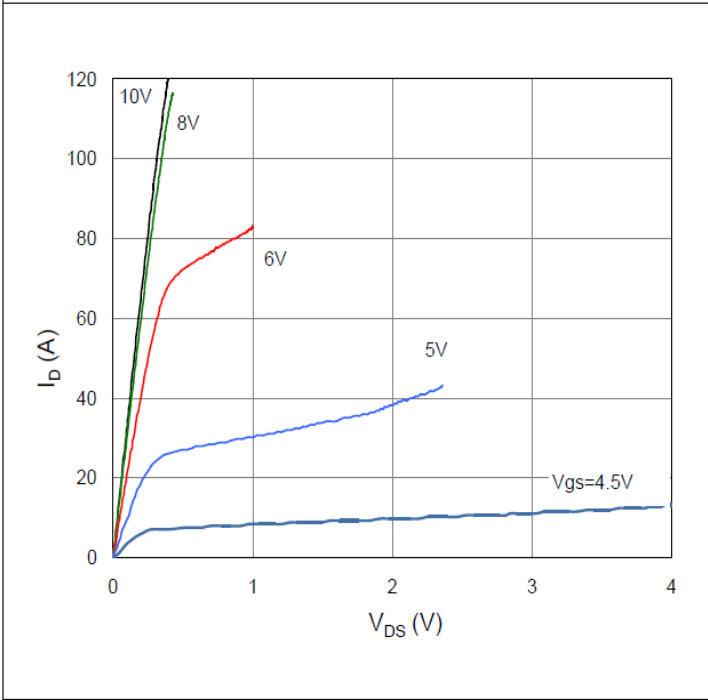


Figure 2. On-Resistance vs. Gate-Source Voltage

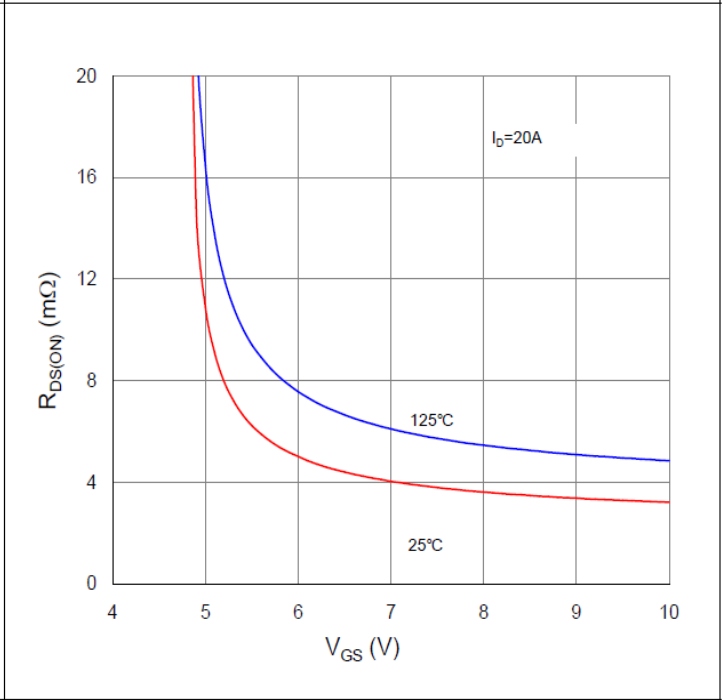


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

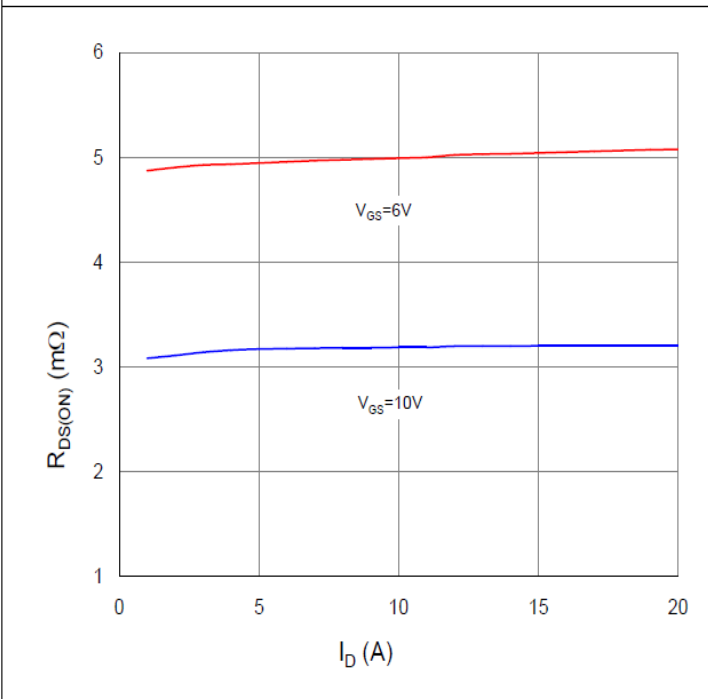
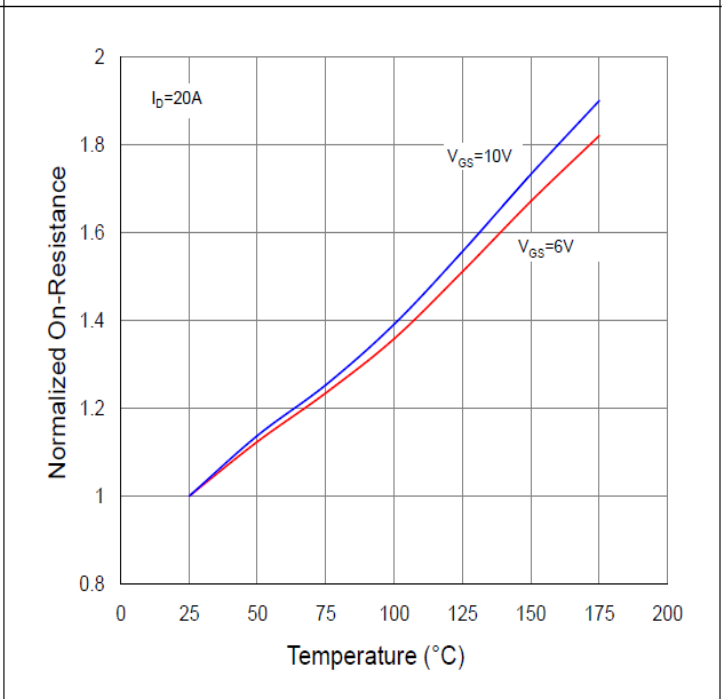
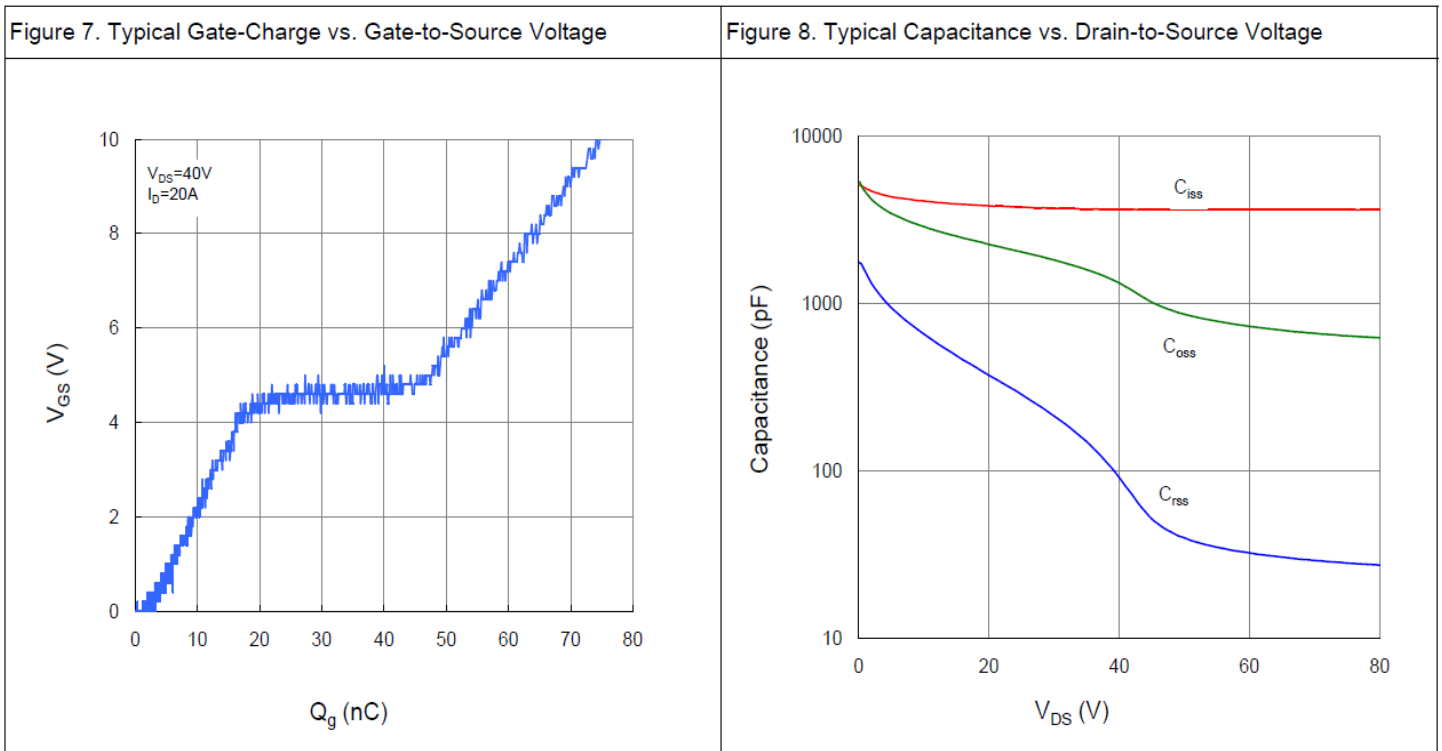
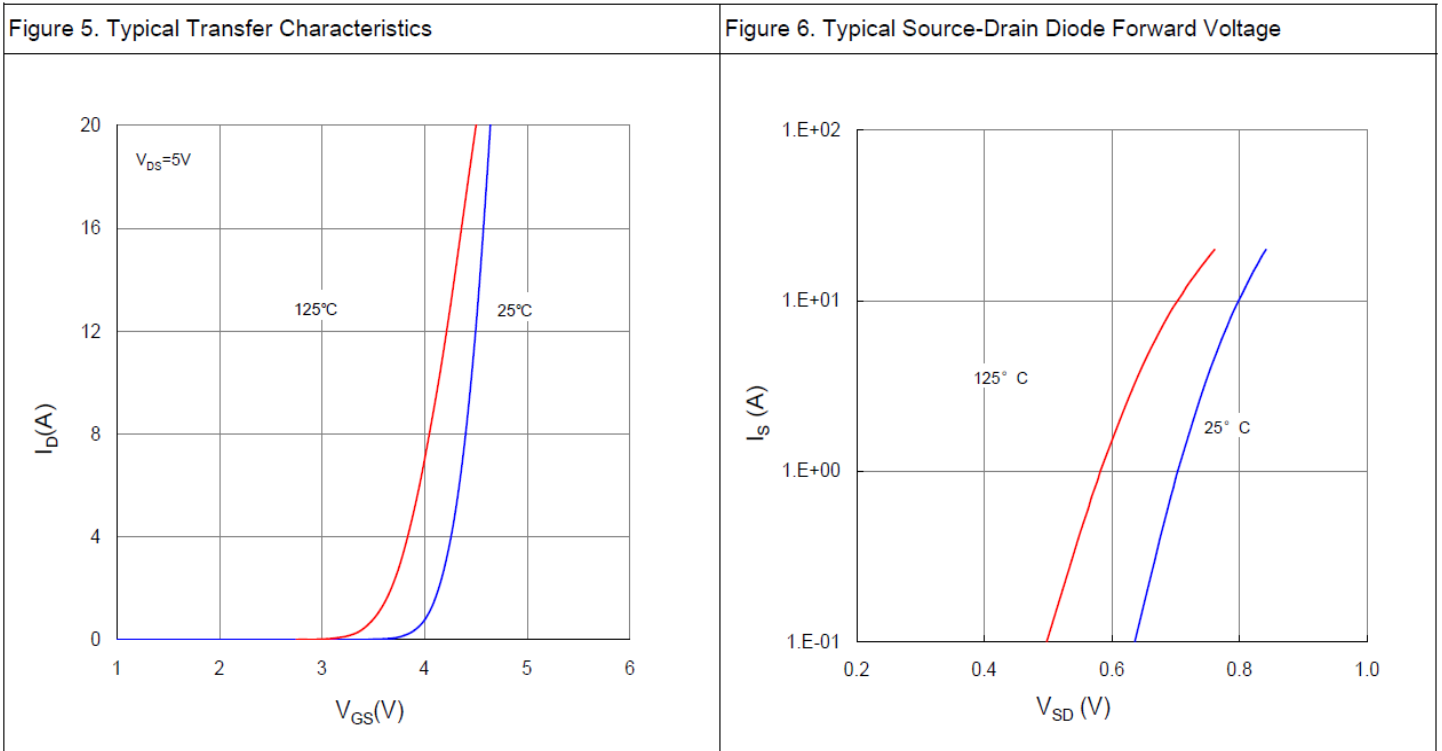


Figure 4. Normalized On-Resistance vs. Junction Temperature



Typical Operating Characteristics(Cont.)



Typical Operating Characteristics (Cont.)

Figure 9. Maximum Safe Operating Area

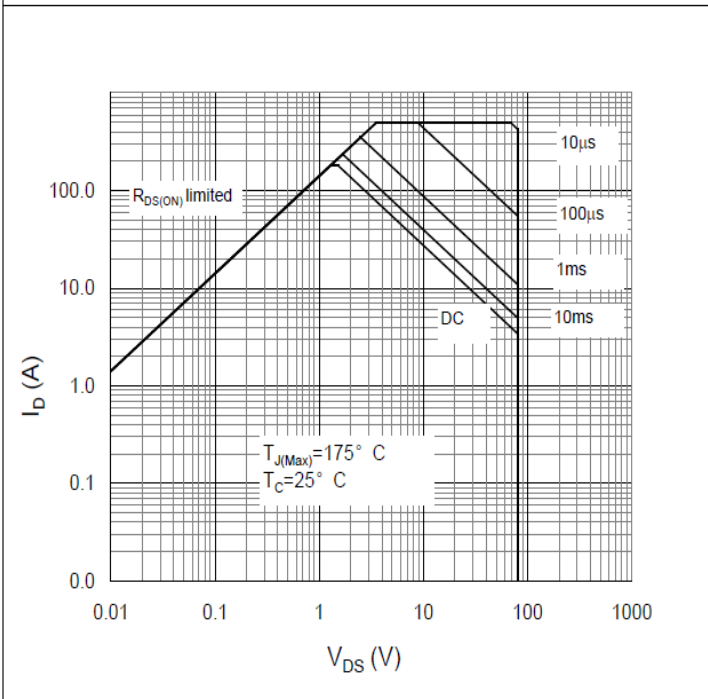


Figure 10. Maximum Drain Current vs. Case Temperature

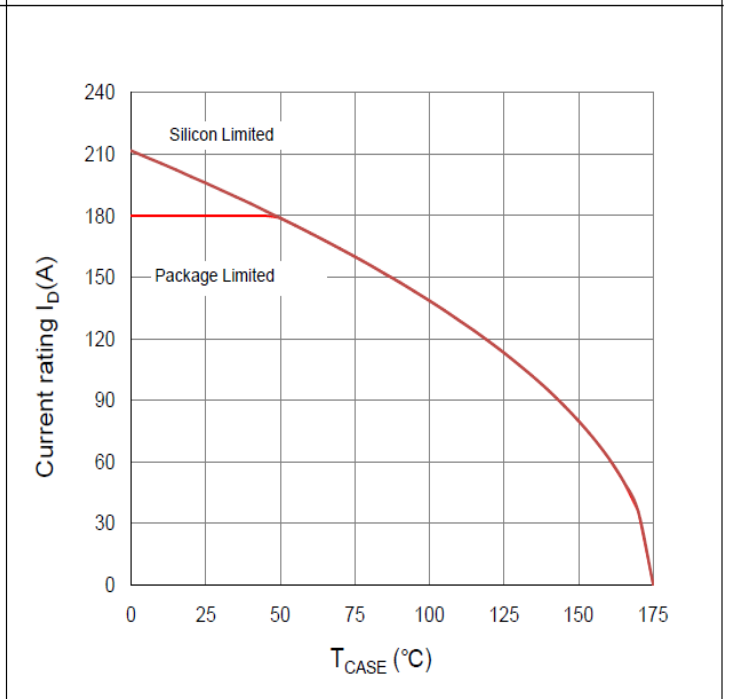
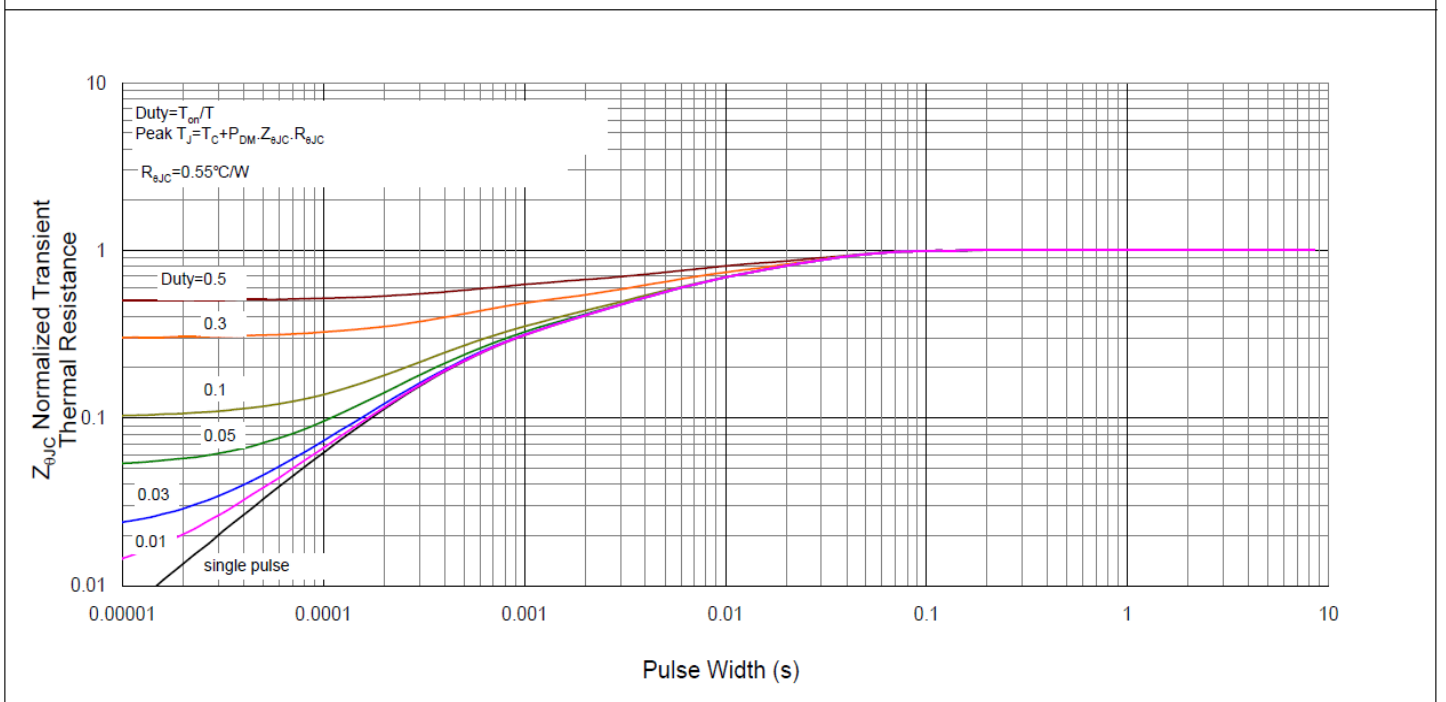
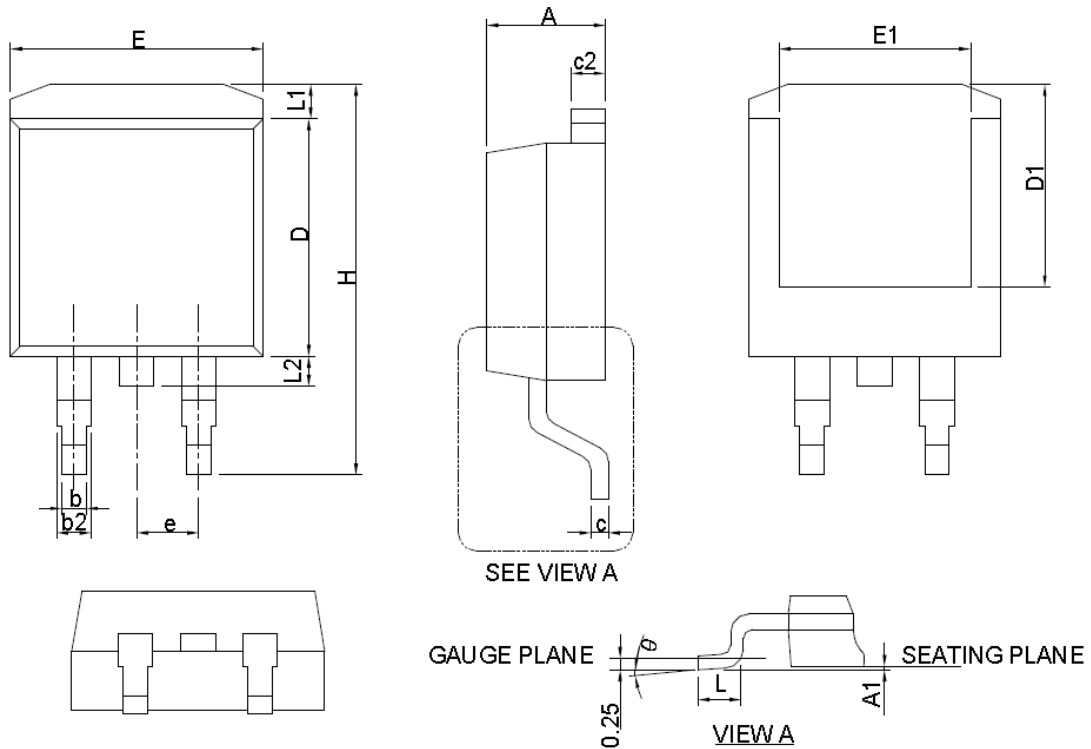


Figure 11. Normalized Maximum Transient Thermal Impedance, Junction-to-Case



Package Information

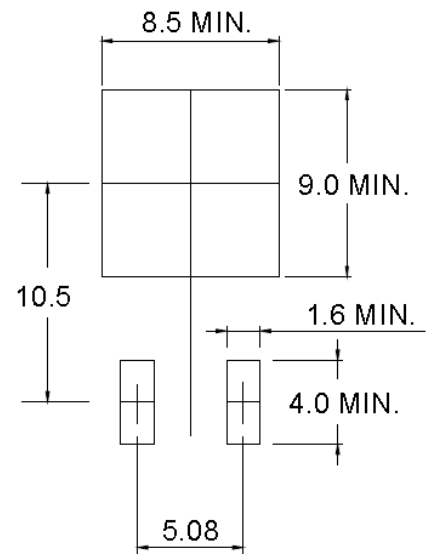
TO263-3 Package



SYMBOL	TO-263-3			
	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	4.06	4.83	0.160	0.190
A1	0.00	0.25	0.000	0.010
b	0.51	0.99	0.020	0.039
b2	1.14	1.78	0.045	0.070
c	0.38	0.74	0.015	0.029
c2	1.14	1.65	0.045	0.065
D	8.38	9.65	0.330	0.380
D1	6.00	9.00	0.236	0.354
E	9.65	11.43	0.380	0.450
E1	6.22	9.00	0.245	0.354
e	2.54 BSC		0.100 BSC	
H	14.61	15.88	0.575	0.625
L	1.78	2.79	0.070	0.110
L1	-	1.68	-	0.066
L2	-	1.78	-	0.070
θ	0°	8°	0°	8°

Note : Follow JEDEC TO-263 AB.

RECOMMENDED LAND PATTERN



UNIT: mm

Design Notes