

N-Channel Enhancement Mode MOSFET

TDM31044

**DESCRIPTION**

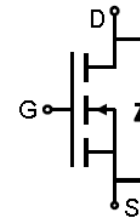
The TDM31044 uses advanced trench technology to provide excellent RDS(ON) and low gate charge. This device is suitable for use as a load switch or in PWM applications.

**GENERAL FEATURES**

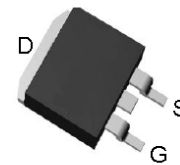
- RDS(ON) < 3.2mΩ @ VGS=10V
- High Power and current handling capability
- Lead free product is available
- TO263 Package

**Application**

- PWM applications
- Load switch
- Power management
- Hard Switched and High Frequency Circuits



Schematic diagram



Top View of TO-263-3

ABSOLUTE MAXIMUM RATINGS(TA=25°C unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	Vds	100	V
Gate-Source Voltage	VGS	+20	V
Diode Continuous Forward Current	Is (Tc=25°C)	80	A
Drain Current @ Continuous	ID (Tc=25°C)	120(Note 1)	A
	ID (Tc=100°C)	120(Note 1)	A
Drain Current @ Current-Pulsed (Note 1)	IDM (Tc=25°C)	400	A
Maximum Power Dissipation	Pd(Tc=25°C)	312	W
	Pd(Tc=100°C)	125	W
Drain Current @ Continuous	ID (TA=25°C)	17.6	A
	ID (TA=70°C)	14.1	A
Maximum Power Dissipation	Pd(TA=25°C)	2	W
	Pd(TA=70°C)	1.28	W
Maximum Operating Junction Temperature	TJ	150	°C
Storage Temperature Range	TSTG	-55 To 150	°C
Avalanche Energy, Single pulse(L=0.5mH)	EAS	900	mJ

THERMAL CHARACTERISTICS

Thermal Resistance,Junction-to-Ambient (Note 1)	RθJA	62.5	°C/W
Thermal Resistance,Junction-to-Case	RθJC	0.4	°C/W

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ELECTRICAL CHARACTERISTICS ( $T_A=25^\circ\text{C}$  unless otherwise noted)

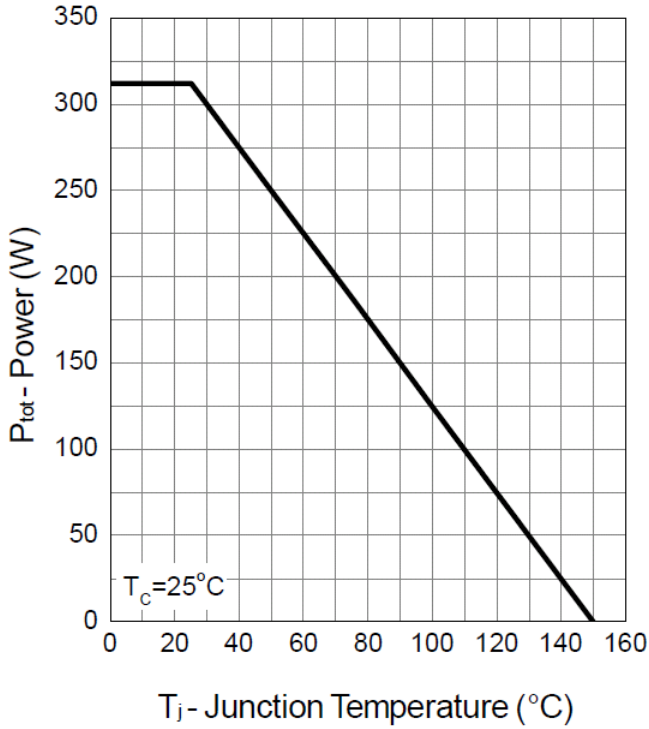
Parameter	Symbol	Condition	Min	Typ	Max	Unit
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A$	100	-	-	V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=80V, V_{GS}=0V$	-	-	1	$\mu A$
Gate-Body Leakage Current	$I_{GSS}$	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	$\pm 100$	nA
<b>ON CHARACTERISTICS (Note 2)</b>						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	2	3	4	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=40A$	-	2.6	3.2	m $\Omega$
<b>DYNAMIC CHARACTERISTICS (Note3)</b>						
Gate Resistance	$R_G$	$V_{DS}=0V, V_{GS}=0V, F=1.0\text{MHz}$	-	1.0	-	$\Omega$
Input Capacitance	$C_{iss}$	$V_{DS}=30V, V_{GS}=0V, F=1.0\text{MHz}$	-	6500	8400	PF
Output Capacitance	$C_{oss}$		-	3100	-	PF
Reverse Transfer Capacitance	$C_{rss}$		-	100	-	PF
<b>SWITCHING CHARACTERISTICS (Note 3)</b>						
Turn-on Delay Time	$t_{d(on)}$	$V_{DS}=30V, R_L=30\Omega, V_{GEN}=10V, R_G=6\Omega, I_D=1A$	-	30	55	nS
Turn-on Rise Time	$t_r$		-	25	45	nS
Turn-Off Delay Time	$t_{d(off)}$		-	115	205	nS
Turn-Off Fall Time	$t_f$		-	160	290	nS
Total Gate Charge	$Q_g$	$V_{DS}=50V, I_D=40A, V_{GS}=10V$	-	130	180	nC
Gate-Source Charge	$Q_{gs}$		-	33	-	nC
Gate-Drain Charge	$Q_{gd}$		-	37	-	nC
Body Diode Reverse Recovery Time	$T_{rr}$	$I_F=40A, di/dt=100A/\mu s$	-	90	-	nS
Body Diode Reverse Recovery Charge	$Q_{rr}$		-	240	-	nC
<b>DRAIN-SOURCE DIODE CHARACTERISTICS</b>						
Diode Forward Voltage (Note 2)	$V_{SD}$	$V_{GS}=0V, I_S=40A$	-	0.8	1.3	V

## NOTES:

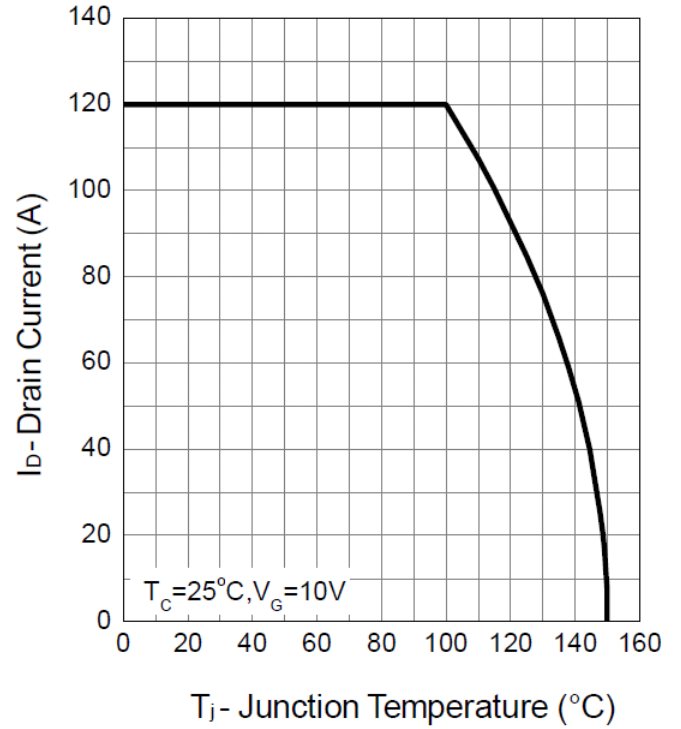
1. Pulse width limited by max. junction temperature.
2. Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$ .
3. Guaranteed by design, not subject to production testing

Typical Operating Characteristics

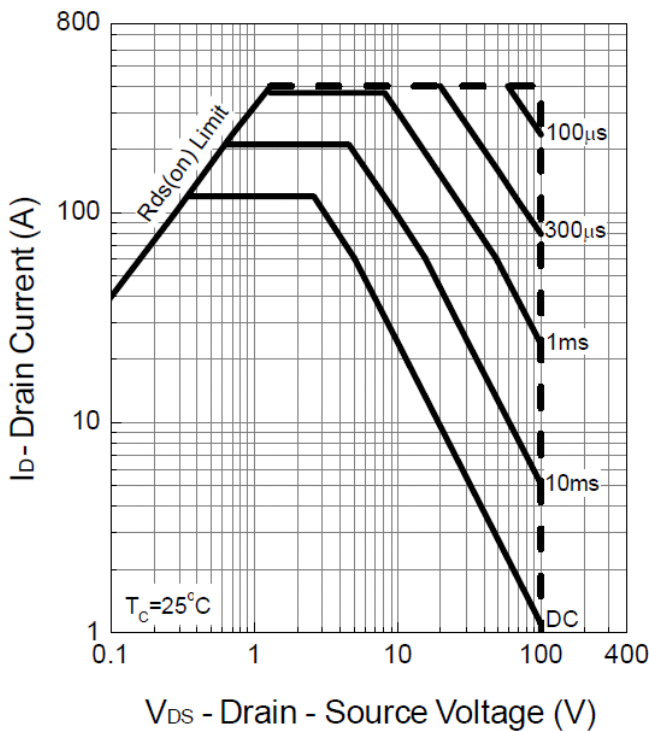
Power Dissipation



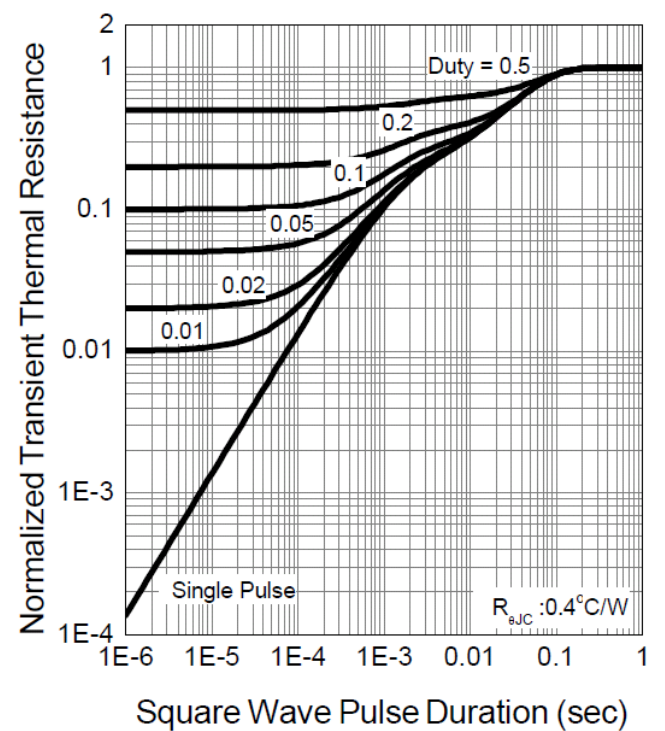
Drain Current



Safe Operation Area

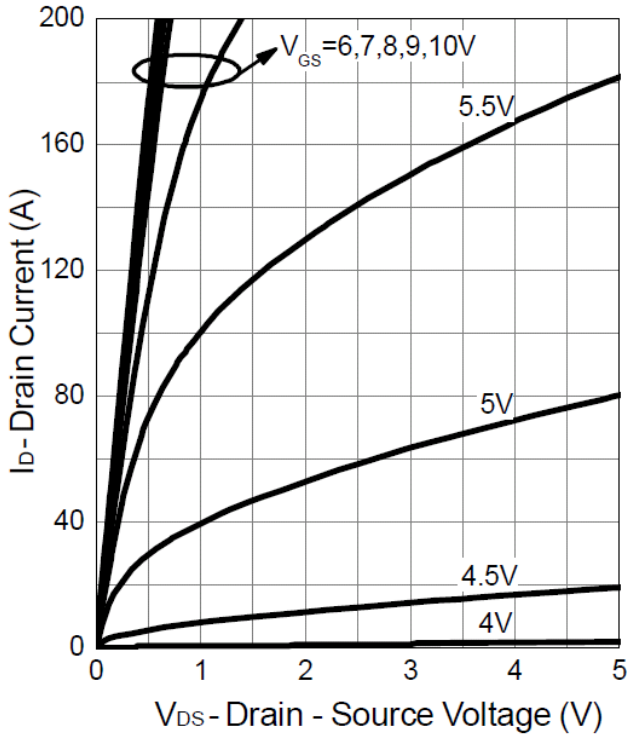


Thermal Transient Impedance

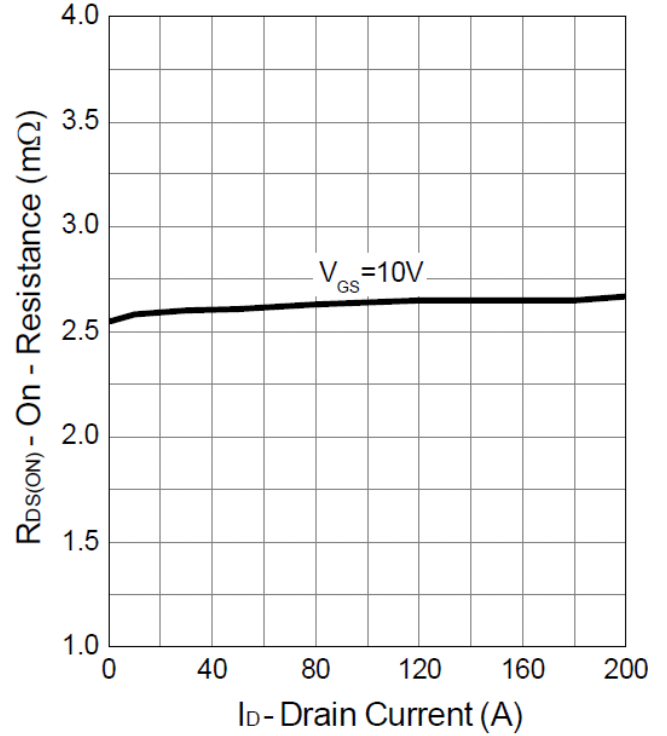


Typical Operating Characteristics(Cont.)

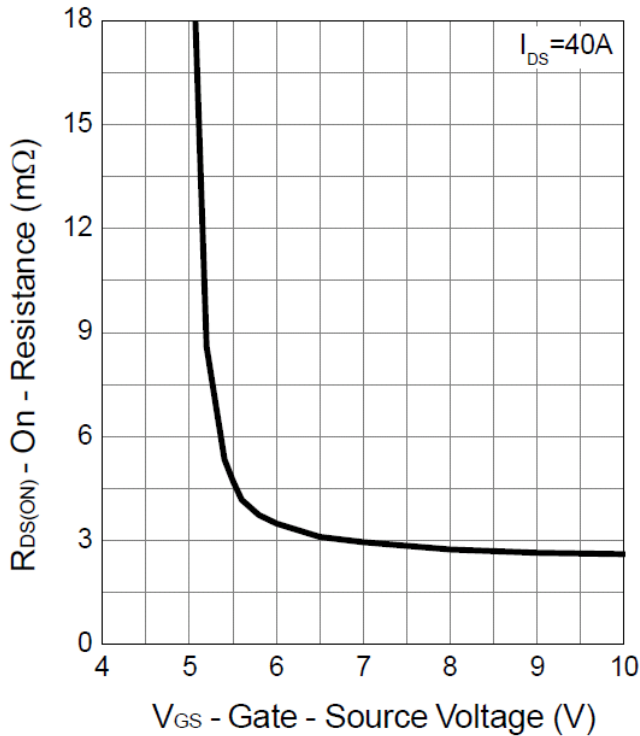
Output Characteristics



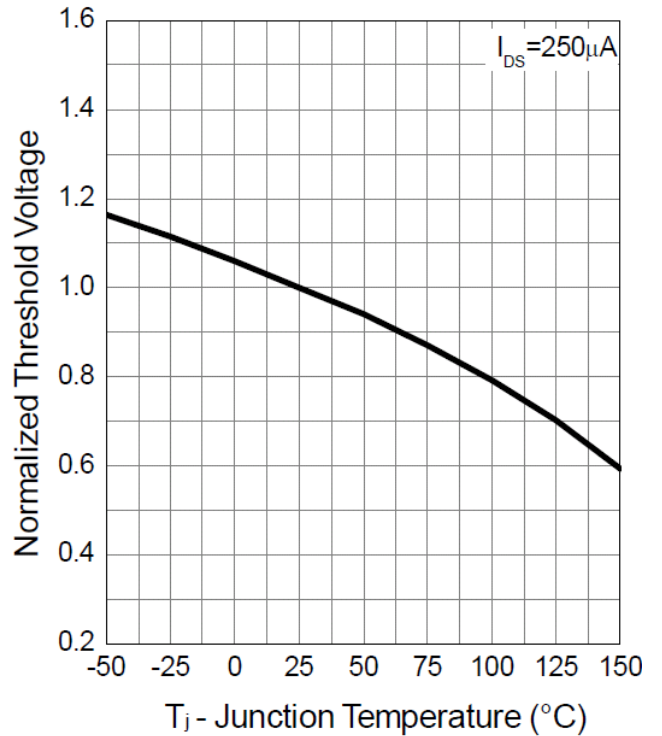
Drain-Source On Resistance



Gate-Source On Resistance

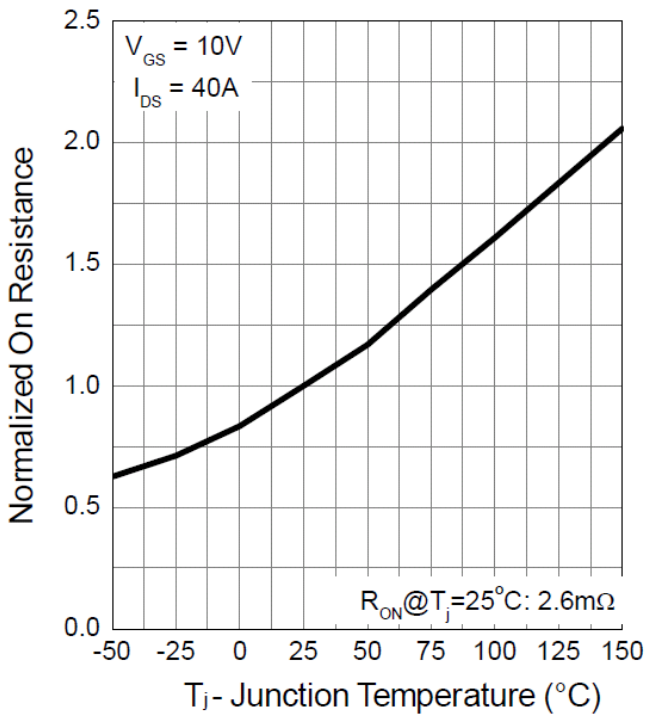


Gate Threshold Voltage

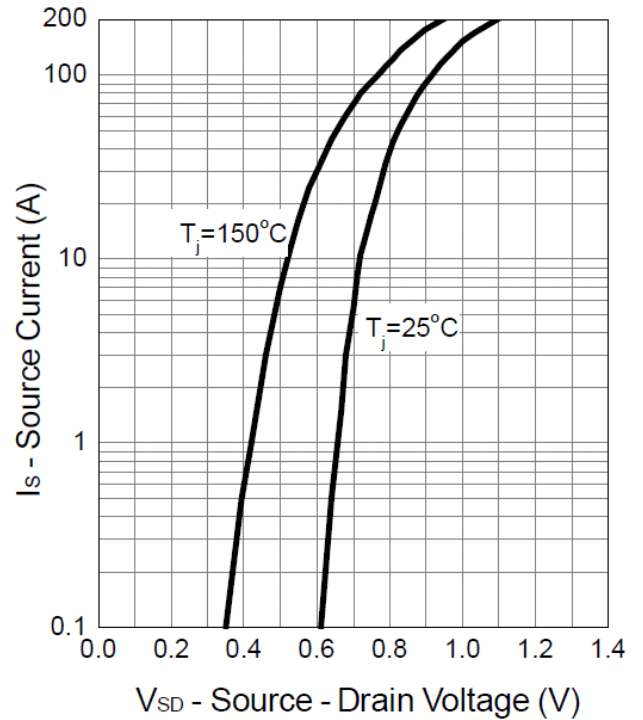


Typical Operating Characteristics(Cont.)

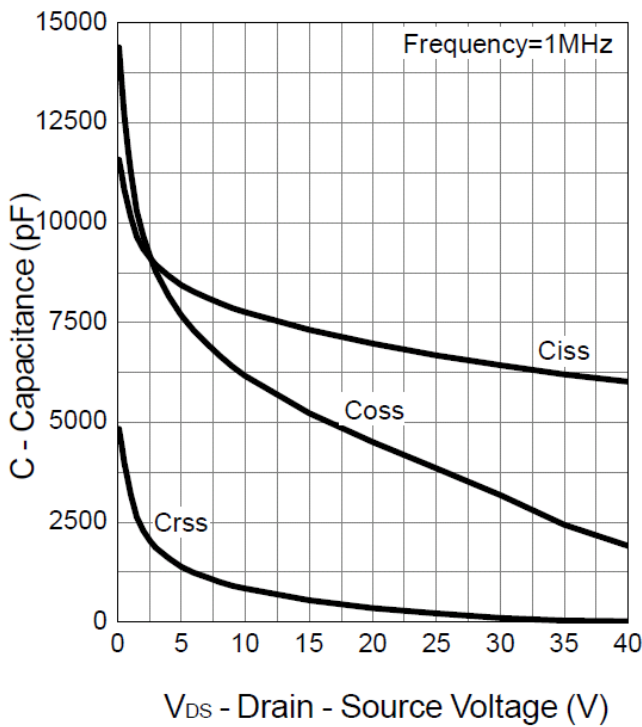
Drain-Source On Resistance



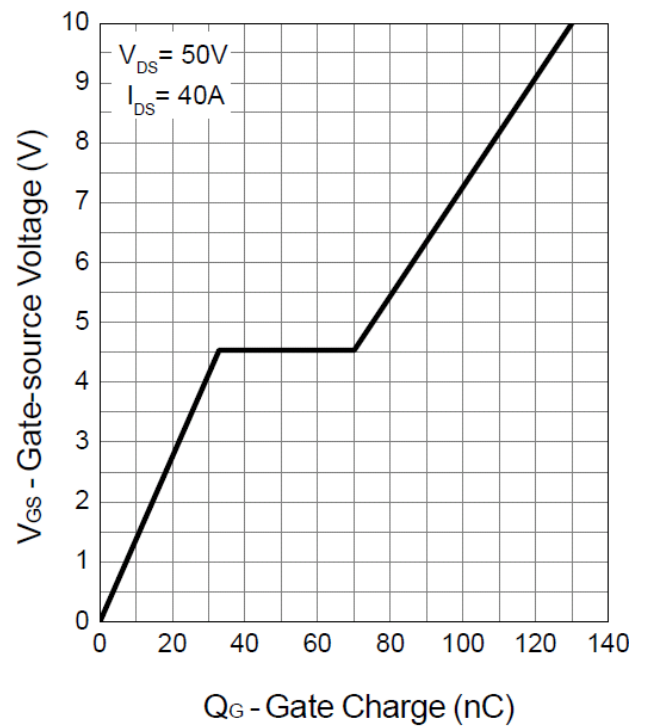
Source-Drain Diode Forward



Capacitance

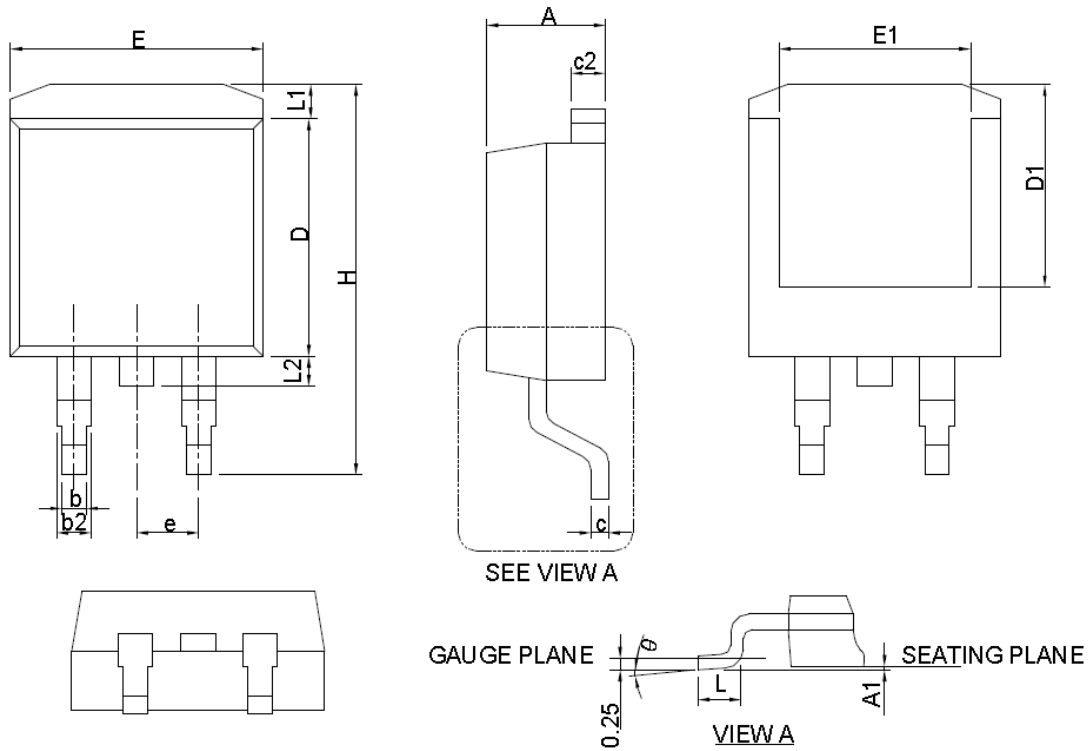


Gate Charge



Package Information

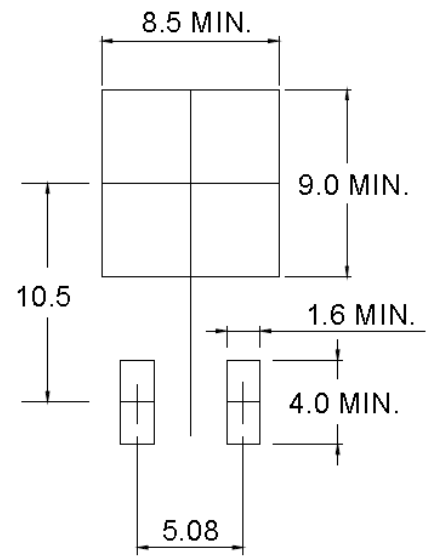
TO263 Package



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