

### DESCRIPTION

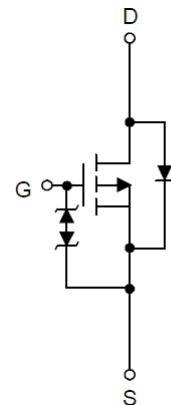
The TDM31035 uses advanced trench technology to provide excellent RDS(ON) and low gate charge. This device is suitable for use as a load switch or in PWM applications.

### GENERAL FEATURES

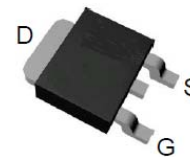
- -100V/-13A  
RDS(ON) <205mΩ @ VGS=-10V
- RDS(ON) < 300mΩ @ VGS=-4V
- Reliable and Rugged
- Lead free product is available
- Surface Mount Package

### Application

- PWM applications
- Load switch
- Power management



P-Channel MOSFET



Top View of TO-252-2

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

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V <sub>DS</sub>	-100	V
Gate-Source Voltage	V <sub>GS</sub>	±20	V
Diode Continuous Forward Current	I <sub>S</sub>	-1	A
300µs Pulse Drain Current Tested	I <sub>DP</sub> (T <sub>C</sub> =25°C)	-52	A
	I <sub>DP</sub> (T <sub>C</sub> =100°C)	-32	A
Continuous Drain Current	I <sub>D</sub> (T <sub>C</sub> =25°C)	-13 <sup>note1</sup>	A
	I <sub>D</sub> (T <sub>C</sub> =100°C)	-8	A
Maximum Power Dissipation	P <sub>D</sub> (T <sub>C</sub> =25°C)	50	W
	P <sub>D</sub> (T <sub>C</sub> =100°C)	20	W
Thermal Resistance-Junction to Ambient	R <sub>θJA</sub>	50	°C/W
Thermal Resistance-Junction to Case	R <sub>θJC</sub>	2.5	°C/W
Maximum Junction Temperature	T <sub>J</sub>	150	°C
Storage Temperature Range	T <sub>STG</sub>	-55 to 150	°C

### NOTES:

1. Max continuous current is limited by bonding wire.

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>STATIC 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	$I_{GSS}$	$V_{GS}=\pm 16V, V_{DS}=0V$	-	-	$\pm 10$	$\mu A$
<b>ON CHARACTERISTICS</b> (Note 2)						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-1	-	-3	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=-10V, I_{DS}=-7.8A$	-	-	205	$m\Omega$
		$V_{GS}=-4V, I_{DS}=-6A$	-	-	300	$m\Omega$
<b>DYNAMIC CHARACTERISTICS</b> (Note 3)						
Input Capacitance	$C_{iss}$	$V_{DS}=-30V, V_{GS}=0V, F=1.0MHz$	-	1050	-	PF
Output Capacitance	$C_{oss}$		-	70	-	PF
Reverse Transfer Capacitance	$C_{rss}$		-	40	-	PF
<b>SWITCHING CHARACTERISTICS</b> (Note 3)						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=-30V, R_L=30\Omega, V_{GEN}=-10V, R_G=6\Omega, I_{DS}=-1A$	-	11	21	nS
Turn-on Rise Time	$t_r$		-	10	19	nS
Turn-Off Delay Time	$t_{d(off)}$		-	55	100	nS
Turn-Off Fall Time	$t_f$		-	30	55	nS
Total Gate Charge	$Q_g$	$V_{DS}=-50V, I_{DS}=-7.8A, V_{GS}=-10V$	-	20.9	38	nC
Gate-Source Charge	$Q_{gs}$		-	4.2	-	nC
Gate-Drain Charge	$Q_{gd}$		-	5.2	-	nC
Body Diode Reverse Recovery Time	$T_{rr}$	$I_{DS}=-7.8A, di/dt=100A/\mu s$	-	34	-	nS
Body Diode Reverse Recovery Charge	$Q_{rr}$		-	59	-	nC
<b>DRAIN-SOURCE DIODE CHARACTERISTICS</b>						
Diode Forward Voltage (Note 2)	$V_{SD}$	$V_{GS}=0V, I_{SD}=-1A$	-	-0.75	-1.1	V

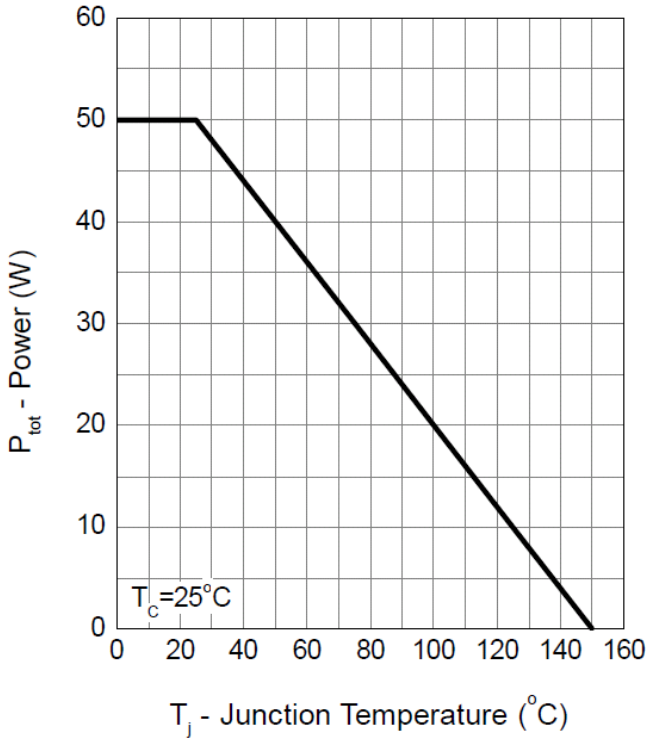
**NOTES:**

- Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$ .
- Guaranteed by design, not subject to production testing

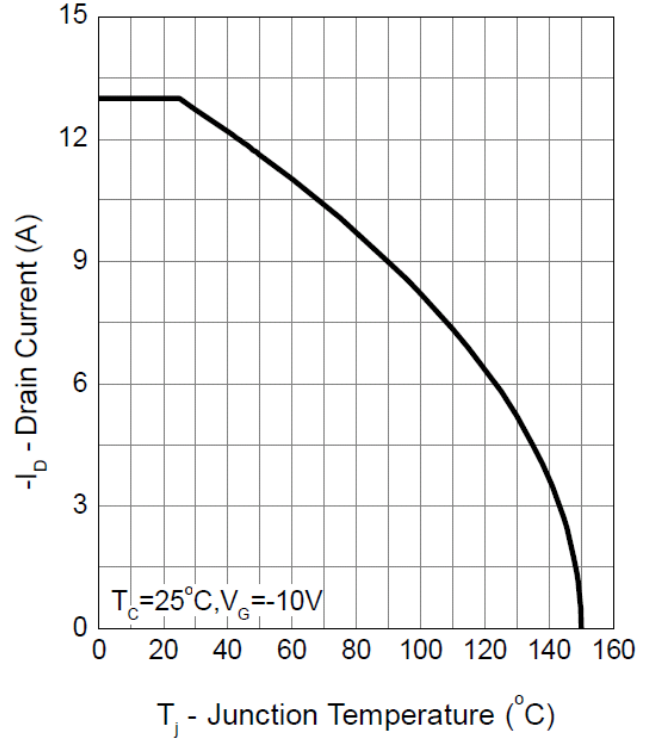
P-Channel Enhancement Mode MOSFET TDM31035

Typical Operating Characteristics

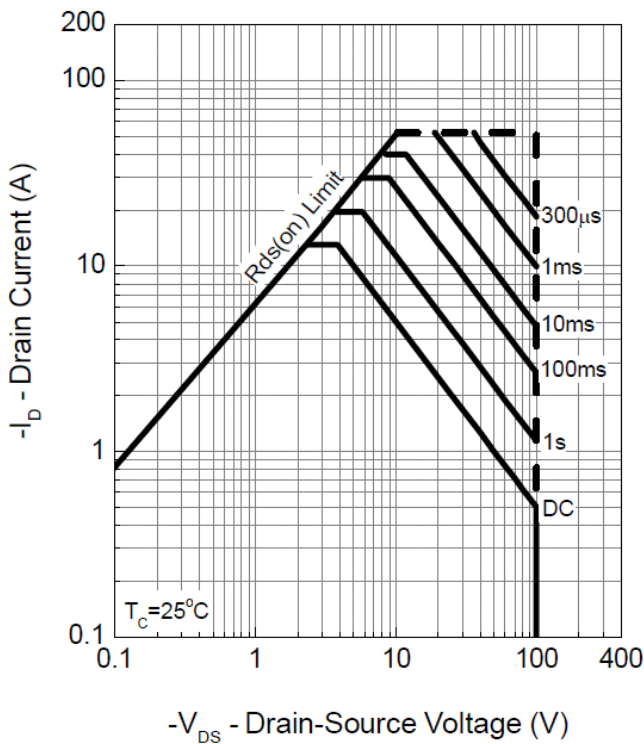
Power Dissipation



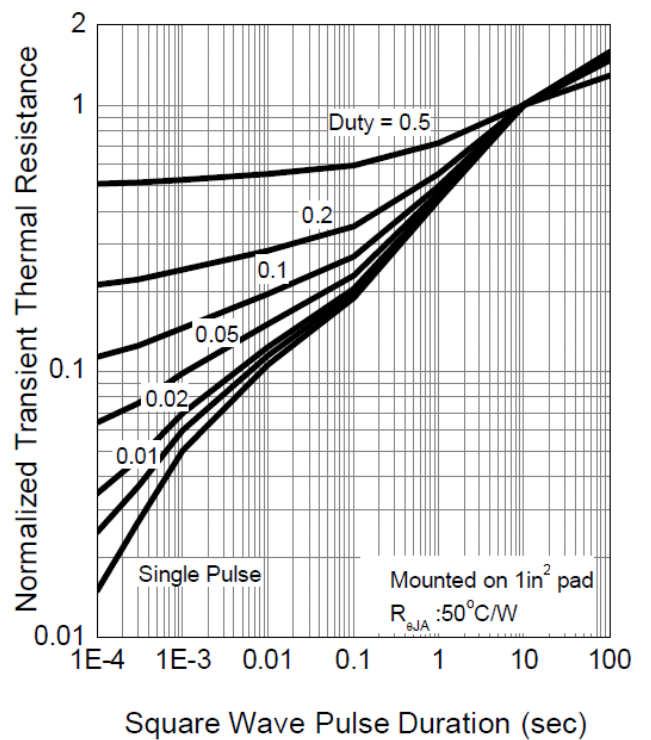
Drain Current



Safe Operation Area

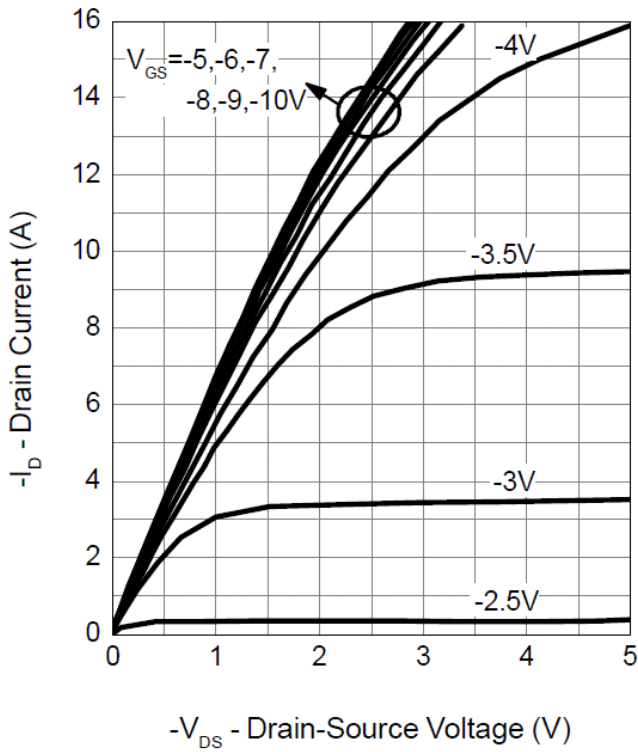


Thermal Transient Impedance

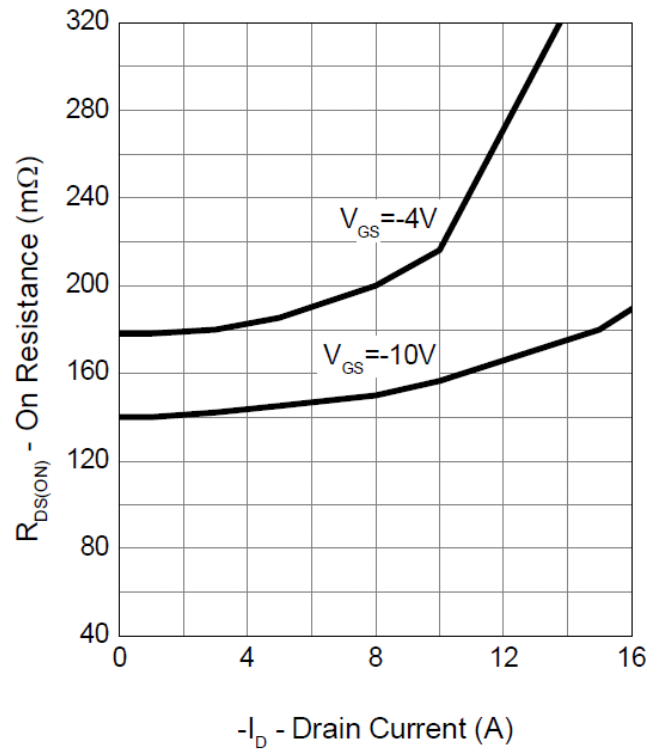


Typical Operating Characteristics(Cont.)

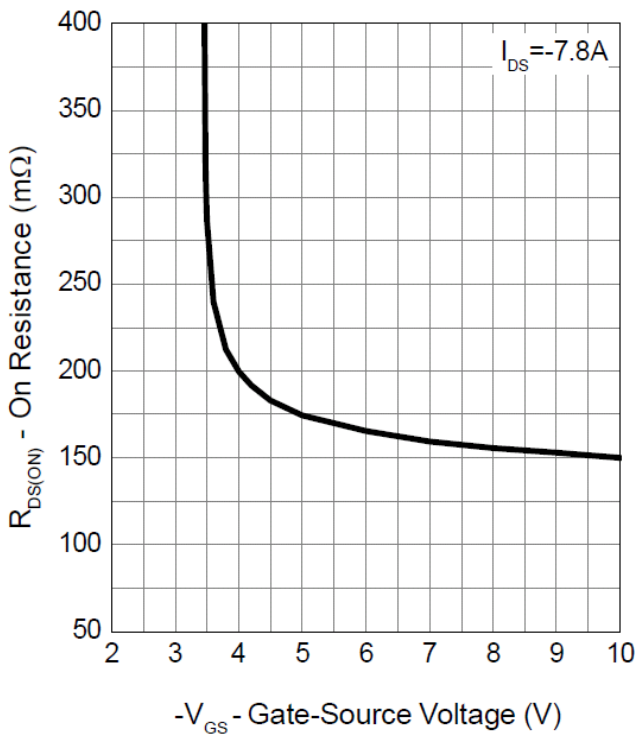
Output Characteristics



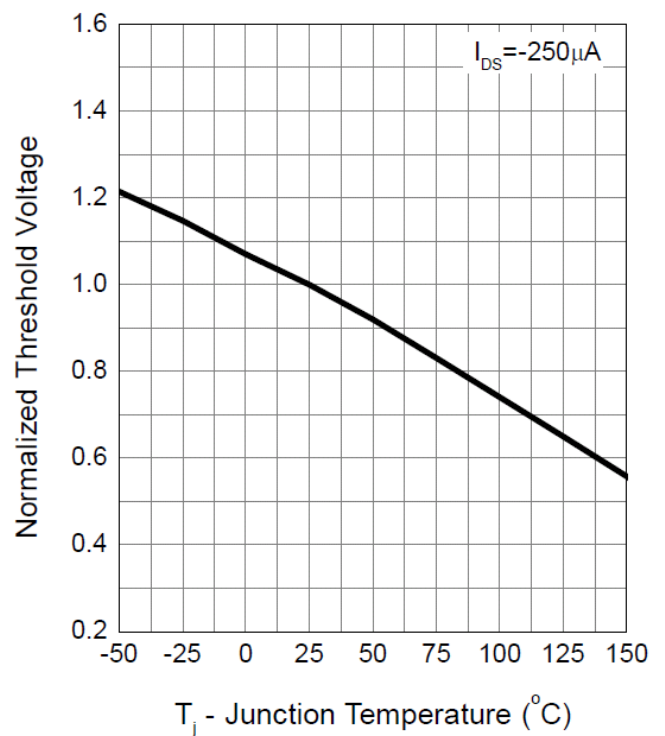
Drain-Source On Resistance



Gate-Source On Resistance

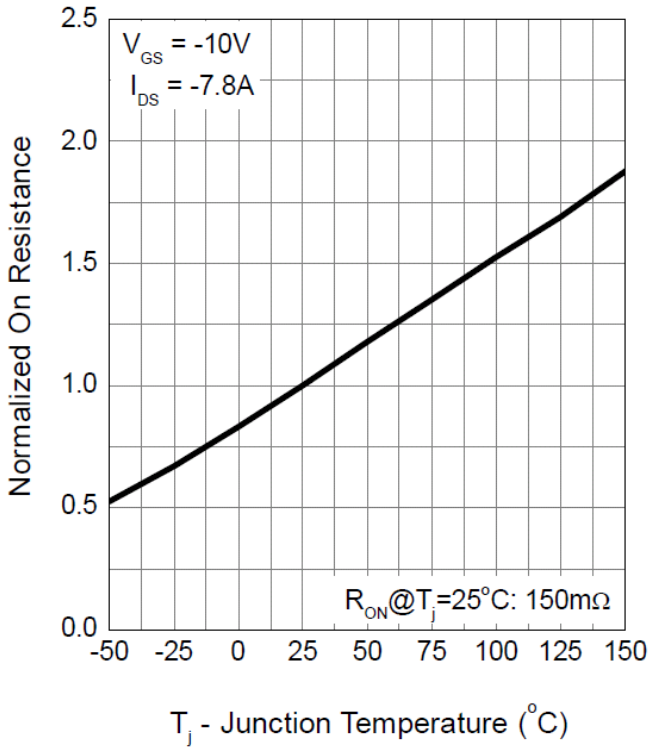


Gate Threshold Voltage

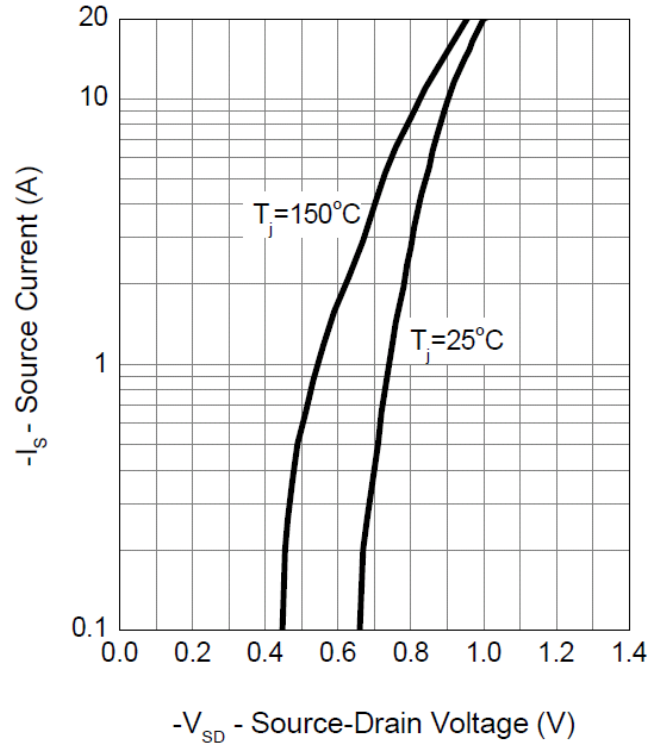


Typical Operating Characteristics (Cont.)

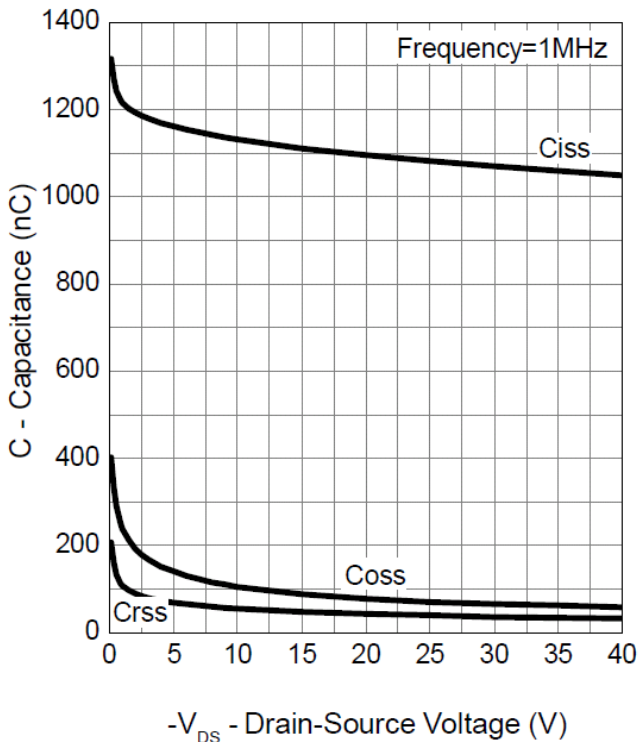
Drain-Source On Resistance



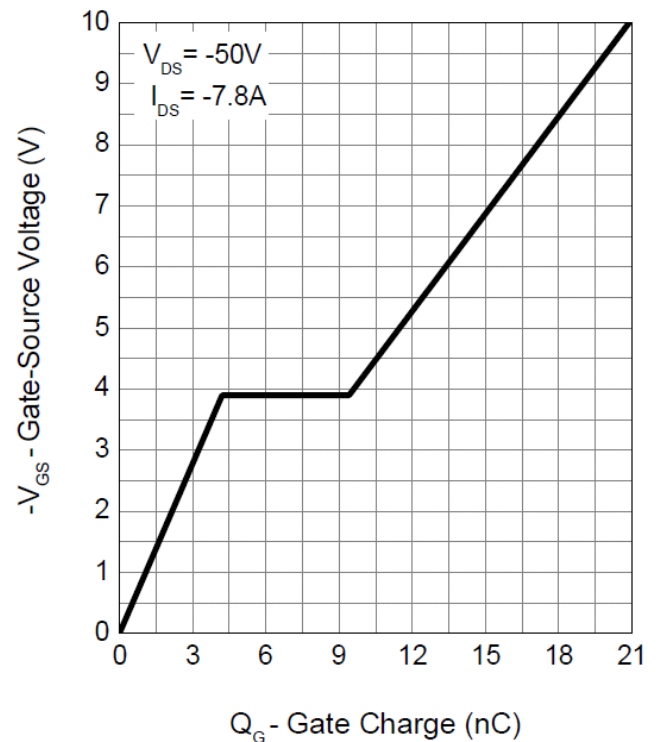
Source-Drain Diode Forward



Capacitance

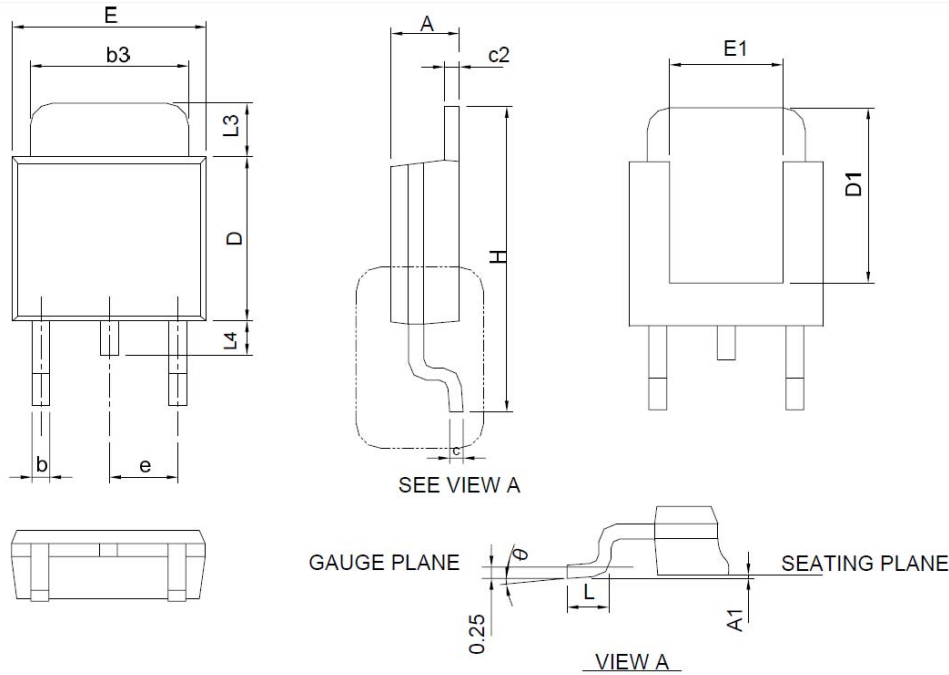


Gate Charge



Package Information

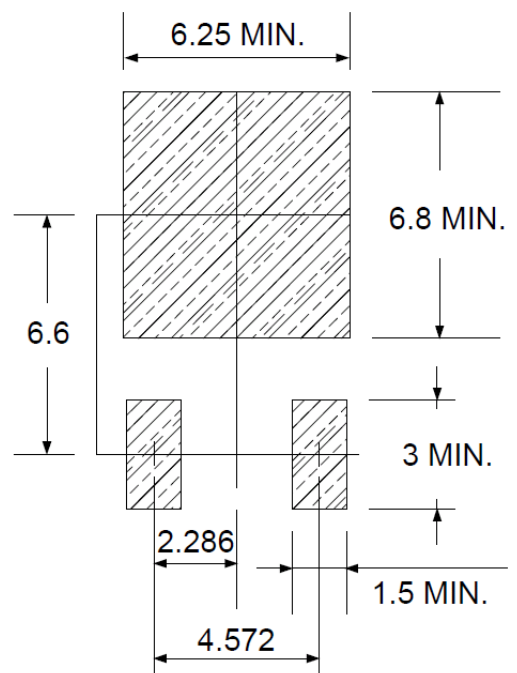
TO-252-2 Package



SYMBOL	TO-252-2			
	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	2.18	2.39	0.086	0.094
A1	-	0.13	-	0.005
b	0.50	0.89	0.020	0.035
b3	4.95	5.46	0.195	0.215
c	0.46	0.61	0.018	0.024
c2	0.46	0.89	0.018	0.035
D	5.33	6.22	0.210	0.245
D1	4.57	6.00	0.180	0.236
E	6.35	6.73	0.250	0.265
E1	3.81	6.00	0.150	0.236
e	2.29 BSC		0.090 BSC	
H	9.40	10.41	0.370	0.410
L	0.90	1.78	0.035	0.070
L3	0.89	2.03	0.035	0.080
L4	-	1.02	-	0.040
θ	0°	8°	0°	8°

Note : Follow JEDEC TO-252 .

RECOMMENDED LAND PATTERN



UNIT: mm

Design Notes