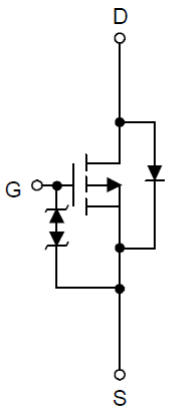
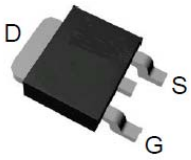
P-Channel Enhancement Mode MOSFET TDM31035

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.



P-Channel MOSFET



Top View of TO-252-2

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

ABSOLUTE MAXIMUM RATINGS(T_A=25℃unless otherwise noted)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	-100	V
Gate-Source Voltage	V_{GS}	±20	V
Diode Continuous Forward Current	Is	-1	A
300μs Pulse Drain Current Tested	I_{DP}(T_C=25℃)	-52	A
	I_{DP}(T_C=100℃)	-32	A
Continuous Drain Current	I_D (T_C=25℃)	-13 note1	A
	I_D (T_C=100℃)	-8	A
Maximum Power Dissipation	P_D(T_C=25℃)	50	W
	P_D(T_C=100℃)	20	W
Thermal Resistance-Junction to Ambient	$R_{\theta JA}$	50	℃/W
Thermal Resistance-Junction to Case	$R_{\theta JC}$	2.5	℃/W
Maximum Junction Temperature	T_J	150	℃
Storage Temperature Range	T_{STG}	-55 to 150	℃

NOTES:

1. Max continuous current is limited by bonding wire.

ELECTRICAL CHARACTERISTICS (T_A=25℃unless otherwise noted)

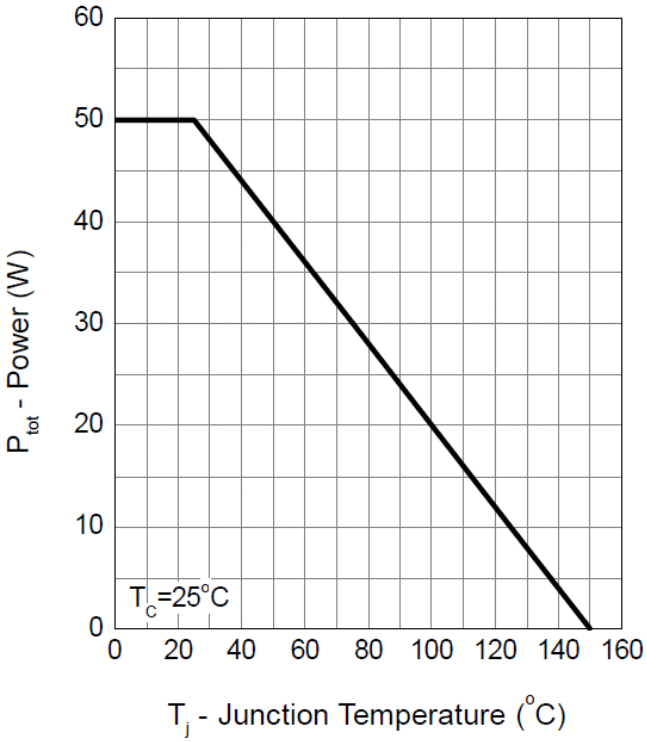
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
STATIC CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V I_D=-250μA	-100	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=-80V,V_{GS}=0V	-	-	-1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±16V,V_{DS}=0V	-	-	±10	μA
ON CHARACTERISTICS (Note 2)						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=VGS,I_D=-250μA	-1	-	-3	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=-10V, I_{DS}=-7.8A	-	-	205	mΩ
		V_{GS}=-4V, I_{DS}=-6A	-	-	300	mΩ
DYNAMIC CHARACTERISTICS (Note3)						
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
SWITCHING CHARACTERISTICS (Note 3)						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=-30V, R_L=30 Ω, V_{GEN}=-10V,	-	11	21	nS
Turn-on Rise Time	t_r	R_G=6 Ω I_{DS}=-1A	-	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/μs	-	34	-	nS
Body Diode Reverse Recovery Charge	Q_{rr}		-	59	-	nC
DRAIN-SOURCE DIODE CHARACTERISTICS						
Diode Forward Voltage (Note 2)	V_{SD}	V_{GS}=0V,I_{SD}=-1A	-	-0.75	-1.1	V

NOTES:

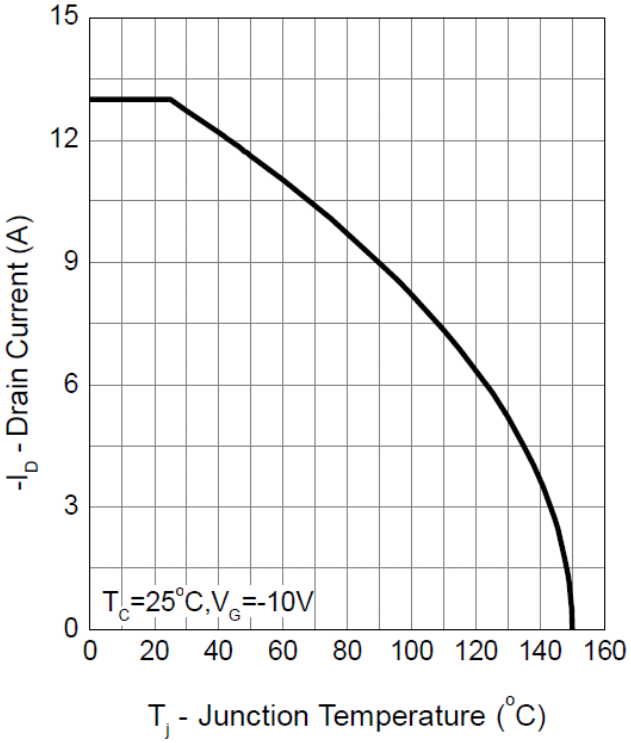
2. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
3. Guaranteed by design, not subject to production testing

Typical Operating Characteristics

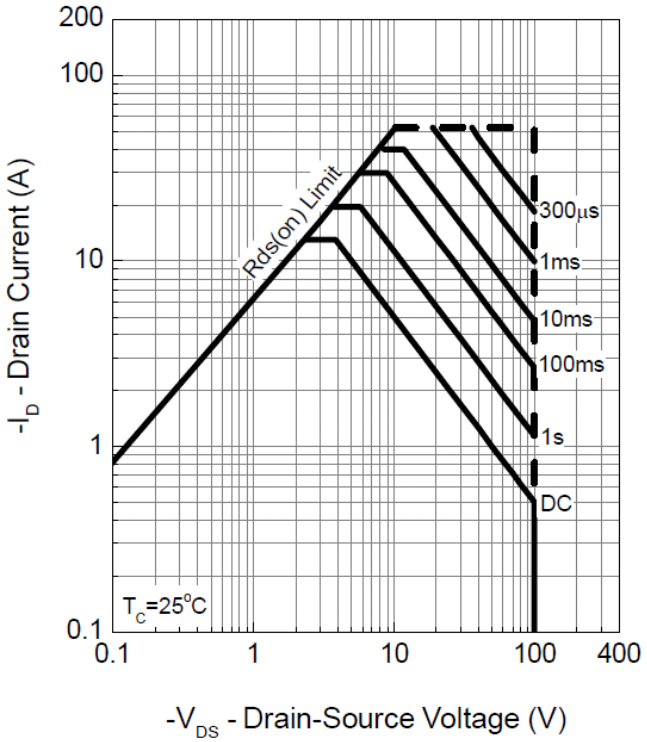
Power Dissipation



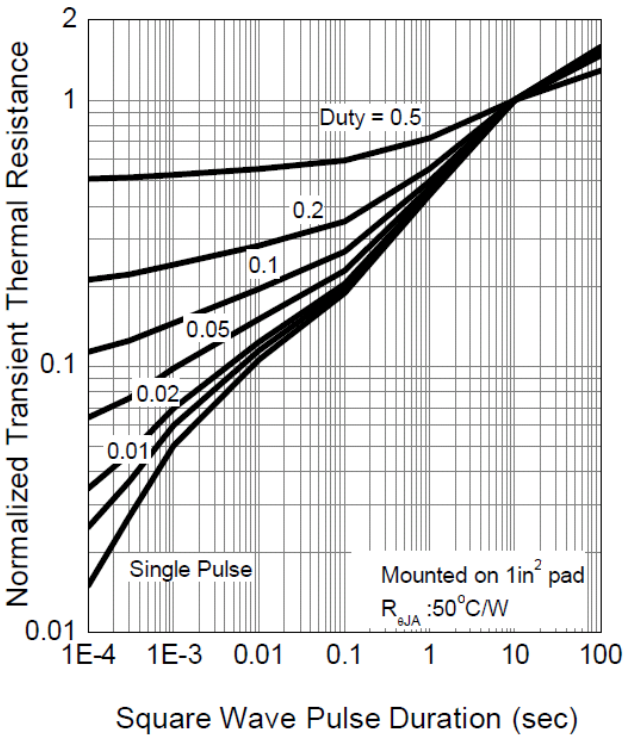
Drain Current



Safe Operation Area

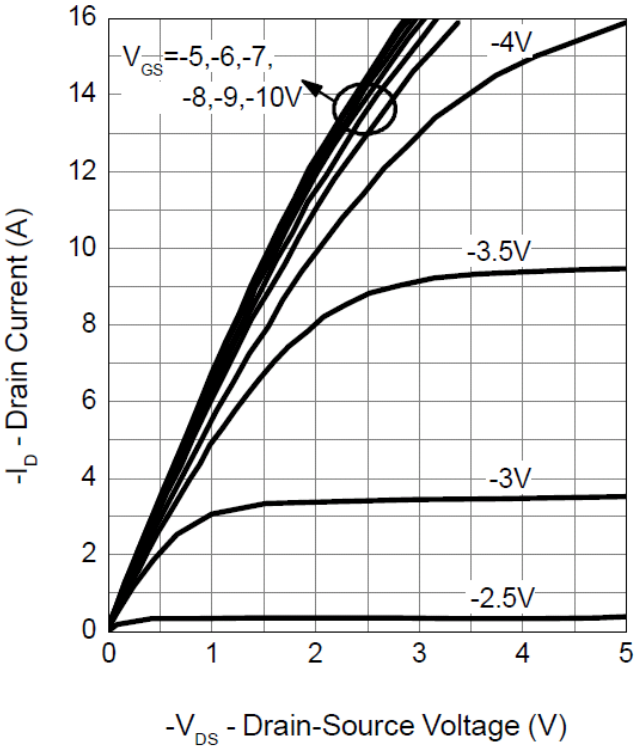


Thermal Transient Impedance

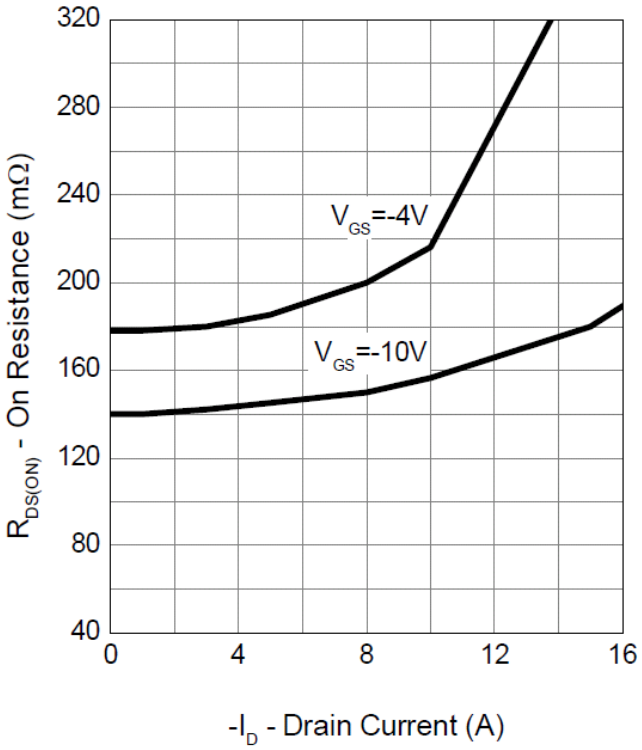


Typical Operating Characteristics(Cont.)

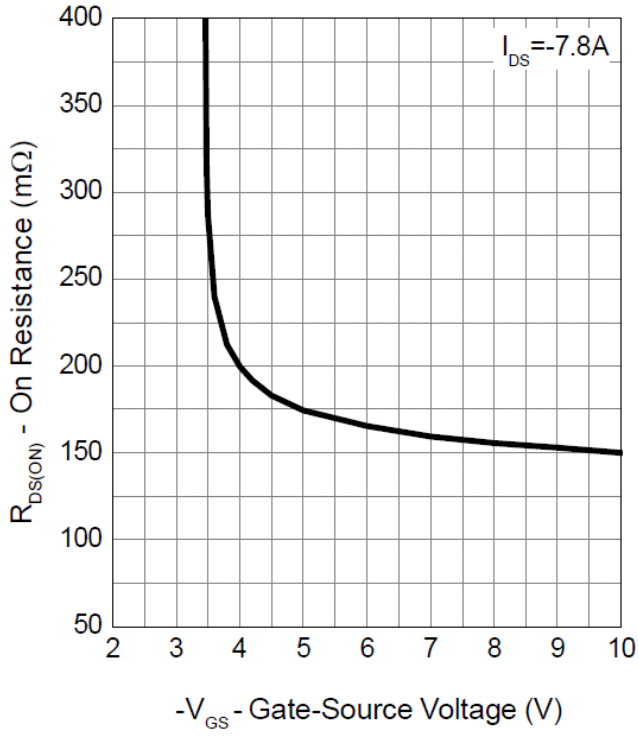
Output Characteristics



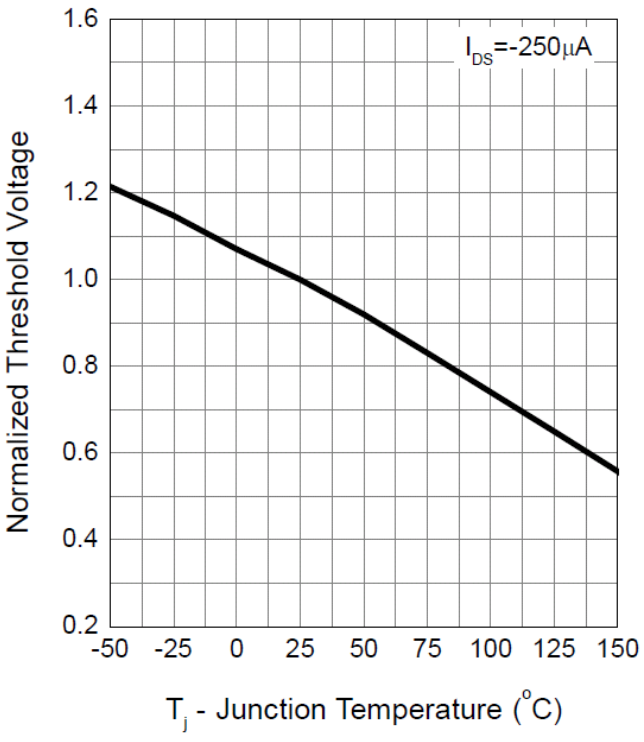
Drain-Source On Resistance



Gate-Source On Resistance

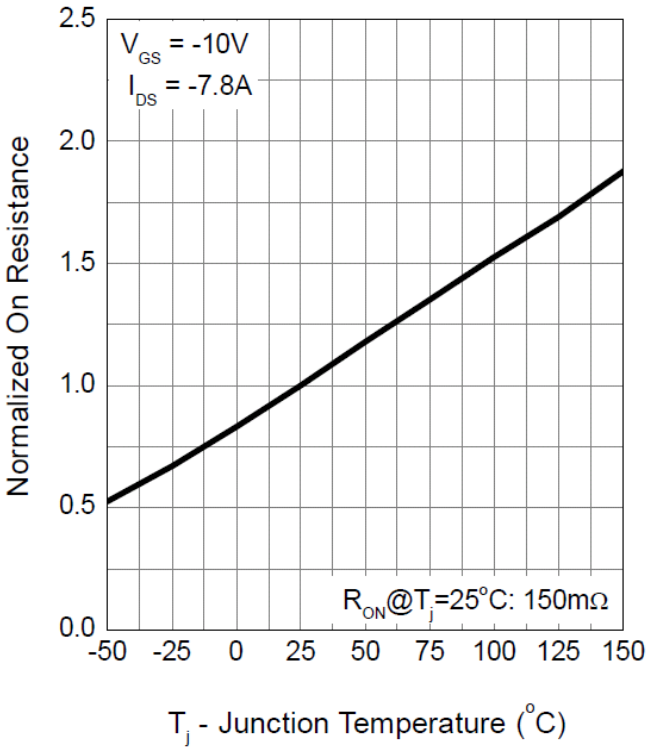


Gate Threshold Voltage

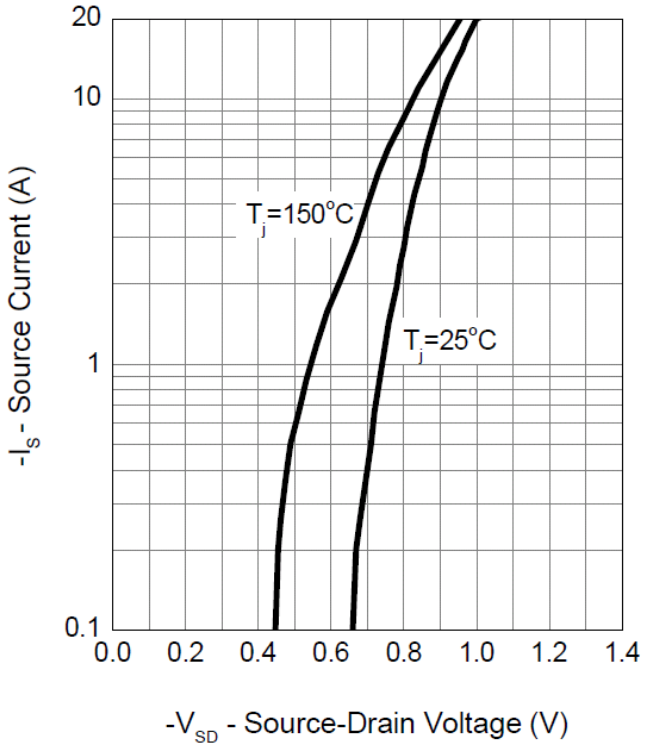


Typical Operating Characteristics (Cont.)

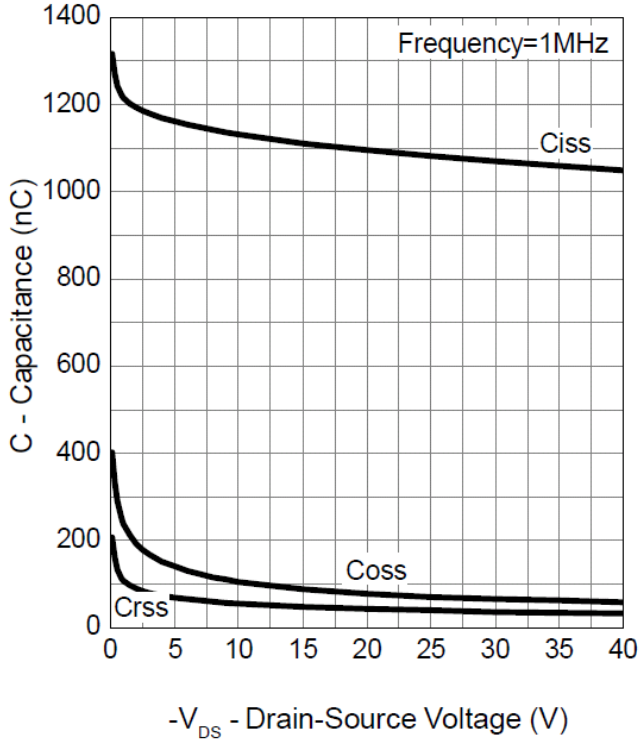
Drain-Source On Resistance



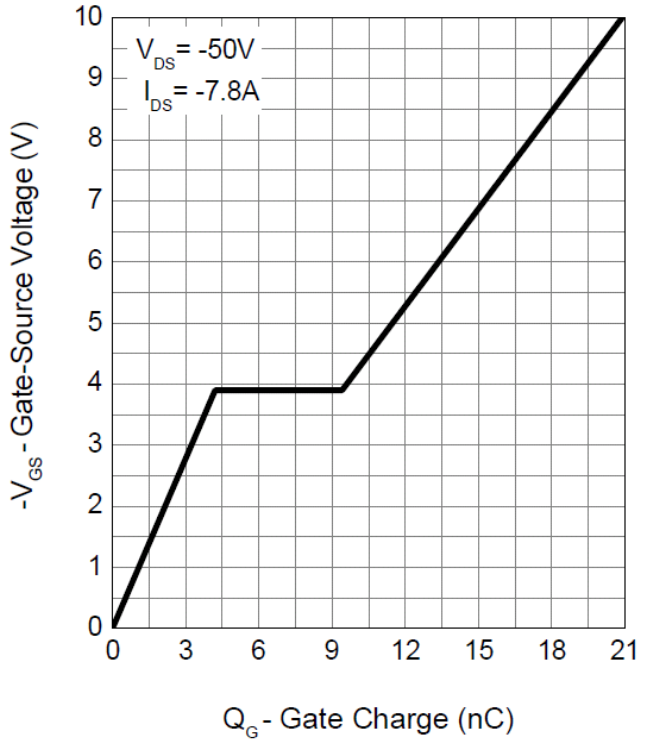
Source-Drain Diode Forward



Capacitance

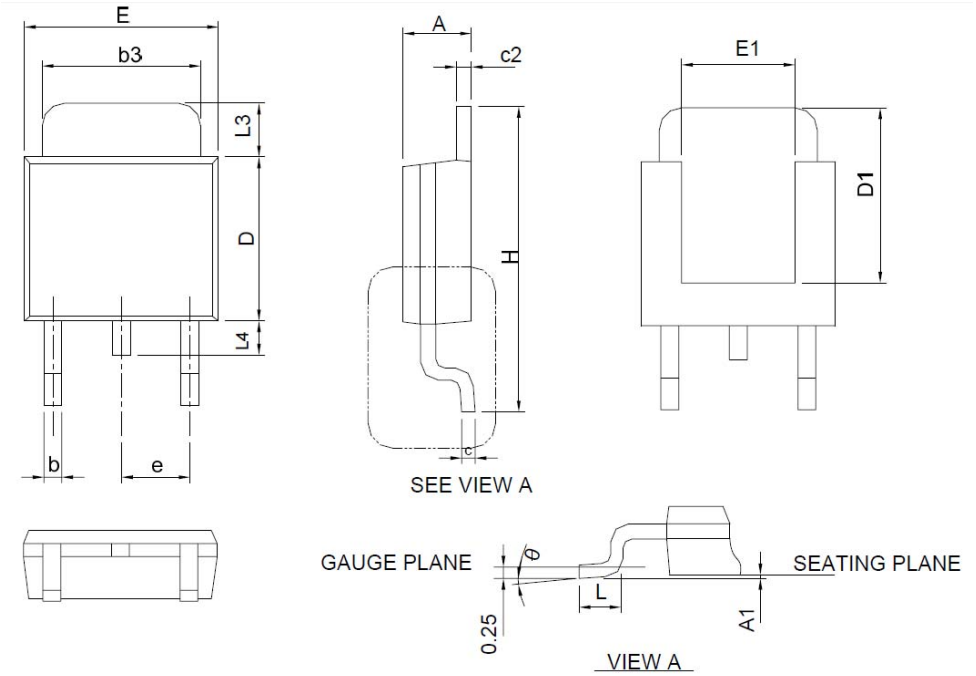


Gate Charge



Package Information

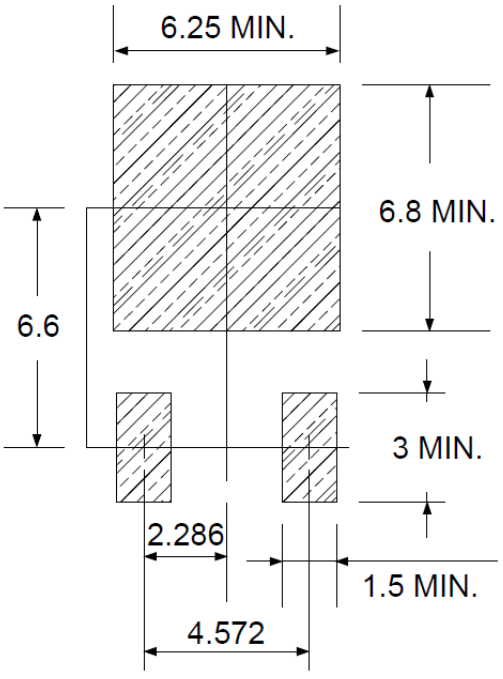
TO-252-2 Package



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