N-Channel Enhancement Mode MOSFET TDM2432

DESCRIPTION

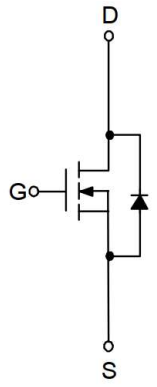
The TDM2432 uses advanced trench technology to provide excellent RDS(ON) and low gate charge. This device is suitable for use as a load switch or in PWM applications.

GENERAL FEATURES

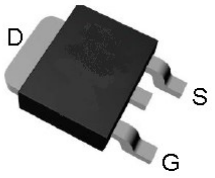
- RDS(ON) < 5mΩ @ VGS=10V
  RDS(ON) < 7.6mΩ @ VGS=4.5V
- High Power and current handling capability
- Lead free product is available

Application

- SMPS Synchronous Rectification.
- Load switch
- DC-DC Conversion.



N-Channel MOSFET



Top View of TO-252-2

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	40	V
Gate-Source Voltage	V_{GS}	±20	V
Diode Continuous Forward Current	I_S（T_C=25℃）	40	A
Drain Current @ Continuous	I_D（T_C=25℃）	88	A
	I_D（T_C=100℃）	62	A
Drain Current @ Current-Pulsed（note1）	I_{DM}（T_C=25℃）	353	A
Maximum Power Dissipation	P_D(T_C=25℃)	68	W
	P_D(T_C=100℃)	34	W
Drain Current @ Continuous	I_D（T_A=25℃）	16.4	A
	I_D（T_A=70℃）	13.7	A
Drain Current @ Current-Pulsed（note1）	I_{DM}（T_A=25℃）	65	A
Maximum Power Dissipation（note2）	P_D(T_A=25℃)	2.3	W
	P_D(T_A=70℃)	1.6	W
Avalanche Energy, Single pulse （note3）	E_{AS}(L=0.1mH)	36	mJ
Thermal Resistance-Junction to Ambient （note2）	$R_{\theta JA}$	50	℃/W
Maximum Operating Junction Temperature	T_J	150	℃
Storage Temperature Range	T_{STG}	-55 To 150	℃

ELECTRICAL CHARACTERISTICS (T_A=25℃unless otherwise noted)

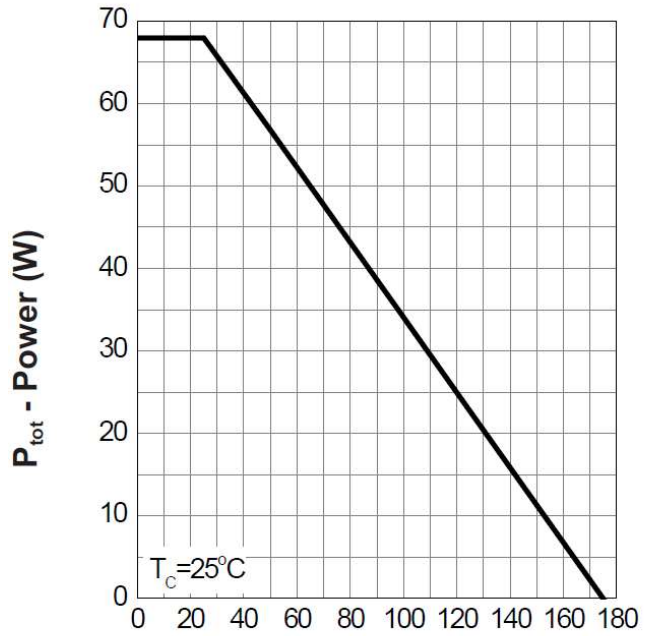
Parameter	Symbol	Condition	Min	Typ	Max	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V I_D=250μA	40	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=32V,V_{GS}=0V	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±20V,V_{DS}=0V	-	-	±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=250μA	1.4	1.8	2.5	V
Drain-Source On-State Resistance （note4）	$R_{DS(ON)}$	V_{GS}=10V, I_D=20A	-	4.2	5	mΩ
		V_{GS}=4.5V, I_D=15A	-	5.6	7.3	mΩ
Dynamic Characteristics （note5）						
Gate Resistance	R_G	V_{DS}=0V,V_{GS}=0V, F=1.0MHz	-	1	2	Ω
Input Capacitance	C_{iss}	V_{DS}=20V,V_{GS}=0V, F=1.0MHz	-	1370	1780	PF
Output Capacitance	C_{oss}		-	317	-	PF
Reverse Transfer Capacitance	C_{rss}		-	46	-	PF
Turn-on Delay Time	$t_{d(on)}$	V_{DS}=20V, R_L=20Ω, V_{GEN}=10V,R_G=6Ω I_{DS}=1A	-	13.3	24	nS
Turn-on Rise Time	t_r		-	7.9	15	nS
Turn-Off Delay Time	$t_{d(off)}$		-	29.1	53	nS
Turn-Off Fall Time	t_f		-	21	38	nS
Total Gate Charge	Q_g	V_{DS}=20V, I_D=20A, V_{GS}=10V	-	22	30.8	nC
Threshold Gate Charge	Q_{gth}			2.3	-	nC
Gate-Source Charge	Q_{gs}		-	4.2	-	nC
Gate-Drain Charge	Q_{gd}		-	3	-	nC
Diode Characteristics						
Diode Forward Voltage （note4）	V_{SD}	V_{GS}=0V,I_{SD}=20A	-	0.75	1.1	V
Reverse Recovery Time	T_{rr}	I_{SD}=20A, dI/dt=100A/μs	-	28	-	nS
Charge Time	T_a		-	17	-	nS
Discharge Time	t_b		-	12	-	nS
Reverse Recovery Charge	Q_{rr}		-	20	-	nC

NOTES:

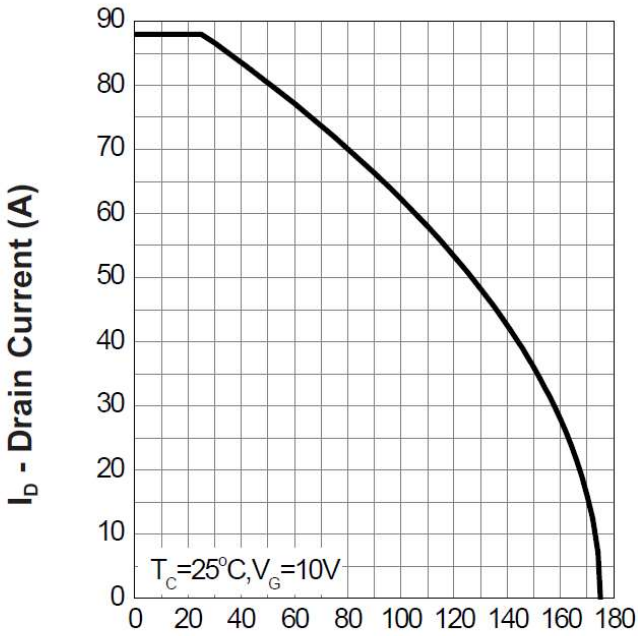
1. Pulse width limited by max. junction temperature.
2. Surface mounted on 1in^2 pad area.
3. UIS tested and pulse width limited by maximum junction temperature 150°C (initial temperature T_j=25°C).
4. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
5. Guaranteed by design, not subject to production testing

Typical Operating Characteristics

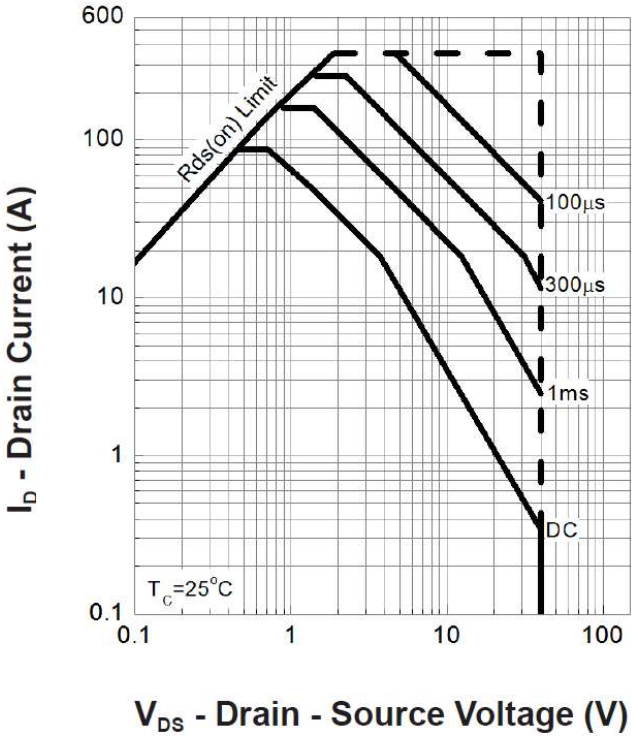
Power Dissipation



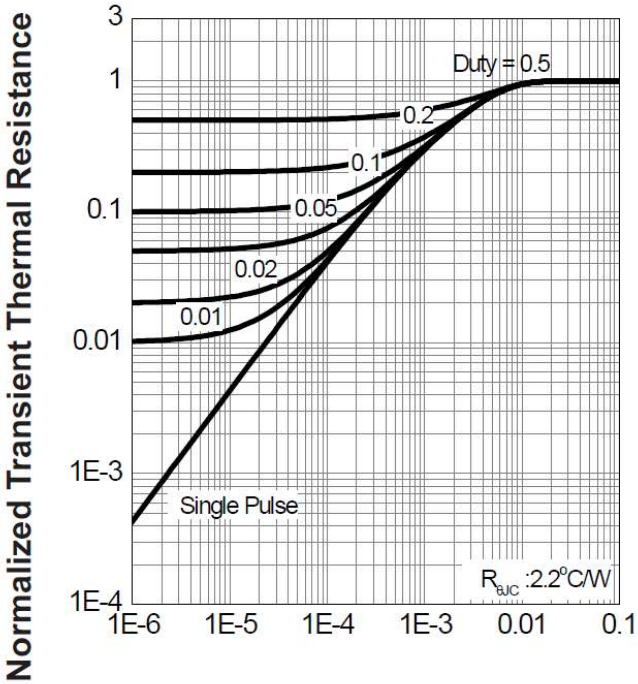
Drain Current



Safe Operation Area

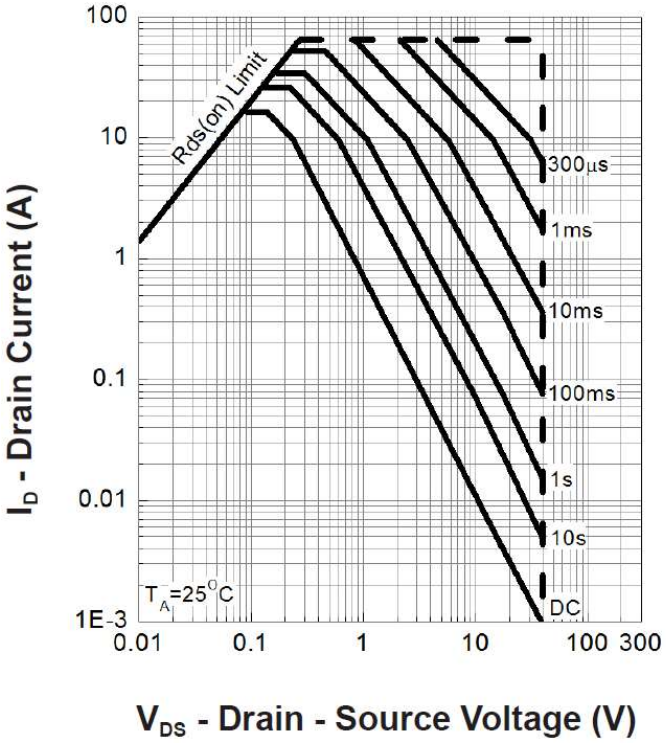


Thermal Transient Impedance

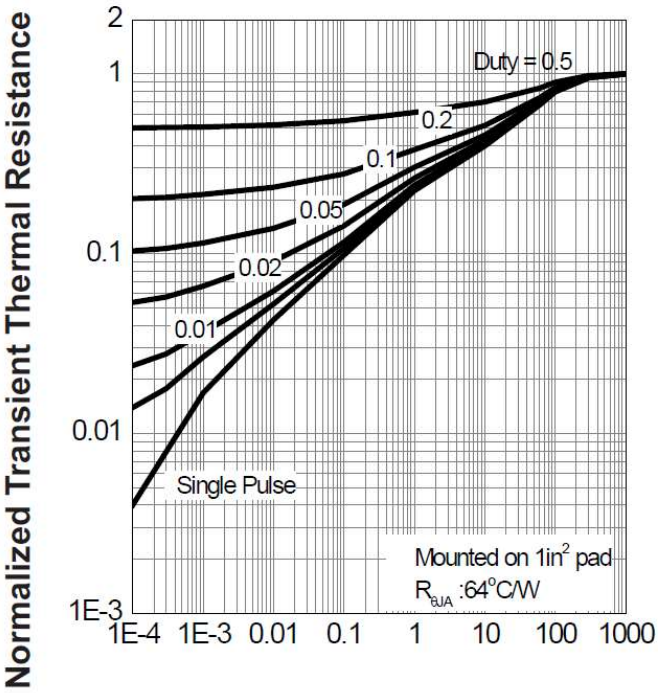


Typical Operating Characteristics (Cont.)

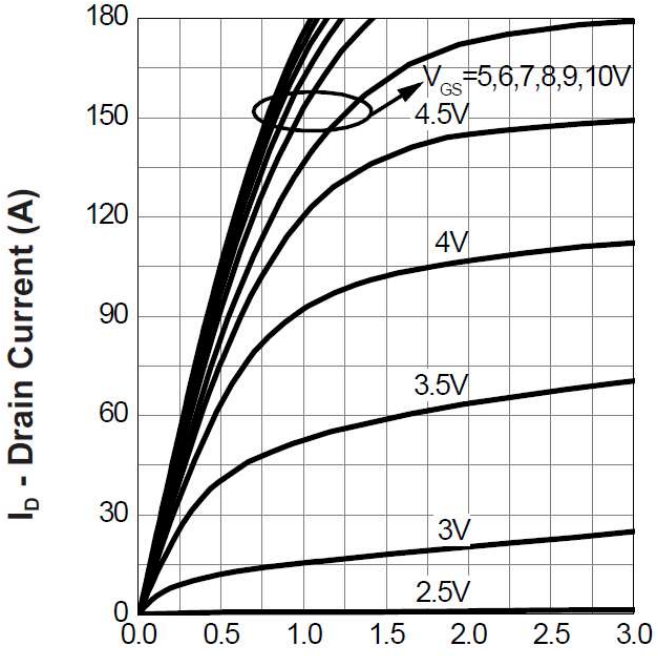
Safe Operation Area



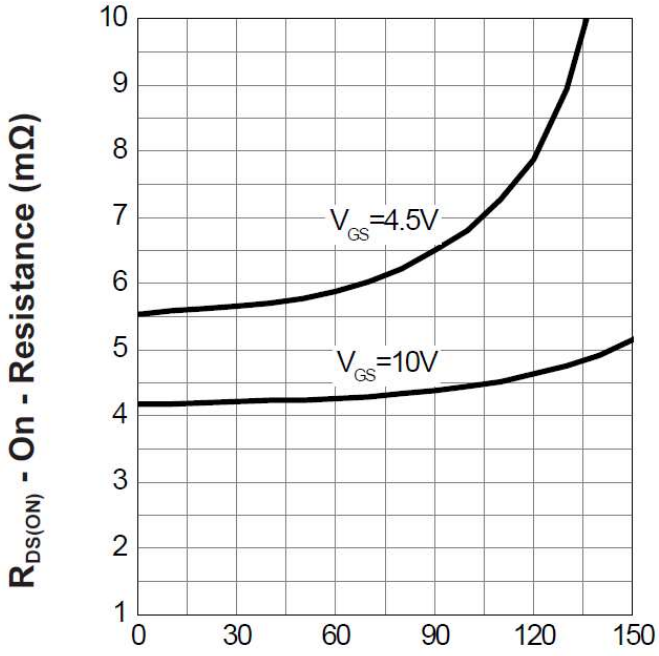
Thermal Transient Impedance



Output Characteristics

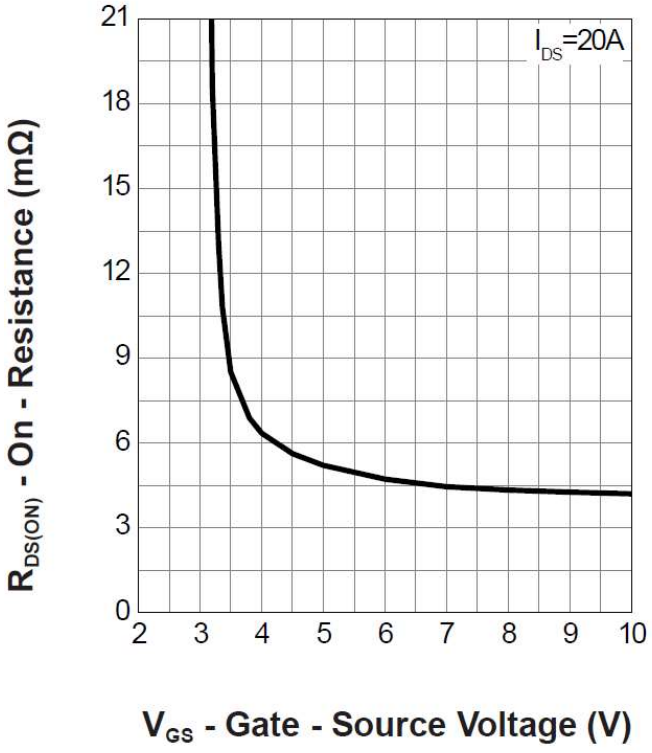


Drain-Source On Resistance

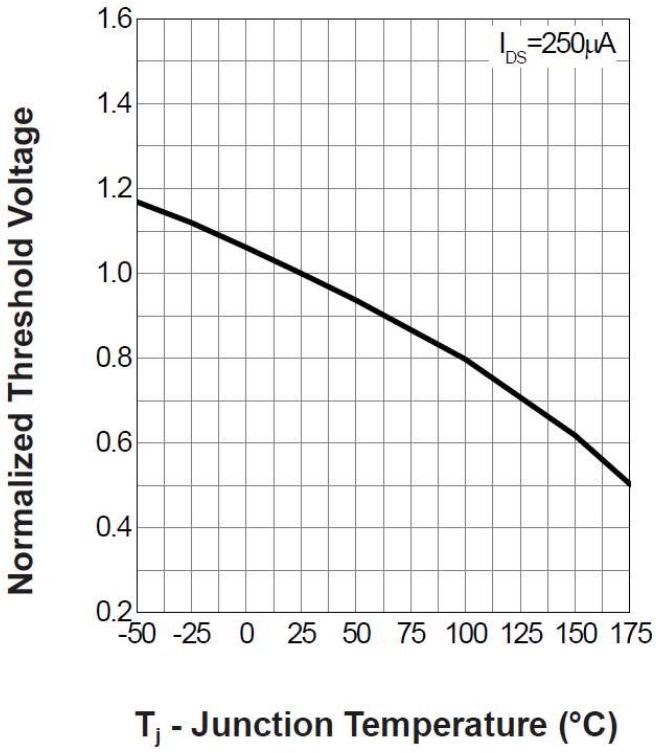


Typical Operating Characteristics (Cont.)

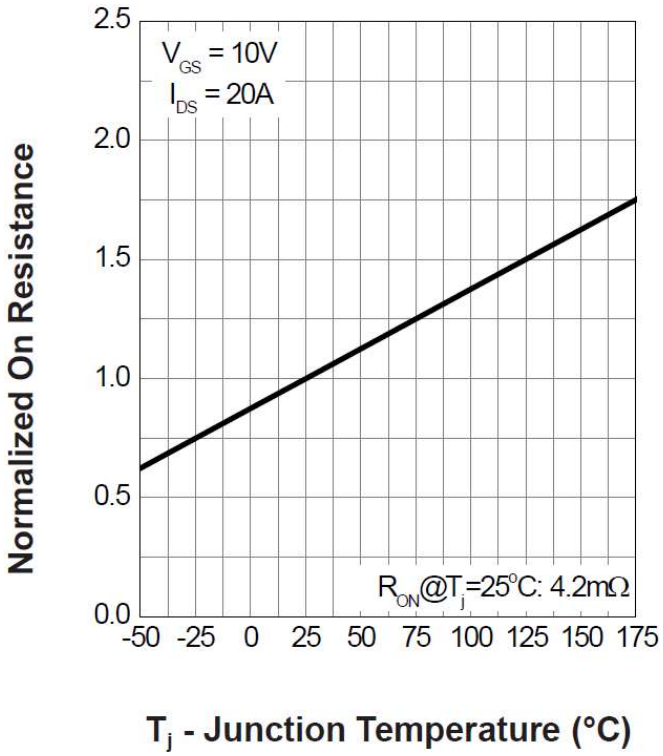
Gate-Source On Resistance



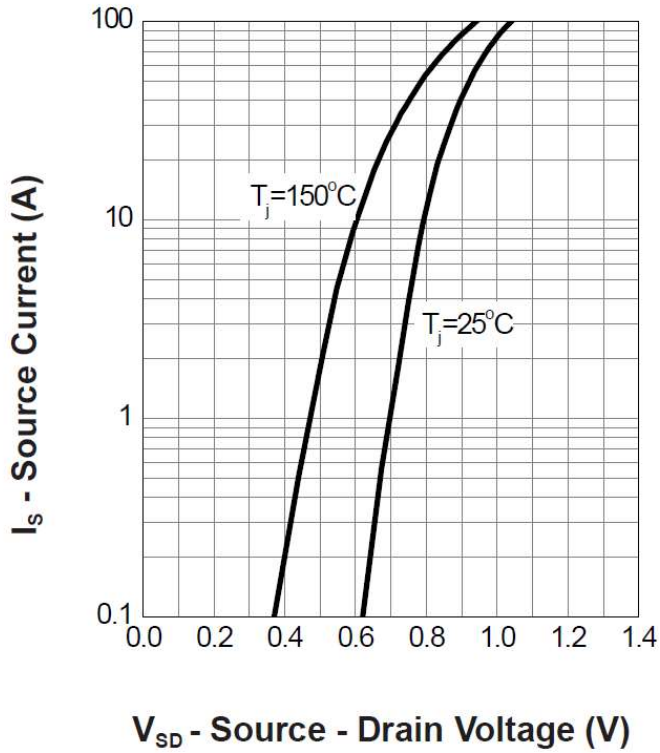
Gate Threshold Voltage



Drain-Source On Resistance

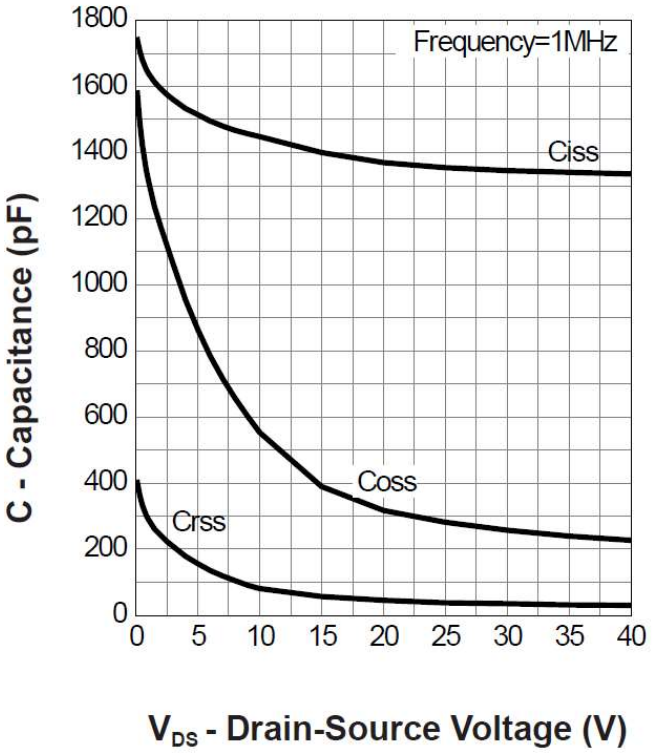


Source-Drain Diode Forward

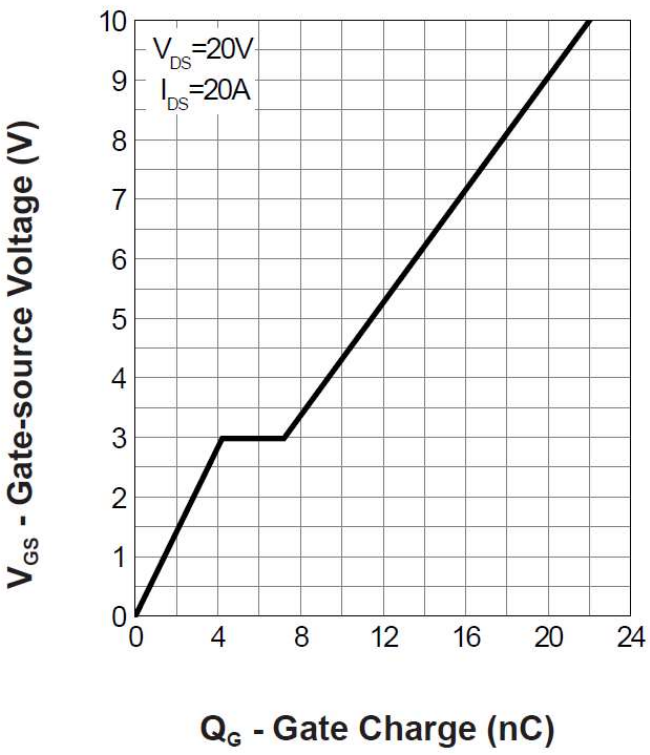


Typical Operating Characteristics (Cont.)

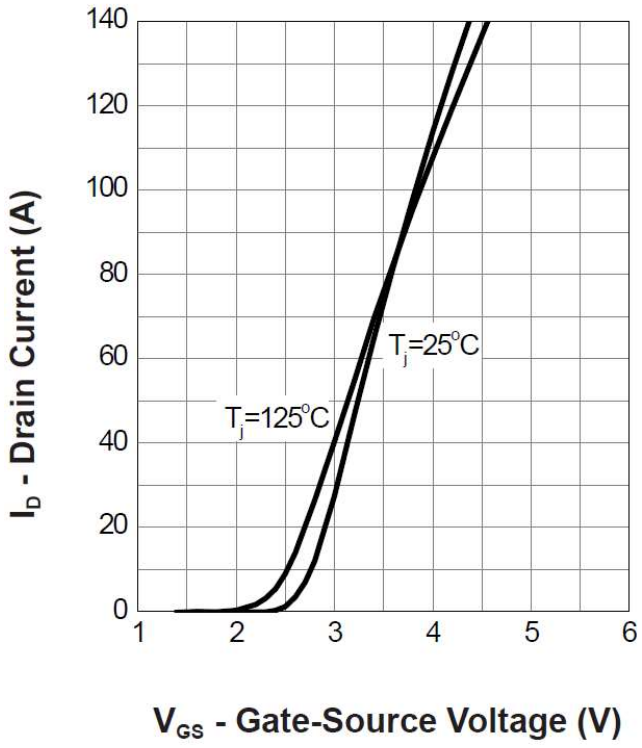
Capacitance



Gate Charge

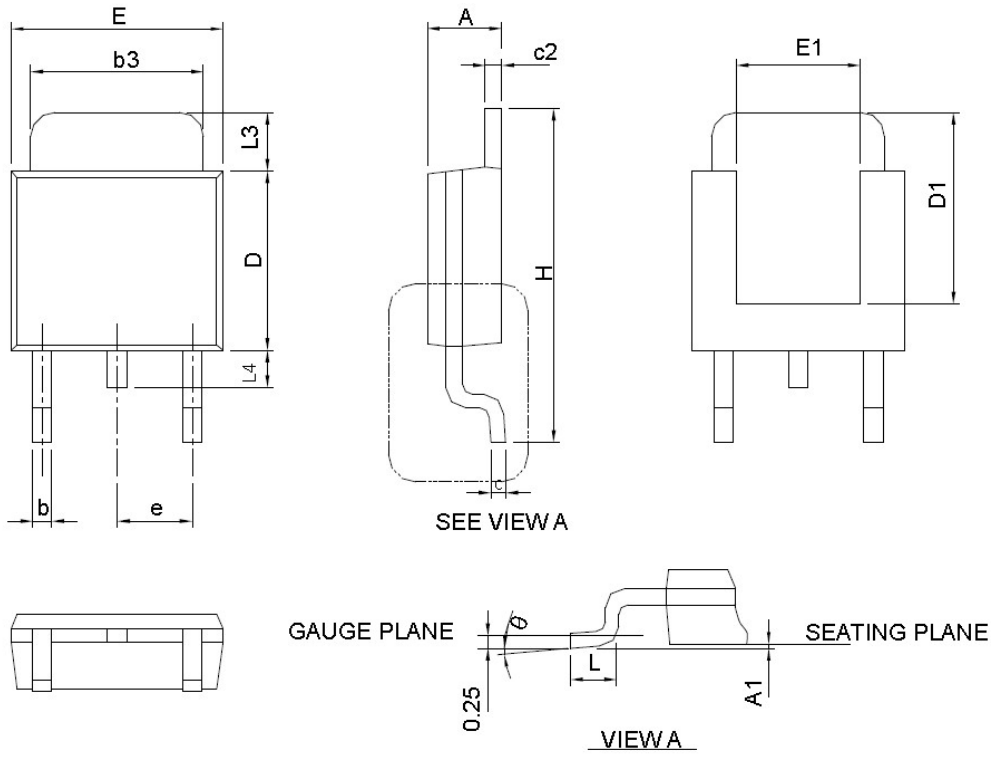


Transfer Characteristics



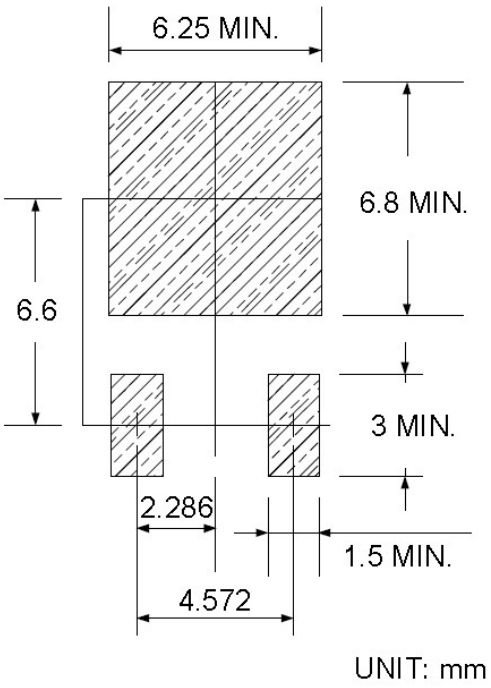
Package Information

TO252-2 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°

RECOMMENDED LAND PATTERN



Design Notes