

N-Channel Enhancement Mode MOSFET

TDM2424

DESCRIPTION

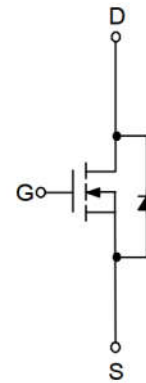
The TDM2424 uses advanced trench technology to provide excellent $R_{DS(ON)}$ and low gate charge. This device is suitable for use as a load switch or in PWM applications.

GENERAL FEATURES

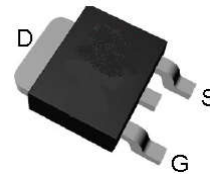
- $R_{DS(ON)} < 4.8m\Omega$ @ $V_{GS}=10V$
 $R_{DS(ON)} < 6.8m\Omega$ @ $V_{GS}=4.5V$
- High Power and current handling capability
- Lead free product is available

Application

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



N-Channel MOSFET



Top View of TO-252-2

ABSOLUTE MAXIMUM RATINGS($T_A=25^\circ\text{C}$ 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 ($T_C=25^\circ\text{C}$)	25	A
Drain Current @ Continuous	I_D ($T_C=25^\circ\text{C}$)	56	A
	I_D ($T_C=100^\circ\text{C}$)	55	A
Drain Current @ Current-Pulsed	I_{DM} ($T_C=25^\circ\text{C}$)	224	A
Maximum Power Dissipation	$P_D(T_C=25^\circ\text{C})$	54	W
	$P_D(T_C=100^\circ\text{C})$	22	W
Drain Current @ Continuous	I_D ($T_A=25^\circ\text{C}$)	17.3	A
	I_D ($T_A=70^\circ\text{C}$)	13.8	A
Drain Current @ Current-Pulsed	I_{DM} ($T_A=25^\circ\text{C}$)	69	A
Maximum Power Dissipation	$P_D(T_A=25^\circ\text{C})$	2.5	W
	$P_D(T_A=70^\circ\text{C})$	1.6	W
Avalanche Energy, Single pulse	$E_{AS}(L=0.1mH)$	51	mJ
Thermal Resistance-Junction to Ambient	$R_{\theta JA}$	50	$^\circ\text{C}/\text{W}$
Maximum Operating Junction Temperature	T_J	150	$^\circ\text{C}$
Storage Temperature Range	T_{STG}	-55 To 150	$^\circ\text{C}$

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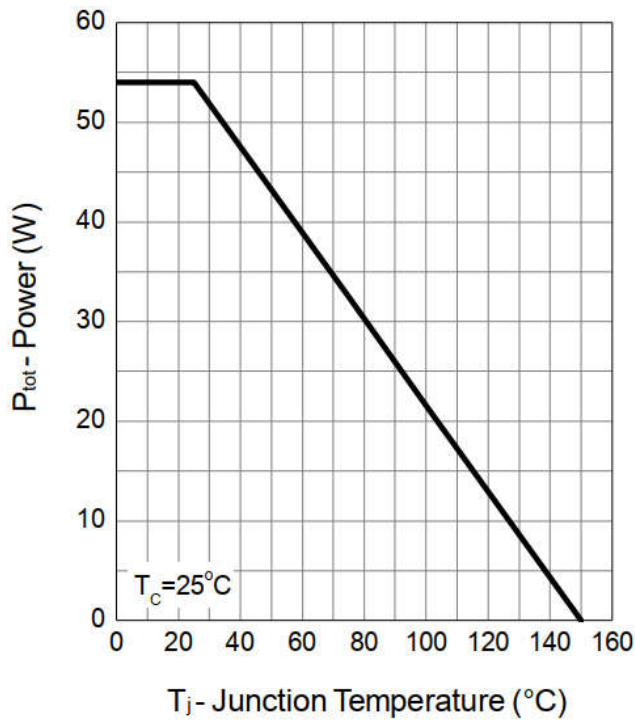
TDM2424

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

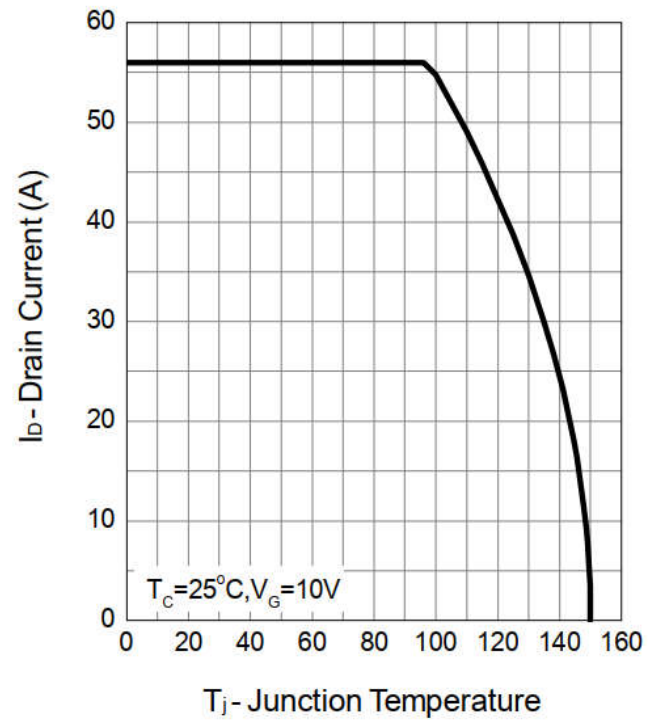
Parameter	Symbol	Condition	Min	Typ	Max	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V I _D =250μA	40	-	-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =32V,V _{GS} =0V	-	-	1	μ A
Gate-Body Leakage Current	I _{GSS}	V _{GS} =±20V,V _{DS} =0V	-	-	± 100	nA
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} ,I _D =250μA	1.3	1.7	2.5	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =20A	-	4	4.8	mΩ
		V _{GS} =4.5V, I _D =15A	-	5.2	6.8	mΩ
Dynamic Characteristics Guaranteed by design						
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	-	1645	2139	PF
Output Capacitance	C _{oss}		-	385	-	PF
Reverse Transfer Capacitance	C _{rss}		-	55	-	PF
Turn-on Delay Time	t _{d(on)}		V _{DS} =20V, R _L =20Ω, V _{GEN} =10V,R _G =6Ω I _{DS} =1A	-	14.3	26
Turn-on Rise Time	t _r	-		7.7	14	nS
Turn-Off Delay Time	t _{d(off)}	-		32.6	59	nS
Turn-Off Fall Time	t _f	-		26.6	48	nS
Total Gate Charge	Q _g	V _{DS} =20V,I _D =20A,V _{GS} =10V	-	24.8	34.7	nC
Total Gate Charge	Q _g	V _{DS} =20V,I _D =20A,V _{GS} =4.5V	-	11.5	-	nC
Gate-Source Charge	Q _{gs}		-	5.2	-	nC
Gate-Drain Charge	Q _{gd}		-	2.6	-	nC
Diode Characteristics						
Diode Forward Voltage	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

Typical Operating Characteristics

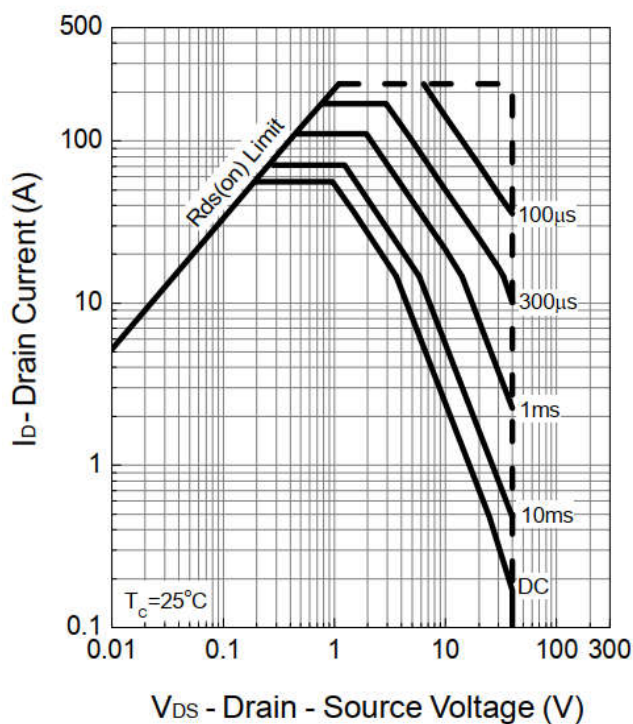
Power Dissipation



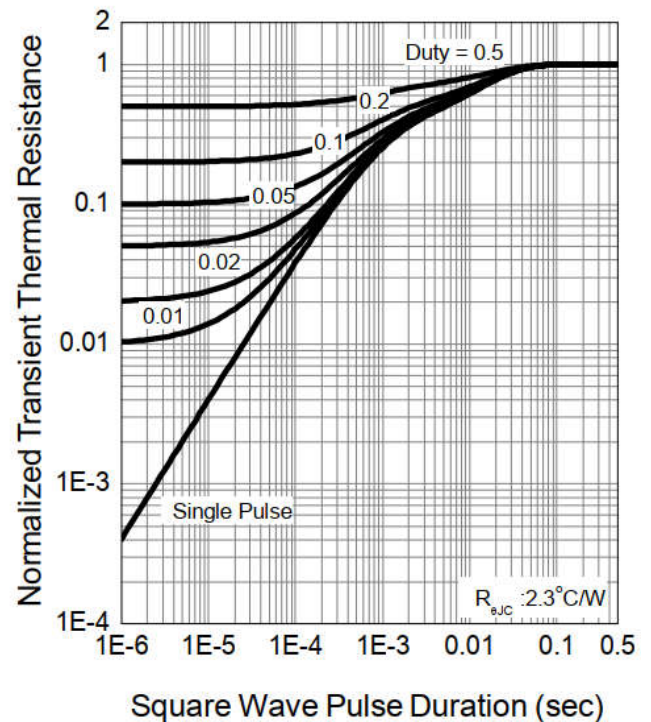
Drain Current



Safe Operation Area

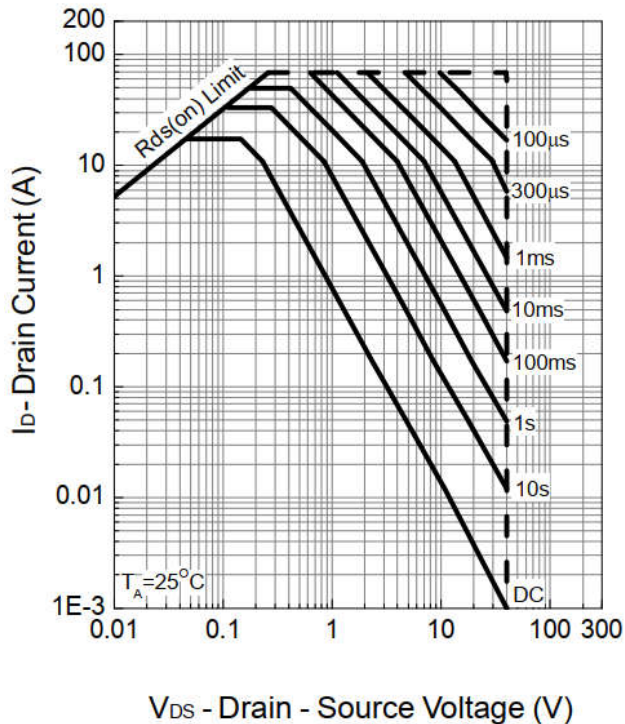


Thermal Transient Impedance

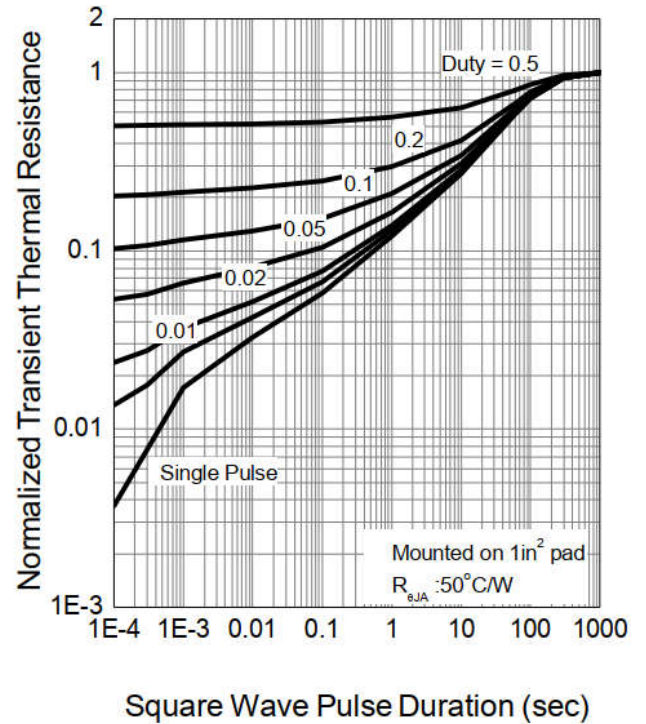


Typical Operating Characteristics (Cont.)

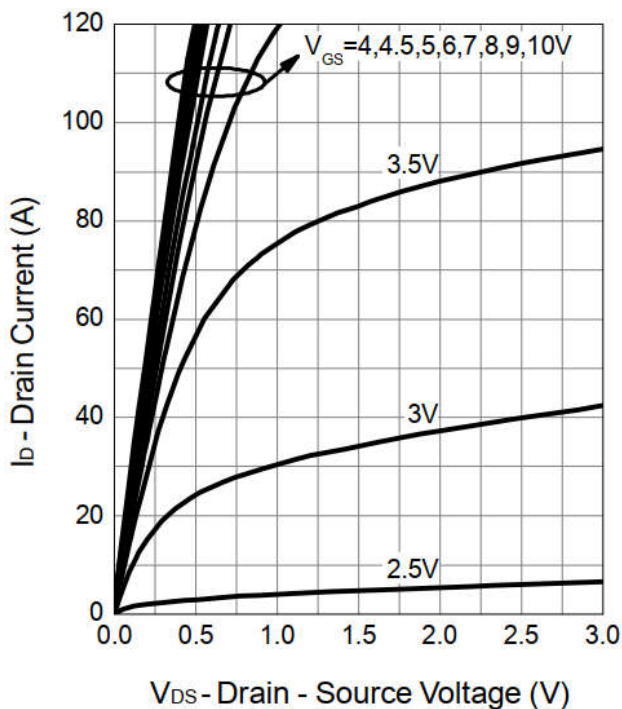
Safe Operation Area



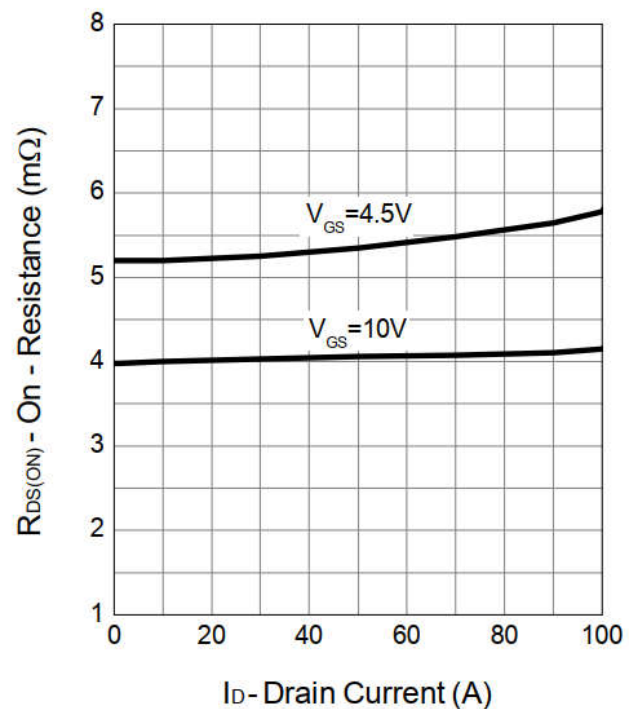
Thermal Transient Impedance



Output Characteristics

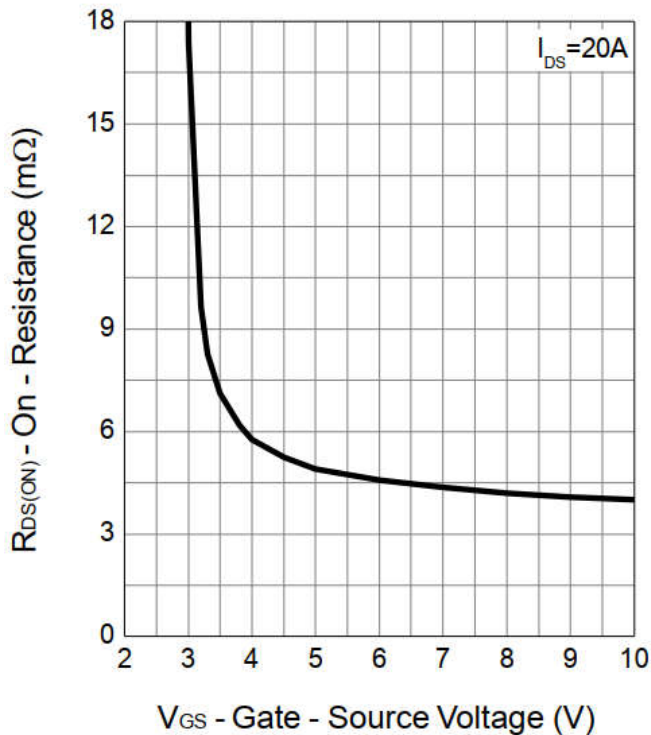


Drain-Source On Resistance

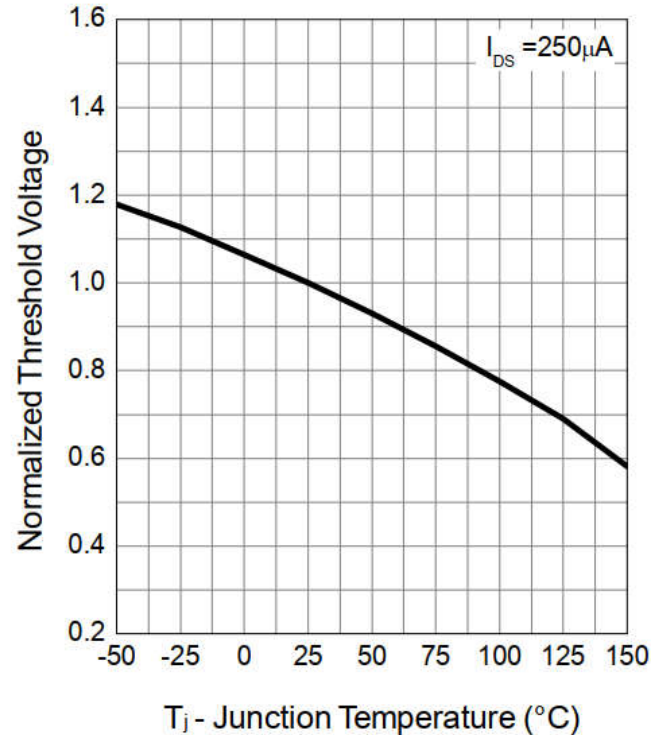


Typical Operating Characteristics (Cont.)

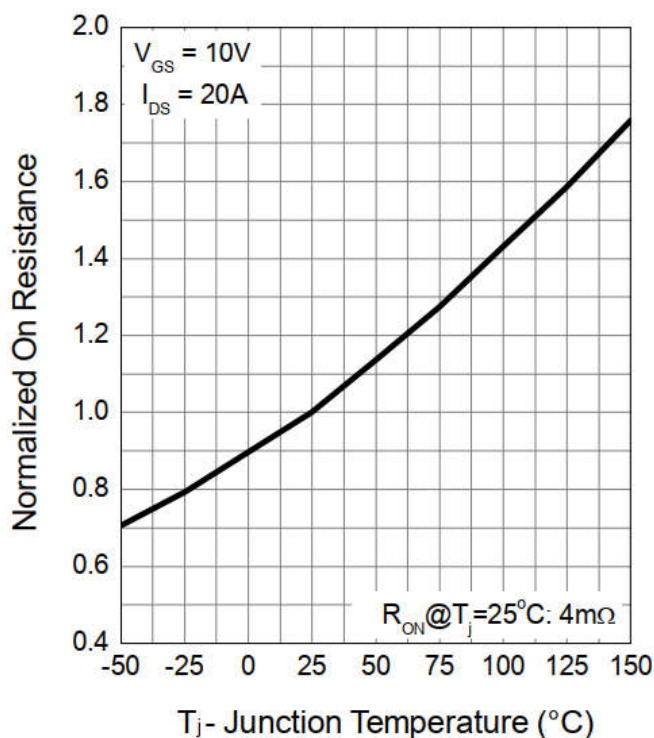
Gate-Source On Resistance



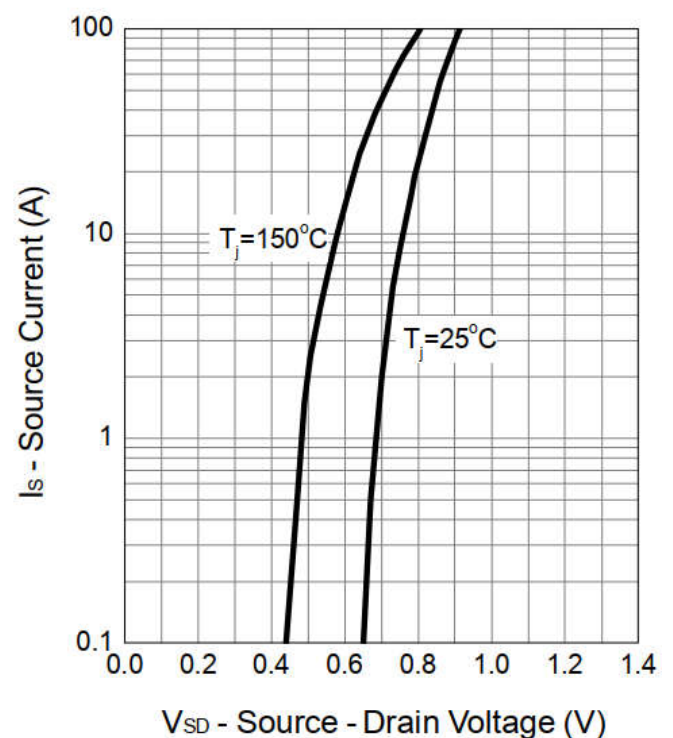
Gate Threshold Voltage



Drain-Source On Resistance

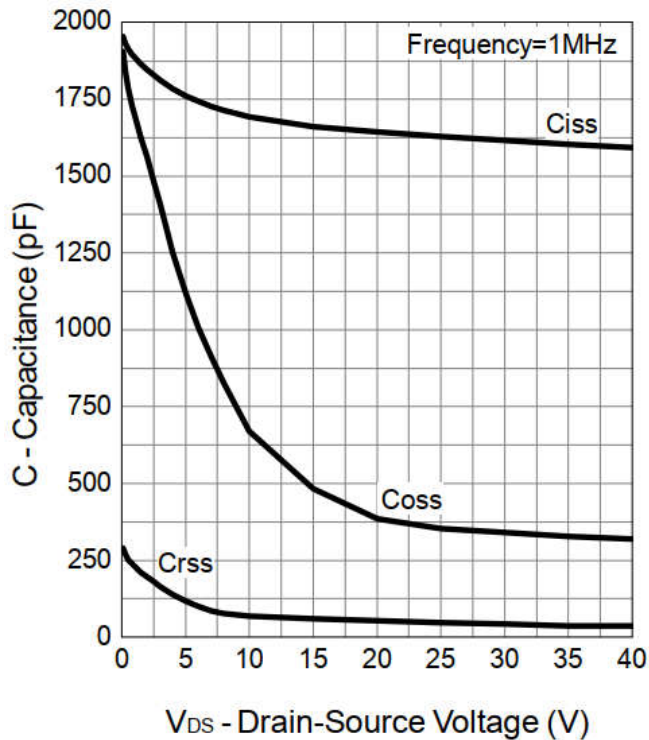


Source-Drain Diode Forward

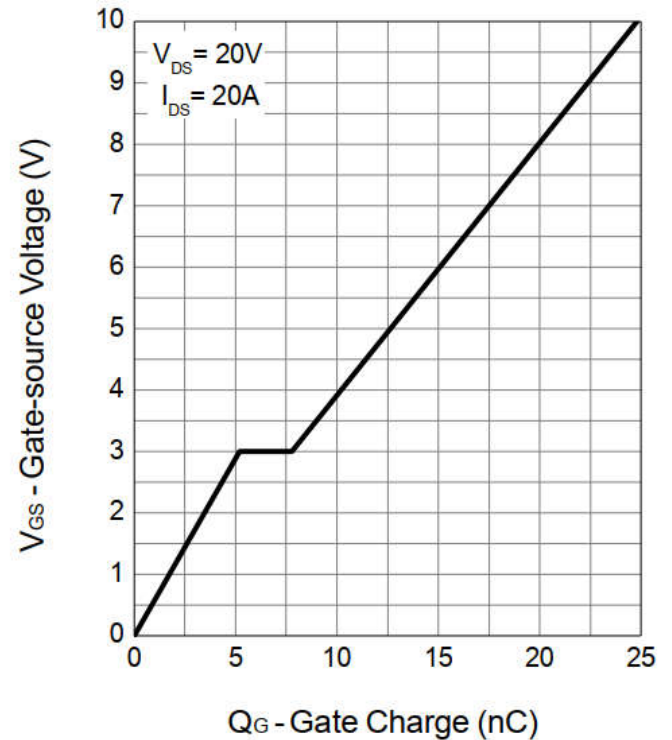


Typical Operating Characteristics (Cont.)

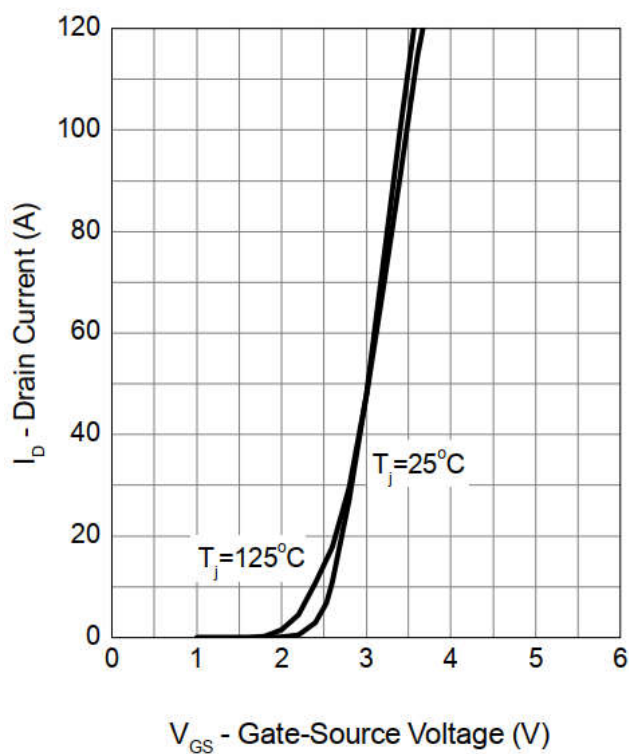
Capacitance



Gate Charge



Transfer Characteristics

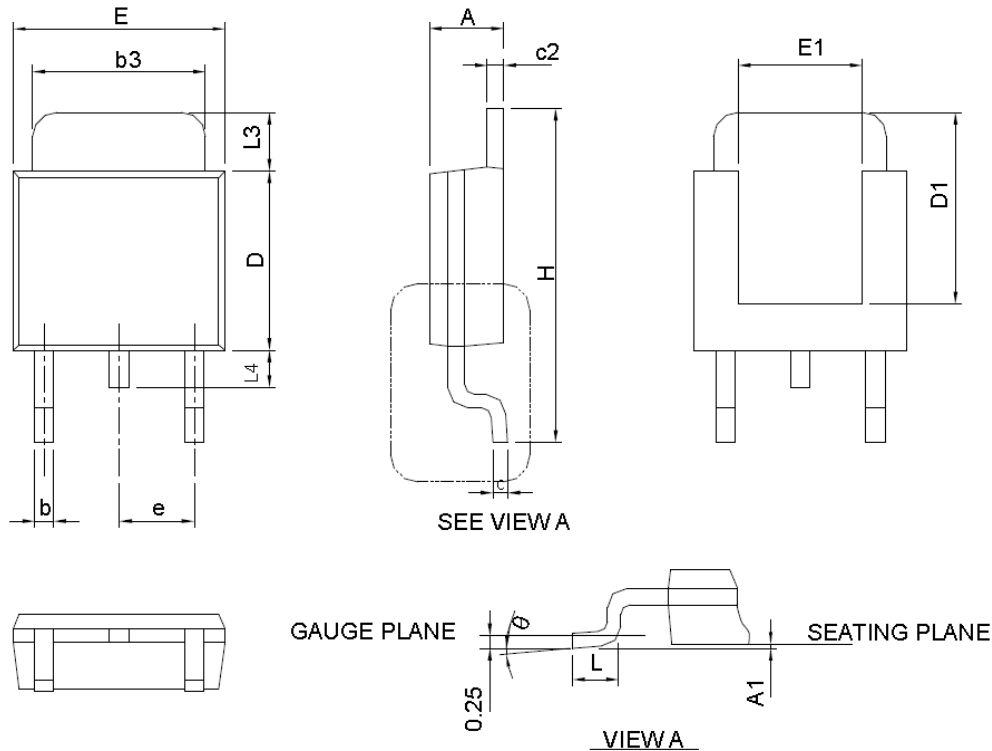


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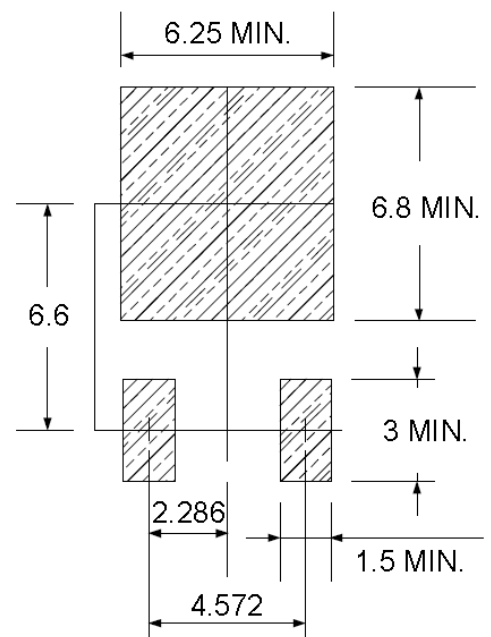
Package Information

TO252-2 Package



DIMENSIONS	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



UNIT: mm

Design Notes