

N-Channel Enhancement Mode MOSFET

TDM2422

DESCRIPTION

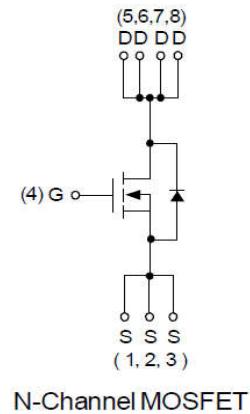
The TDM2422 uses advanced trench technology to provide excellent $R_{DS(ON)}$ and low gate charge. This device is suitable for use as a load switch or in PWM applications.

GENERAL FEATURES

- 40V/80A
 $R_{DS(ON)} < 3.7\text{m}\Omega$ @ $V_{GS}=10\text{V}$
 $R_{DS(ON)} < 5.5\text{m}\Omega$ @ $V_{GS}=4.5\text{V}$
- Lower Q_g and Q_{gd} for high-speed switching
- Lower $R_{DS(ON)}$ to Minimize Conduction Losses
- Surface Mount Package
- Lead Free and Green Devices available(RoHS Compliant)

Application

- Power Management in Desktop Computer or DC/DC Converters.

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 ($T_C=25^\circ\text{C}$)	28	A
Pulsed Drain Current	I_{DM} ($T_C=25^\circ\text{C}$)	320	A
Drain Current @ Continuous	I_D ($T_C=25^\circ\text{C}$)	80	A
	I_D ($T_C=100^\circ\text{C}$)	65	A
Maximum Power Dissipation	$P_D(T_C=25^\circ\text{C})$	62.5	W
	$P_D(T_C=100^\circ\text{C})$	31.3	
Drain Current @ Continuous	I_D ($T_A=25^\circ\text{C}$)	17.5	A
	I_D ($T_A=70^\circ\text{C}$)	14.7	A
Pulsed Drain Current	I_{DM} ($T_A=25^\circ\text{C}$)	70	A
Maximum Power Dissipation(Note 2)	$P_D(T_A=25^\circ\text{C})$	2.3	W
	$P_D(T_A=70^\circ\text{C})$	1.3	
Avalanche Energy, Single pulse	$E_{AS}(L=0.1\text{mH})$	51	mJ
Thermal Resistance,Junction-to-Ambient (Note 2)	$R_{\theta JA}$ ($t \leq 10\text{s}$)	24	$^\circ\text{C}/\text{W}$
	$R_{\theta JA}$ (Steady State)	66	
Thermal Resistance,Junction-to-Case(Note 5)	$R_{\theta JC}$ (Steady State)	2.4	$^\circ\text{C}/\text{W}$
Maximum Operating Junction Temperature	T_J	175	$^\circ\text{C}$
Storage Temperature Range	T_{STG}	-55 To 175	$^\circ\text{C}$

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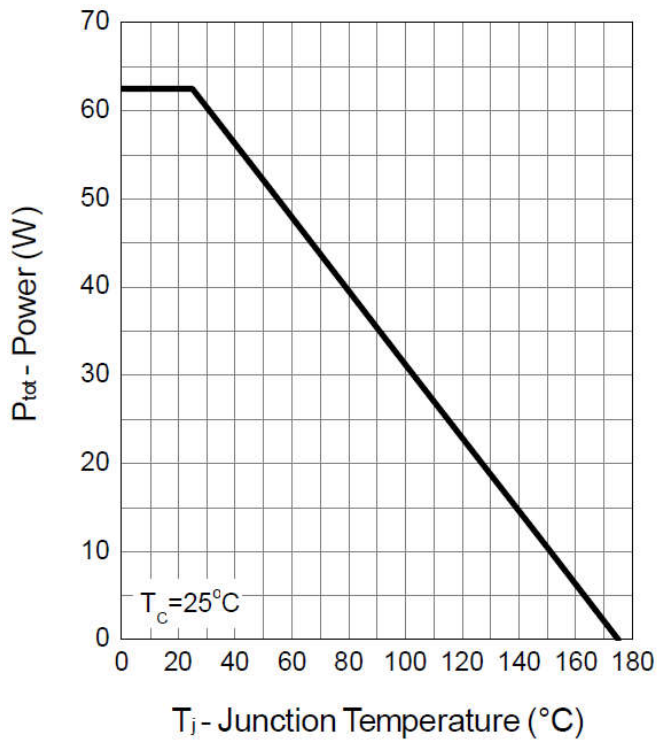
TDM2422

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

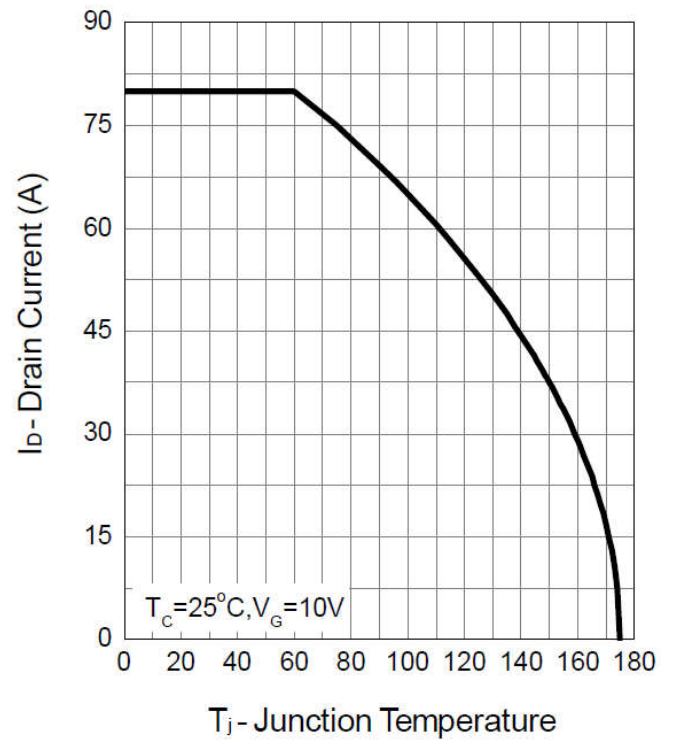
Parameter	Symbol	Condition	Min	Typ	Max	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V I _D =250μA	40	-	-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =32V,V _{GS} =0V	-	-	1	μ A
Gate-Body Leakage Current	I _{GSS}	V _{GS} =±20V,V _{DS} =0V	-	-	± 100	nA
Gate 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	-	3.1	3.7	mΩ
		T _J =125℃	-	4.9	-	
		V _{GS} =4.5V, I _D =15A	-	4.2	5.5	
Dynamic Characteristics(Guaranteed by design)						
Gate Resistance	R _G	V _{GS} =0V,V _{DS} =0V,F=1MHz	-	1	2	Ω
Input Capacitance	C _{iss}	V _{DS} =20V,V _{GS} =0V, F=1.0MHz	-	1620	2106	PF
Output Capacitance	C _{oss}		-	390	-	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	-	nS
Turn-on Rise Time	t _r		-	7.8	-	nS
Turn-Off Delay Time	t _{d(off)}		-	34	-	nS
Turn-Off Fall Time	t _f		-	26	-	nS
Total Gate Charge	Q _g	V _{DS} =20V,I _D =20A,V _{GS} =10V	-	25	32.5	nC
Total Gate Charge	Q _g	V _{DS} =20V,I _D =20A,V _{GS} =4.5V	-	12	-	nC
Gate-Source Charge	Q _{gs}		-	5	-	nC
Gate-Drain Charge	Q _{gd}		-	3	-	nC
Diode Characteristics						
Diode Forward Voltage	V _{SD}	V _{GS} =0V,I _S =20A	-	0.81	1.1	V
Reverse Recovery Time	T _{rr}	I _F =20A, dI/dt=100A/μs	-	27.3	-	nS
Charge Time	T _a		-	16.2	-	nS
Discharge Time	T _b		-	11	-	nS
Reverse Recovery Charge	Q _{rr}		-	17	-	nC

Typical Operating Characteristics

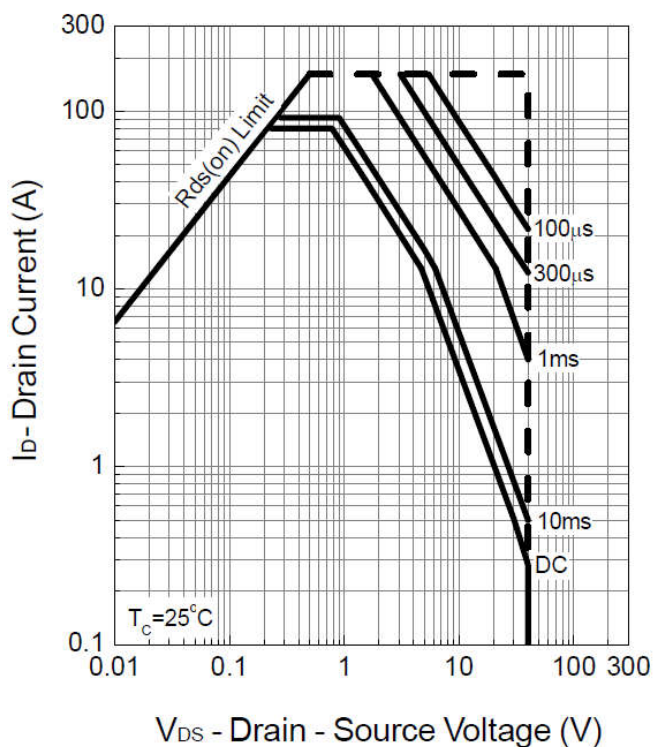
Power Dissipation



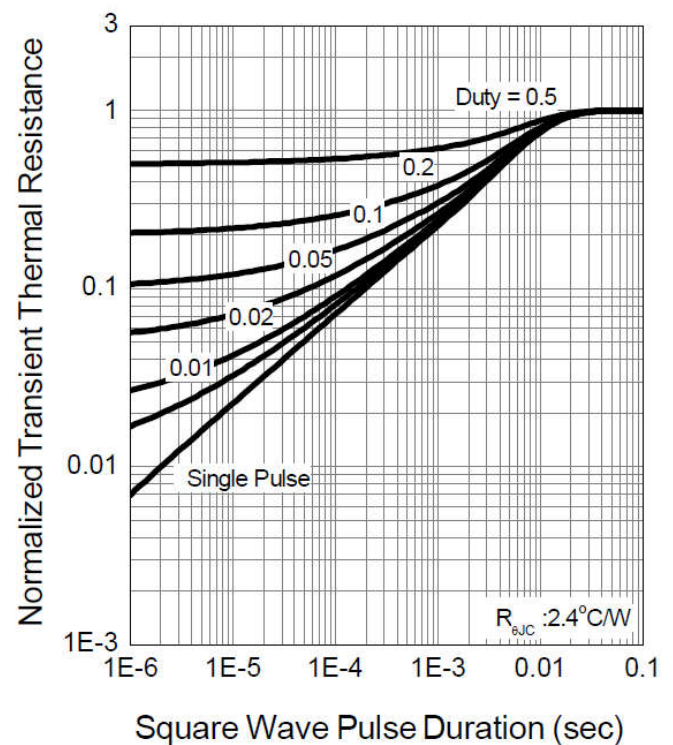
Drain Current



Safe Operation Area

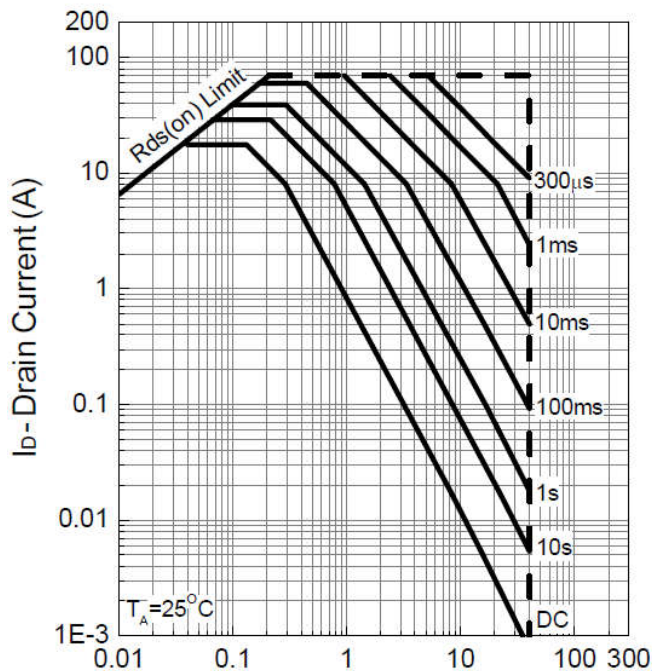


Thermal Transient Impedance

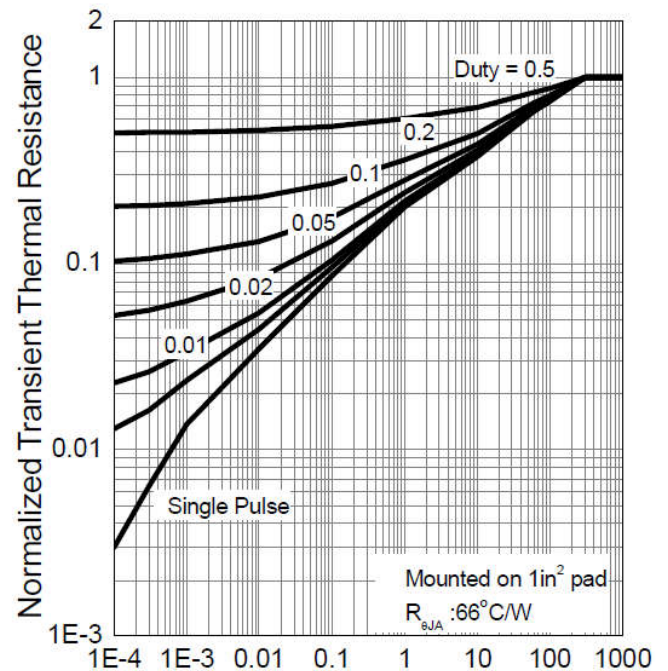


Typical Operating Characteristics(Cont.)

Safe Operation Area

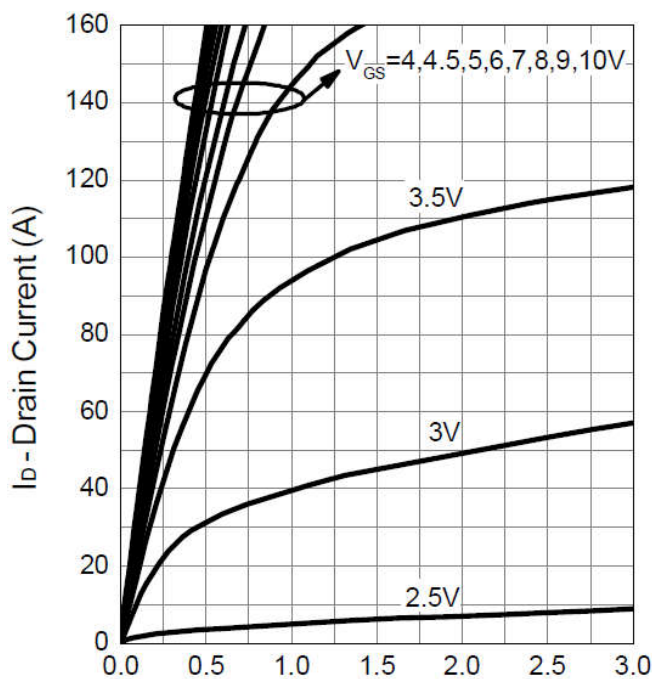
 V_{DS} - Drain - Source Voltage (V)

Thermal Transient Impedance

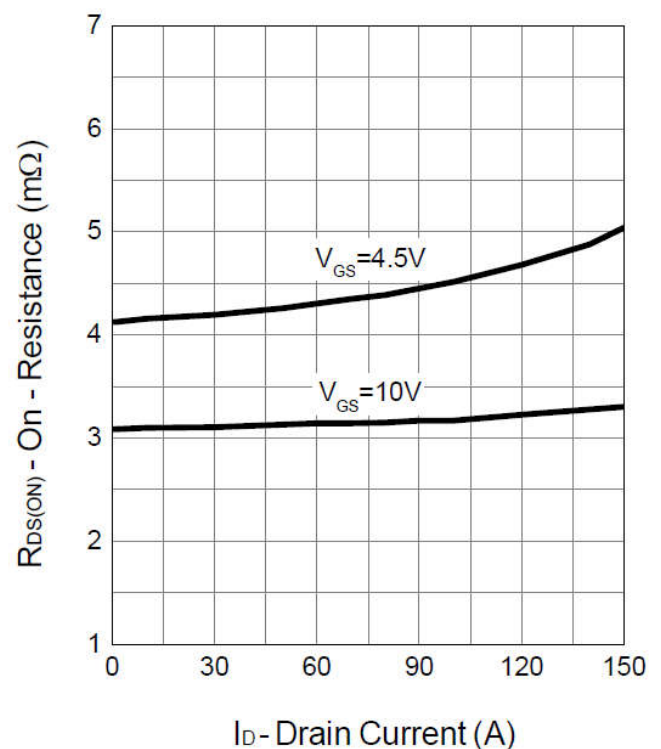


Square Wave Pulse Duration (sec)

Output Characteristics

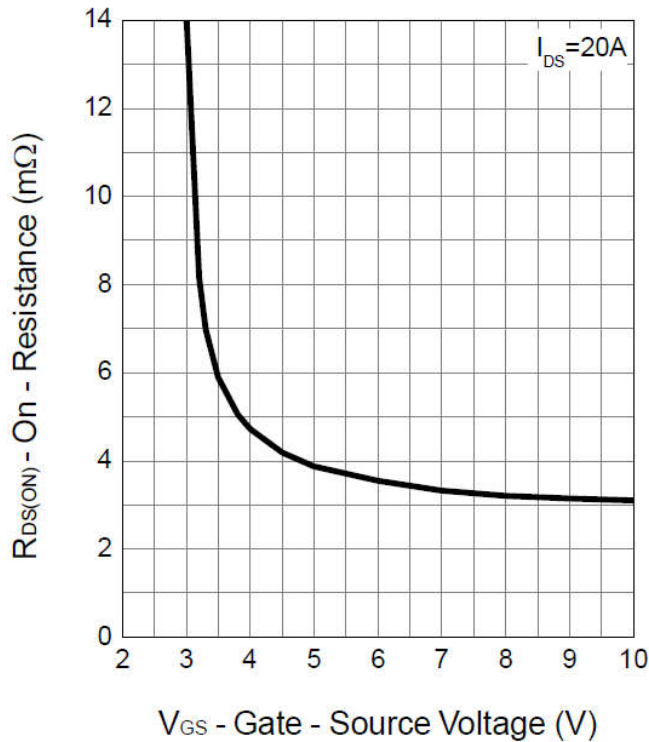
 V_{DS} - Drain - Source Voltage (V)

Drain-Source On Resistance

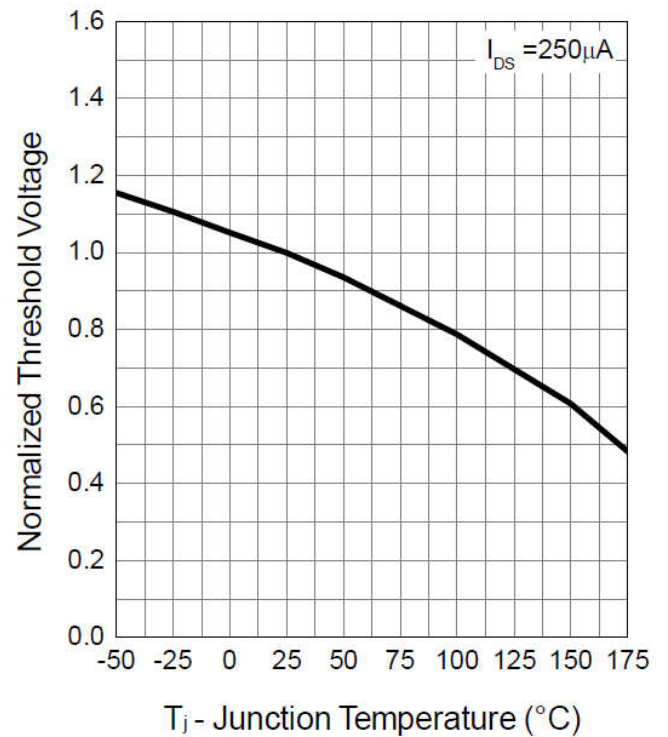
 I_D - Drain Current (A)

Typical Operating Characteristics (Cont.)

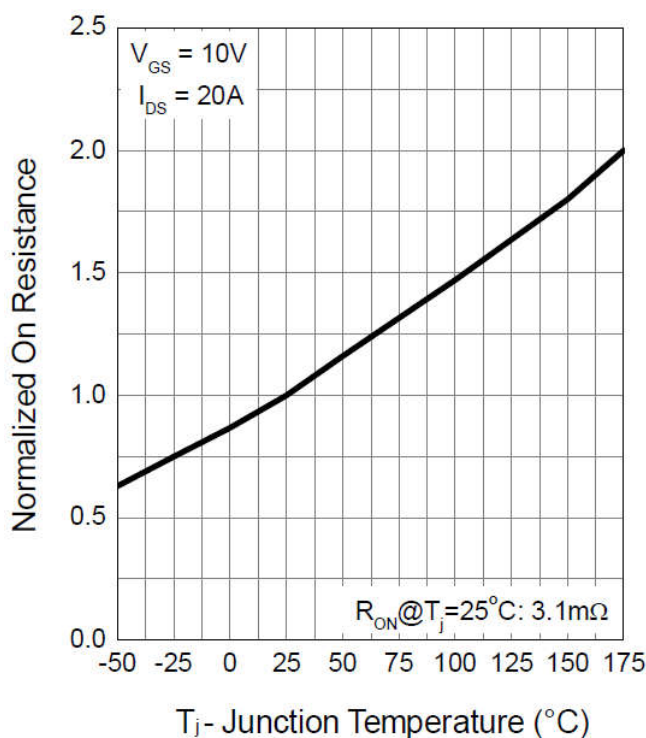
Gate-Source On Resistance



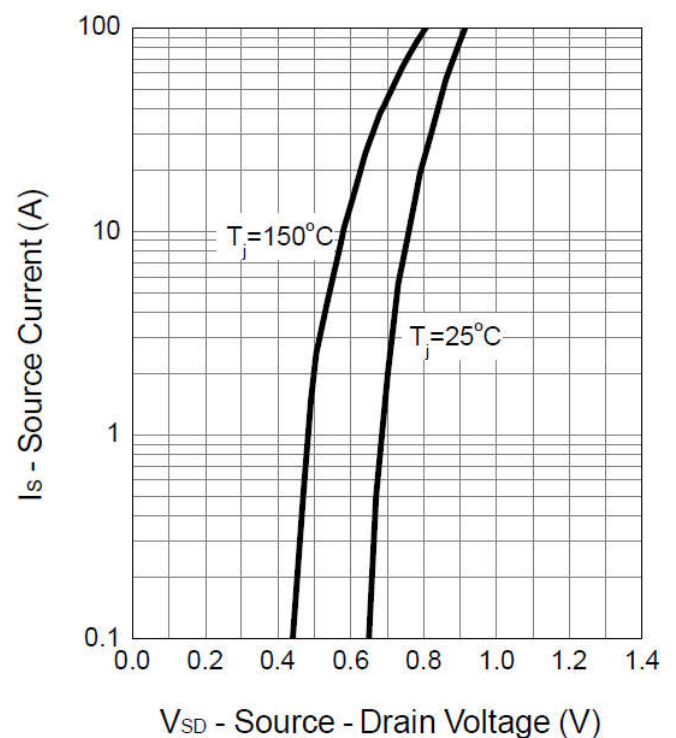
Gate Threshold Voltage



Drain-Source On Resistance

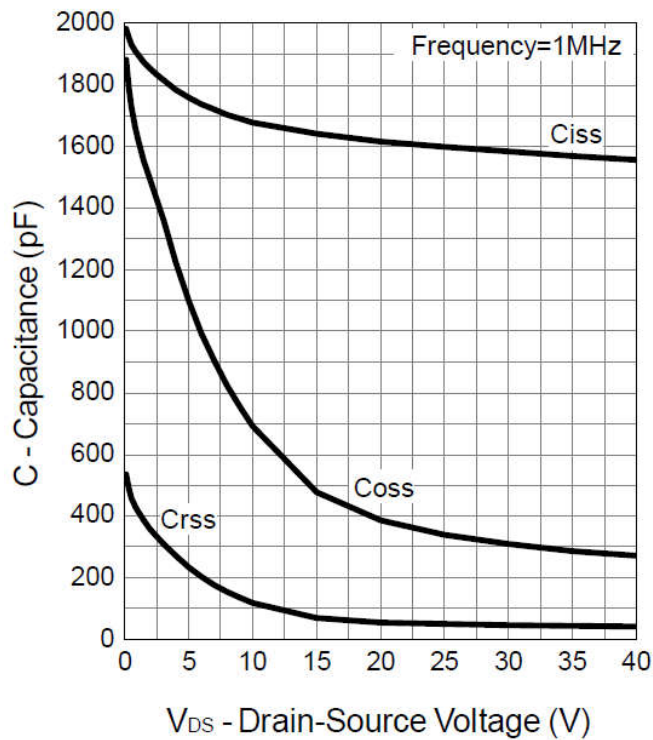


Source-Drain Diode Forward

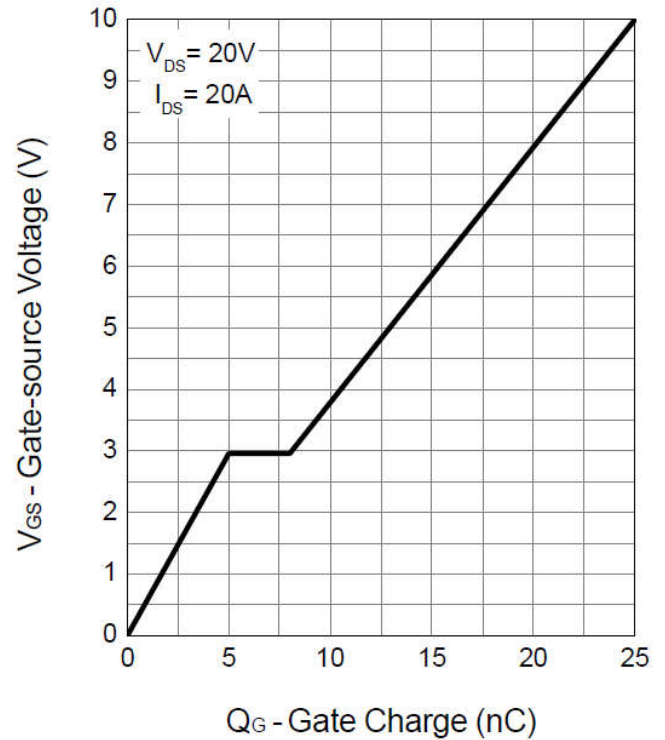


Typical Operating Characteristics (Cont.)

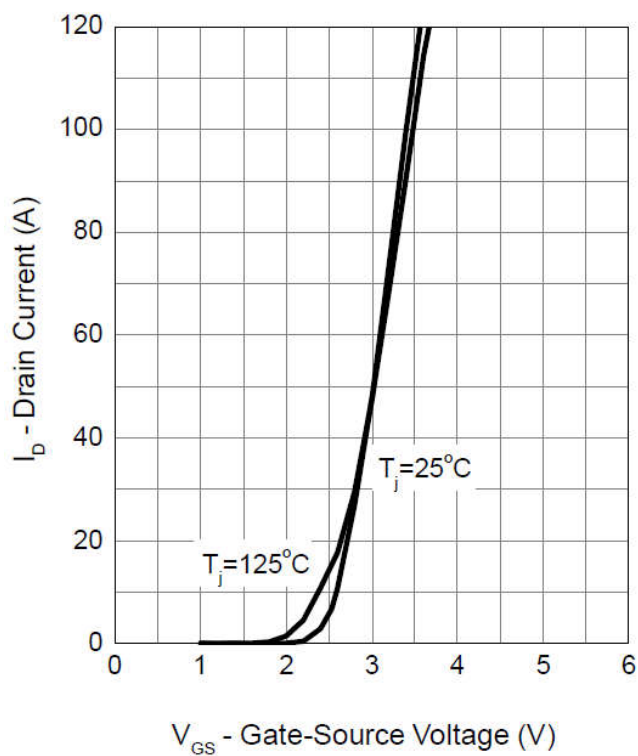
Capacitance



Gate Charge



Transfer Characteristics

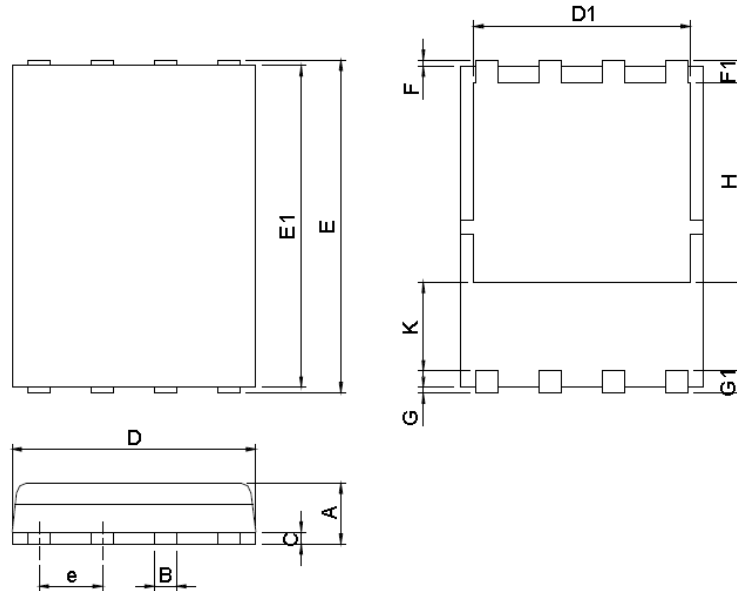


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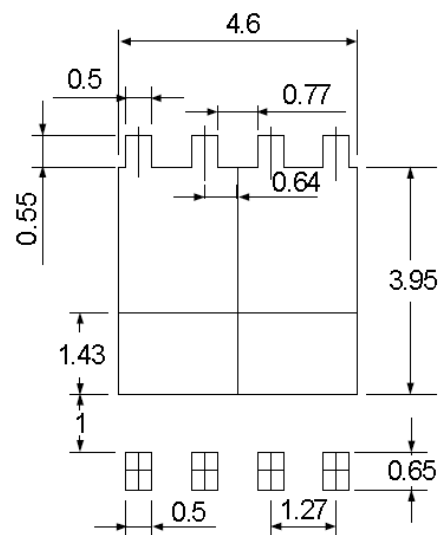
Package Information

DFN5*6-8 Package



DIMENSIONS	DFN5x6-8			
	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	0.90	1.20	0.035	0.047
B	0.3	0.51	0.012	0.020
C	0.19	0.25	0.007	0.010
D	4.80	5.30	0.189	0.209
D1	4.00	4.40	0.157	0.173
E	5.90	6.20	0.232	0.244
E1	5.50	5.80	0.217	0.228
e	1.27 BSC		0.050 BSC	
F	0.05	0.30	0.002	0.012
F1	0.35	0.75	0.014	0.030
G	0.05	0.30	0.002	0.012
G1	0.35	0.75	0.014	0.030
H	3.34	3.9	0.131	0.154
K	0.762	-	0.03	-

RECOMMENDED LAND PATTERN



UNIT: mm

Note : 1.Dimension D, D1,D2 and E1 do not include mold flash or protrusions.
Mold flash or protrusions shall not exceed 10 mil.

Design Notes