

N-Channel Enhancement Mode MOSFET

TDM3302

DESCRIPTION

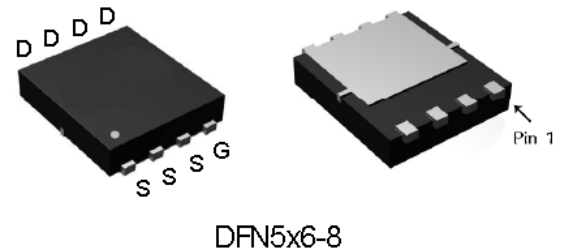
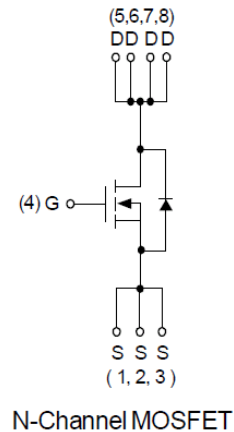
The TDM3302 uses advanced trench technology to provide excellent $R_{DS(ON)}$ and low gate charge. This device is suitable for use as a load switch or in PWM applications.

GENERAL FEATURES

- 30V/100A
 $R_{DS(ON)} < 1.1m\Omega$ @ $V_{GS}=10V$
 $R_{DS(ON)} < 1.7m\Omega$ @ $V_{GS}=4.5V$
- Reliable and Rugged
- 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

- OR-ing
- Synchronous Rectifier for Server
- Battery Charger and Power Circuits

ABSOLUTE MAXIMUM RATINGS($T_A=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	± 20	V
Diode Continuous Forward Current	I_S ($T_C=25^\circ\text{C}$)	78	A
Drain Current @ Continuous (Note 1)	I_D ($T_C=25^\circ\text{C}$)	100	A
	I_D ($T_C=100^\circ\text{C}$)	100	A
Drain Current @ Current-Pulsed (Note 2)	I_{DM} ($T_C=25^\circ\text{C}$)	400	A
Maximum Power Dissipation	$P_D(T_C=25^\circ\text{C})$	86.8	W
	$P_D(T_C=100^\circ\text{C})$	34.7	
Drain Current @ Continuous (Note 3)	I_D ($T_A=25^\circ\text{C}$)	34	A
	I_D ($T_A=70^\circ\text{C}$)	27	A
Maximum Power Dissipation(Note 3)	$P_D(T_A=25^\circ\text{C})$	1.9	W
	$P_D(T_A=70^\circ\text{C})$	1.2	
Avalanche Energy, Single pulse (Note 4)	$E_{AS}(L=0.1mH)$	231	mJ
Thermal Resistance,Junction-to-Ambient (Note 3)	$R_{\theta JA}$ ($t \leq 10s$)	24	$^\circ\text{C}/\text{W}$
	$R_{\theta JA}$ (Steady State)	65	
Thermal Resistance,Junction-to-Case	$R_{\theta JC}$ (Steady State)	1.44	$^\circ\text{C}/\text{W}$
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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ELECTRICAL CHARACTERISTICS ($T_A=25^{\circ}\text{C}$ unless otherwise noted)

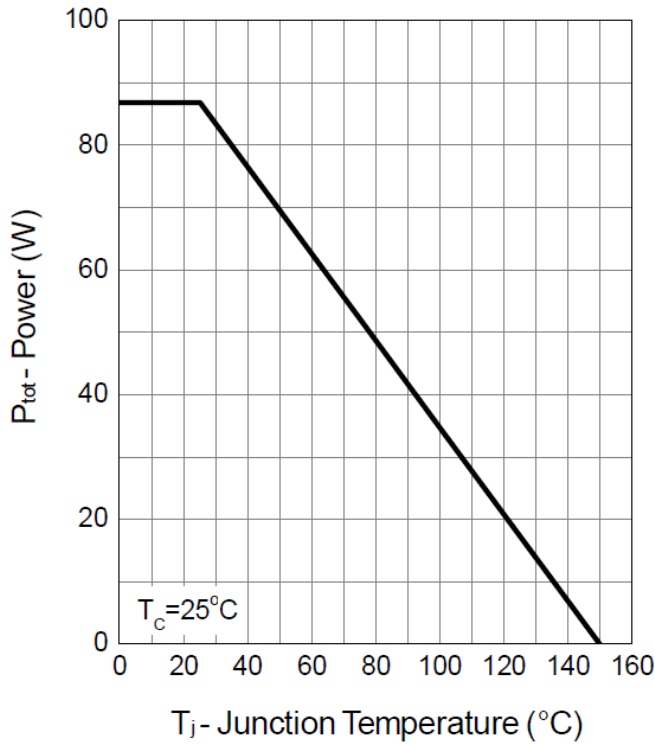
Parameter	Symbol	Condition	Min	Typ	Max	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V I _D =250μA	30	-	-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =24V,V _{GS} =0V	-	-	1	μ A
Gate-Body Leakage Current	I _{GSS}	V _{GS} =±20V,V _{DS} =0V	-	-	±100	nA
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} ,I _D =250μA	1.3	1.6	2.5	V
Drain-Source On-State Resistance(Note5)	R _{DS(ON)}	V _{GS} =10V, I _D =25A	-	0.9	1.1	mΩ
		V _{GS} =4.5V, I _D =15A	-	1.3	1.7	
Forward Transconductance	G _{fs}	V _{DS} =5V, I _{DS} =20A	-	35	-	S
Dynamic Characteristics						
Gate Resistance	R _G	V _{GS} =0V,V _{DS} =0V,F=1MHz	-	1	2.2	Ω
Input Capacitance	C _{iss}	V _{DS} =15V,V _{GS} =0V, F=1.0MHz	-	5165	-	PF
Output Capacitance	C _{oss}		-	3800	-	PF
Reverse Transfer Capacitance	C _{rss}		-	260	-	PF
Turn-on Delay Time	t _{d(on)}	V _{DD} =15V, R _L =15Ω, V _{GEN} =10V,R _G =1Ω I _D =1A	-	20.6	-	nS
Turn-on Rise Time	t _r		-	11.6	-	nS
Turn-Off Delay Time	t _{d(off)}		-	53.5	-	nS
Turn-Off Fall Time	t _f		-	81.7	-	nS
Gate Charge Characteristics						
Total Gate Charge	Q _g	V _{DS} =15V,I _D =25A,V _{GS} =10V	-	76	99	nC
Total Gate Charge	Q _g	V _{DS} =15V,I _D =25A,V _{GS} =4.5V	-	37	-	nC
Gate-Source Charge	Q _{gs}		-	12	-	nC
Gate-Drain Charge	Q _{gd}		-	11	-	nC
Diode Characteristics						
Diode Forward Voltage (Note 5)	V _{SD}	V _{GS} =0V,I _S =25A	-	0.75	1.1	V
Body Diode Reverse Recovery Time	T _{rr}	I _{SD} =25A, dI/dt=100A/μs, V _{DS} =15V	-	74	-	nS
Body Diode Reverse Recovery Charge	Q _{rr}		-	95.5	-	nC

NOTES:

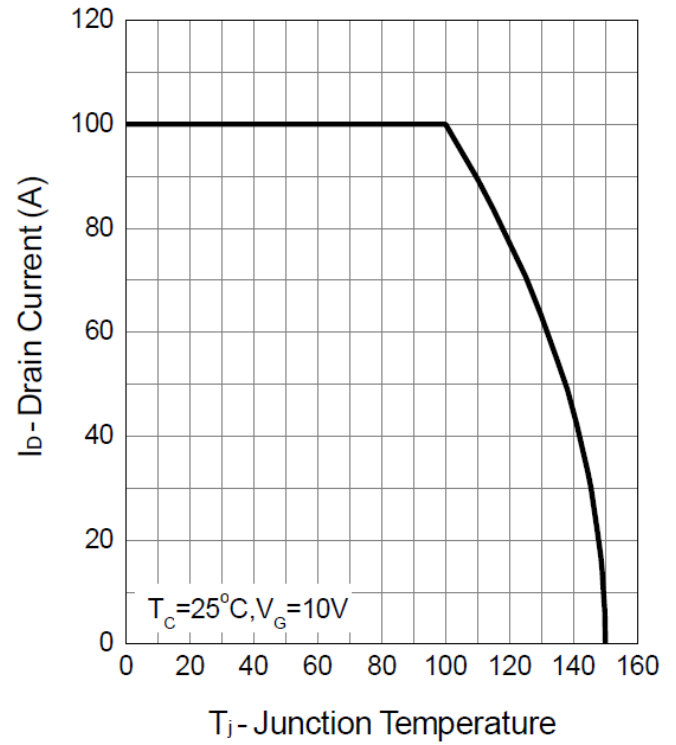
1. Maximum continue current is limited by bonding wire.
2. Pulse width is limited by max. junction temperature.
3. $R_{\theta JA}$ steady state=999s.
4. UIS tested and pulse width limited by maximum junction temperature 150°C (initial temperature $T_j=25^{\circ}\text{C}$).
5. Pulse test ; pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.

Typical Operating Characteristics

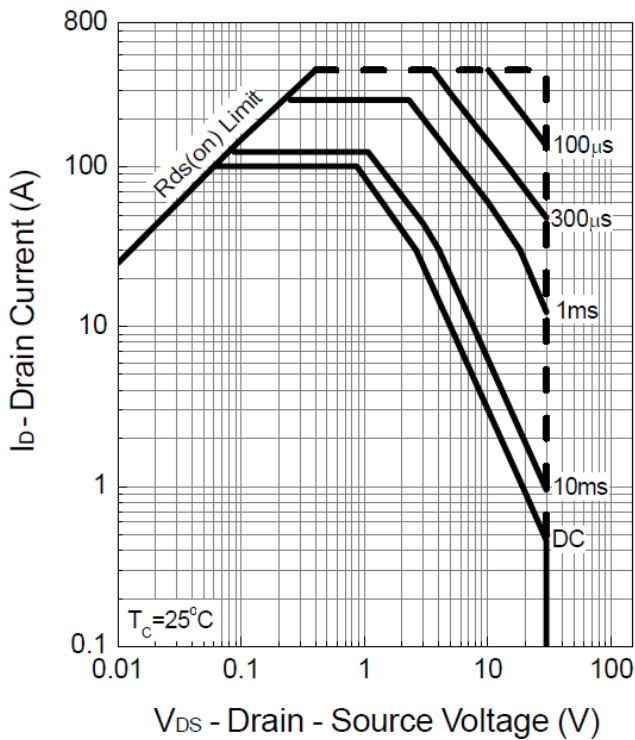
Power Dissipation



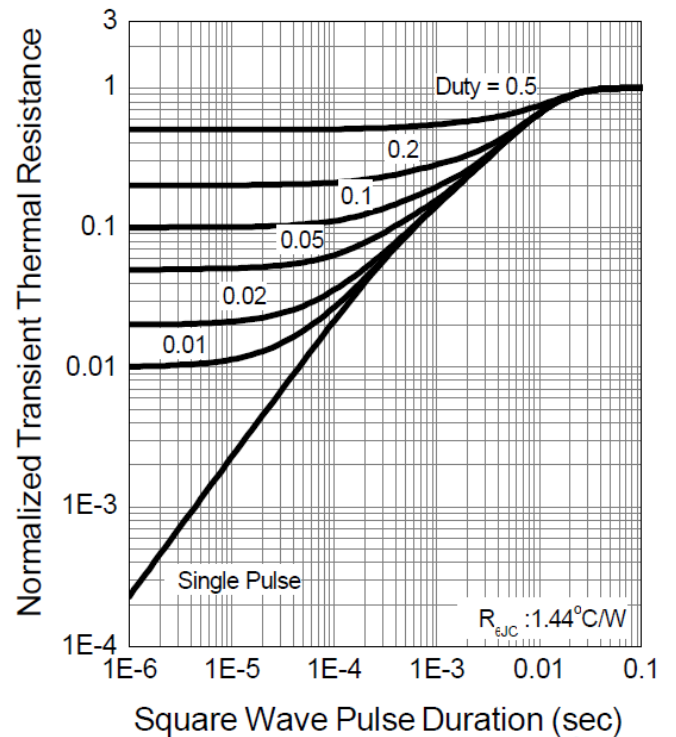
Drain Current



Safe Operation Area

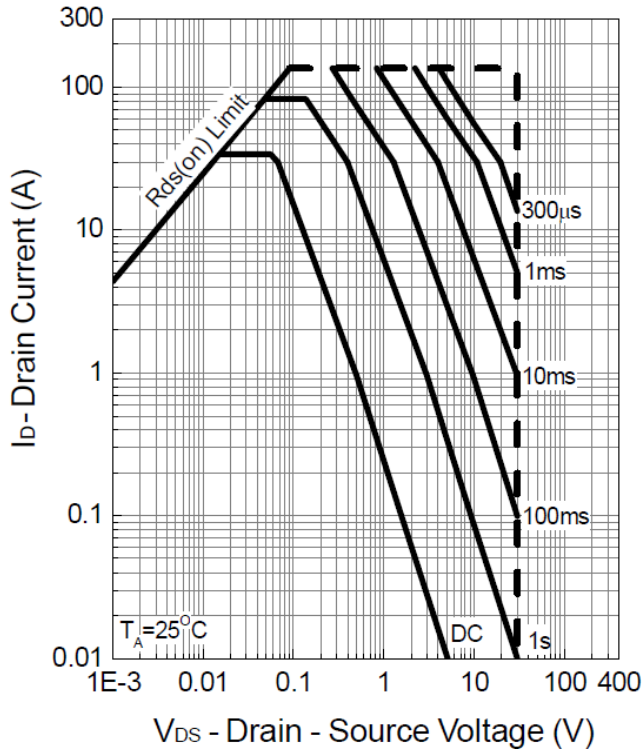


Thermal Transient Impedance

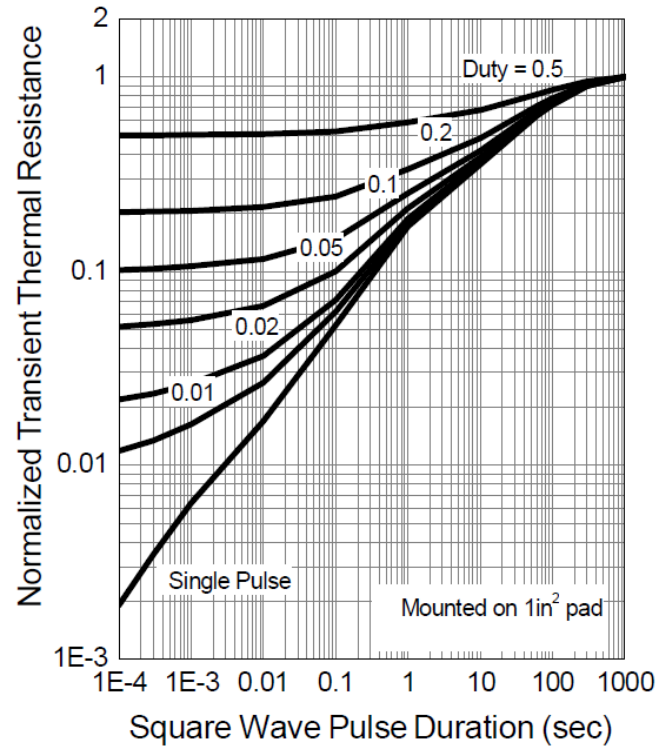


Typical Operating Characteristics(Cont.)

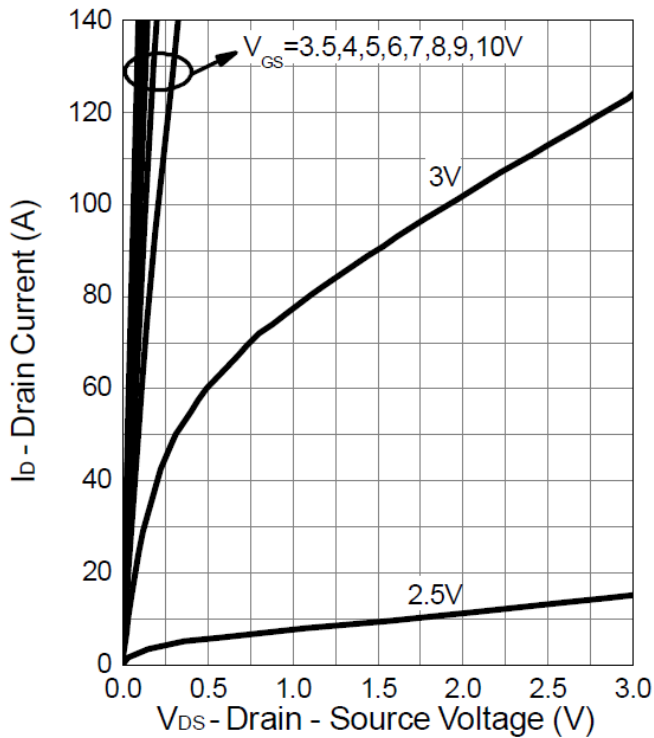
Safe Operation Area



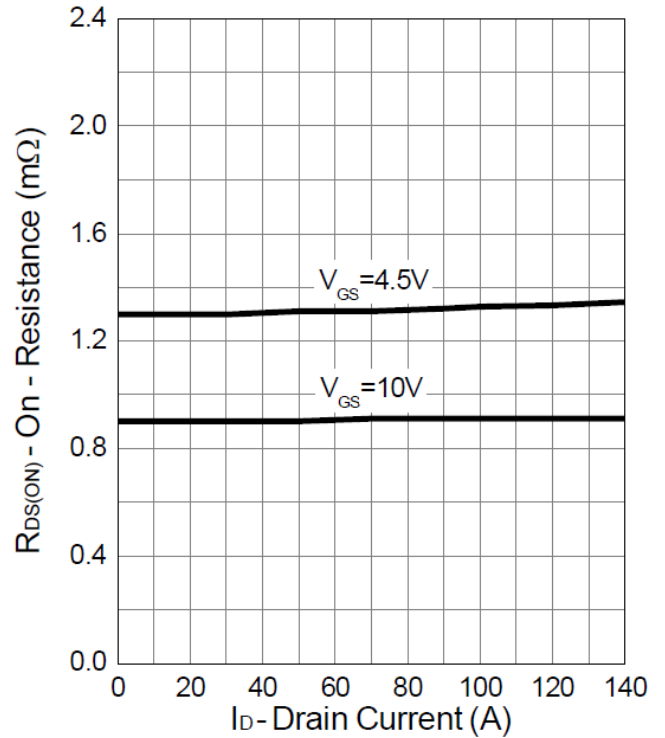
Thermal Transient Impedance



Output Characteristics

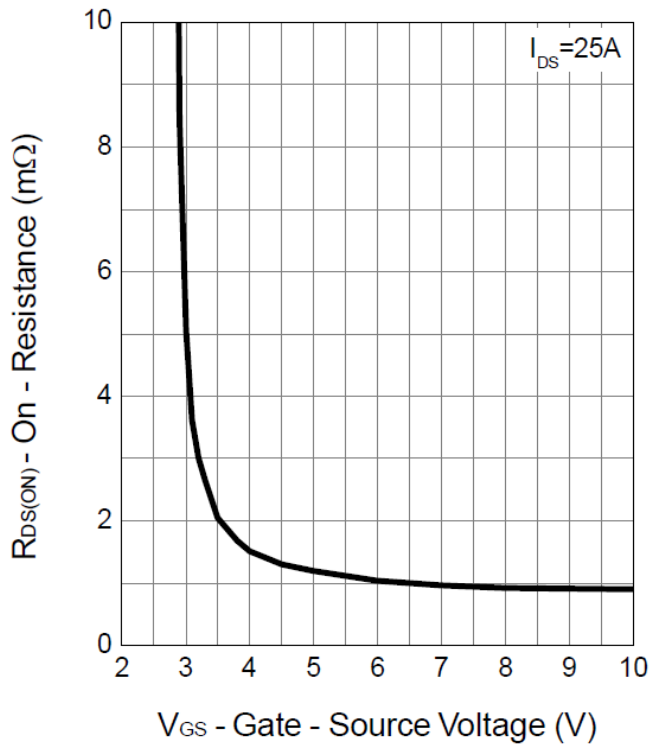


Drain-Source On Resistance

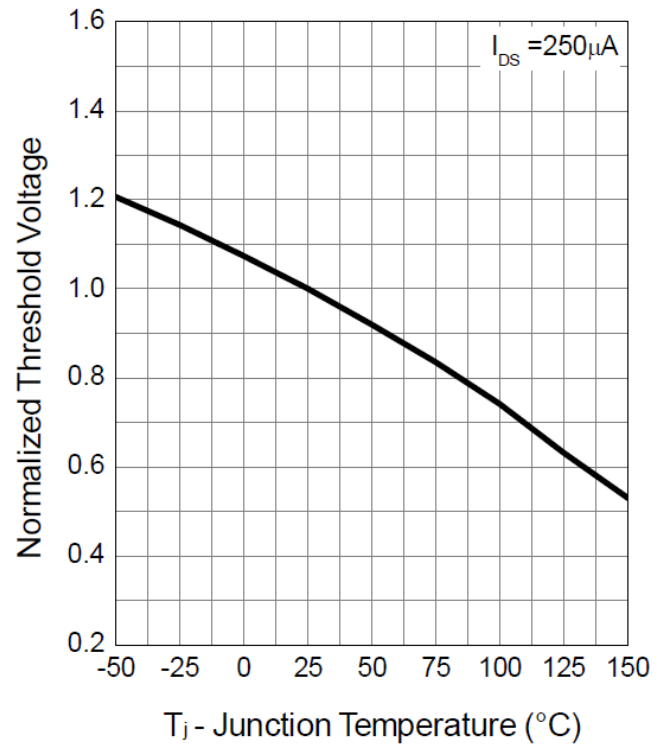


Typical Operating Characteristics (Cont.)

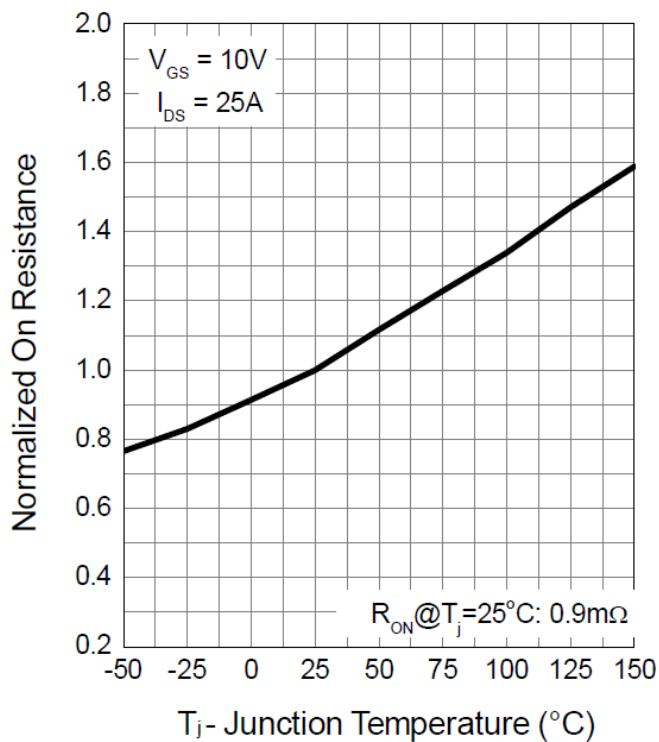
Gate-Source On Resistance



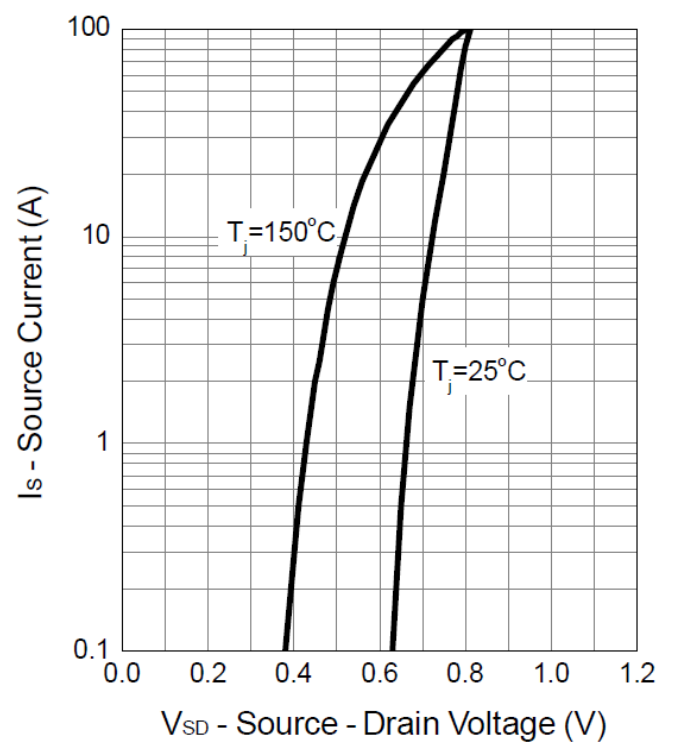
Gate Threshold Voltage



Drain-Source On Resistance

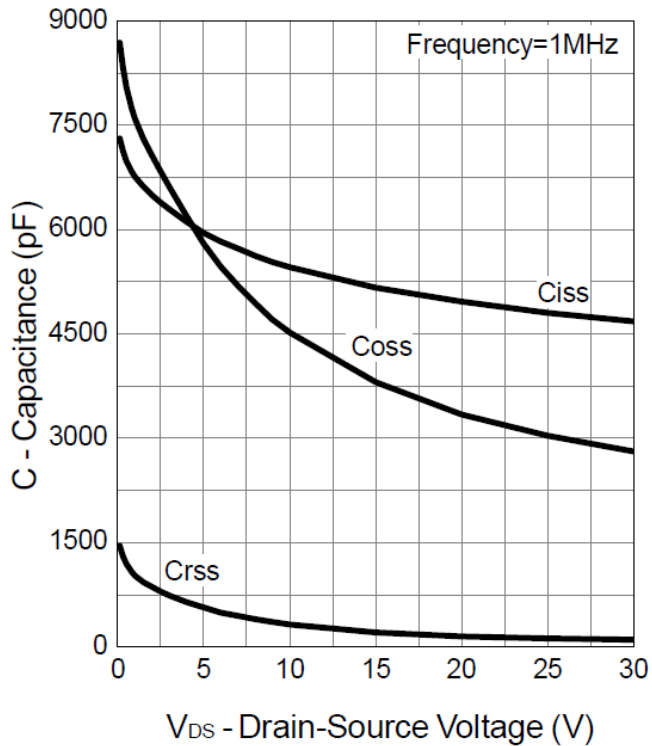


Source-Drain Diode Forward

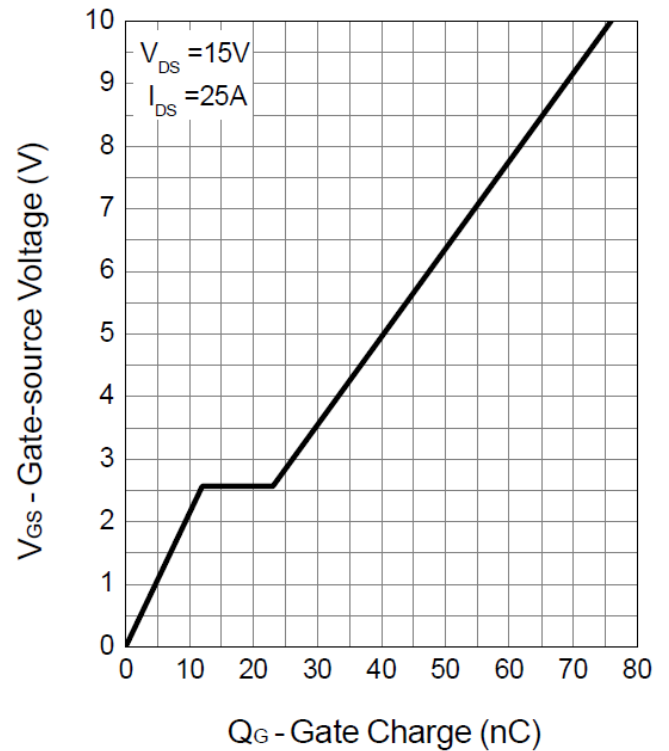


Typical Operating Characteristics (Cont.)

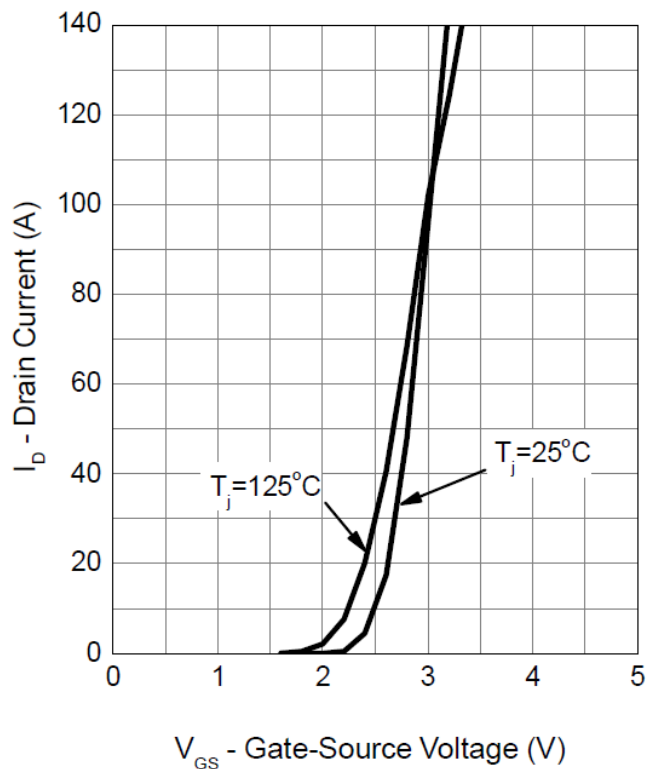
Capacitance



Gate Charge



Transfer Characteristics

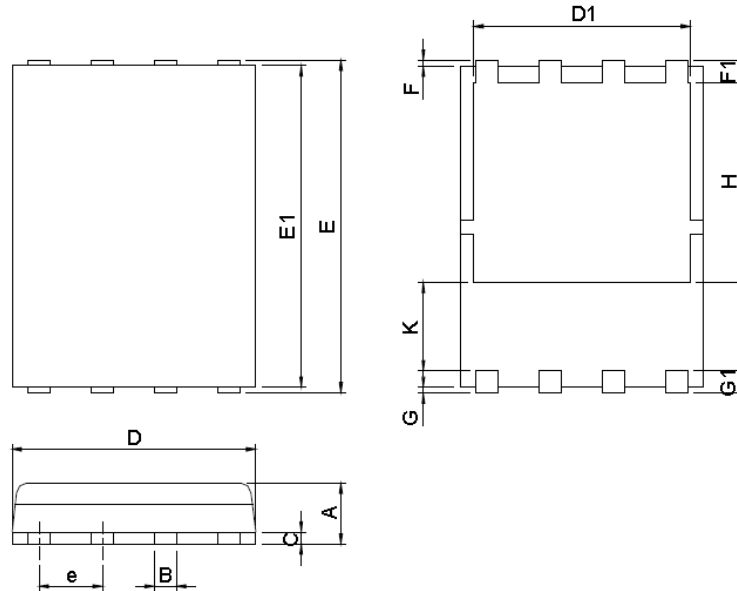


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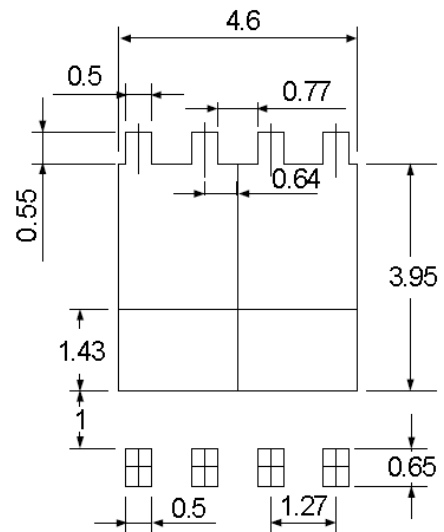
Package Information

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