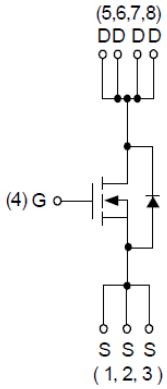
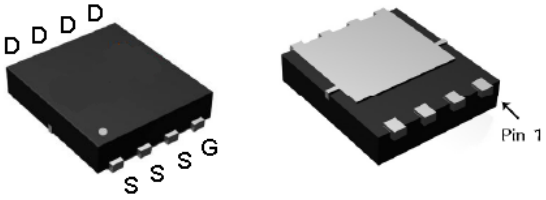
N-Channel Enhancement Mode MOSFET TDM3302

DESCRIPTION

The TDM3302 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.



N-Channel MOSFET



DFN5x6-8

GENERAL FEATURES

- 30V/100A
  RDS(ON) <1.1mΩ @ VGS=10V
  RDS(ON) <1.7mΩ @ VGS=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℃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℃）	78	A
Drain Current @ Continuous (Note 1)	I_D（T_C=25℃）	100	A
	I_D（T_C=100℃）	100	A
Drain Current @ Current-Pulsed (Note 2)	I_{DM}（T_C=25℃）	400	A
Maximum Power Dissipation	P_D(T_C=25℃)	86.8	W
	P_D(T_C=100℃)	34.7	
Drain Current @ Continuous (Note 3)	I_D（T_A=25℃）	34	A
	I_D（T_A=70℃）	27	A
Maximum Power Dissipation(Note 3)	P_D(T_A=25℃)	1.9	W
	P_D(T_A=70℃)	1.2	
Avalanche Energy, Single pulse (Note 4)	EAS(L=0.1mH)	231	mJ
Thermal Resistance,Junction-to-Ambient (Note 3)	$R_{\theta JA}$ (t≤10s)	24	℃/W
	$R_{\theta JA}$ (Steady State)	65	
Thermal Resistance,Junction-to-Case	$R_{\theta JC}$ (Steady State)	1.44	℃/W
Maximum Operating Junction Temperature	T_J	150	℃
Storage Temperature Range	T_{STG}	-55 To 150	℃

ELECTRICAL CHARACTERISTICS (T_A=25℃unless otherwise noted)

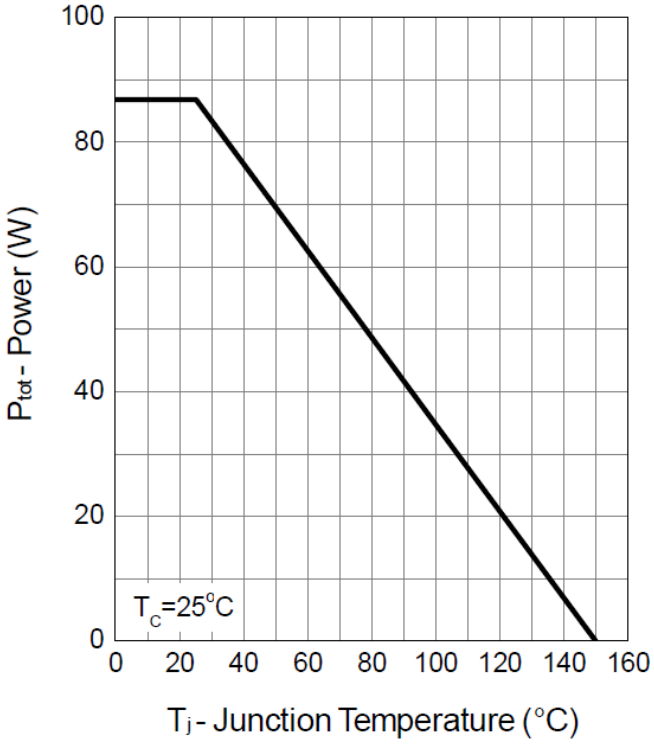
Parameter	Symbol	Condition	Min	Typ	Max	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V I_D=250μA	30	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=24V,V_{GS}=0V	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±20V,V_{DS}=0V	-	-	±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=VGS,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	Gfs	V_{DS}=5V, IDS=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	-	20.6	-	nS
Turn-on Rise Time	t_r	I_D=1A	-	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:

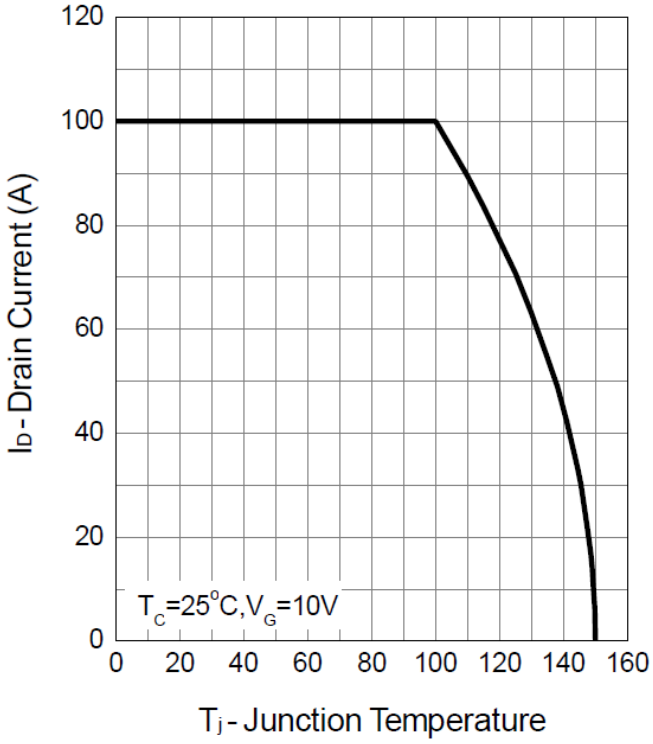
1. Maximum continue current is limited by bonding wire.
2. Pulse width is limited by max. junction temperature.
3. $R_{\theta JA}$ steady state=999s.
4. UIS tested and pulse width limited by maximum junction temperature 150°C (initial temperature T_j=25°C).
5. Pulse test ; pulse width≤300μs, duty cycle≤2%.

Typical Operating Characteristics

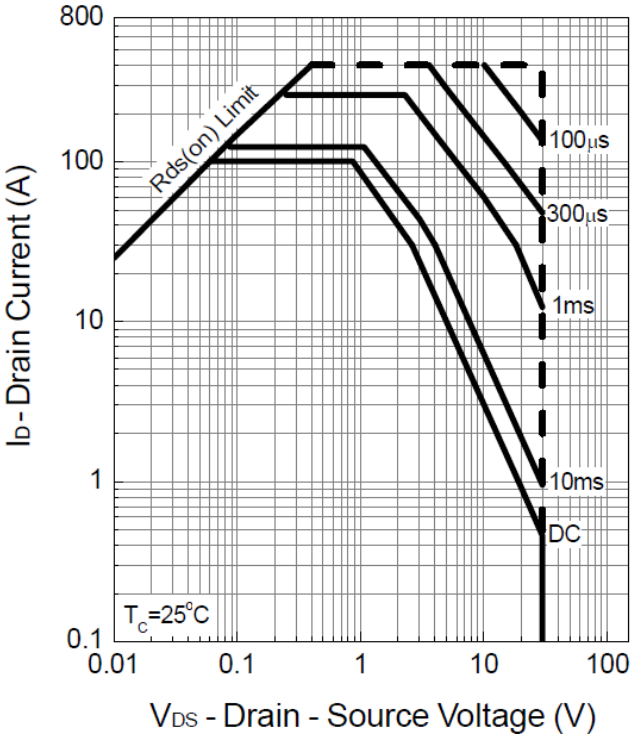
Power Dissipation



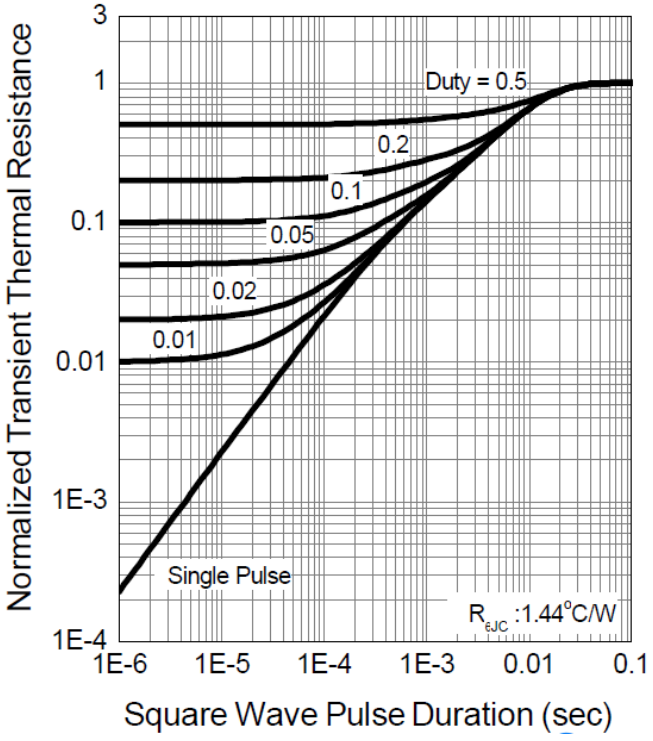
Drain Current



Safe Operation Area

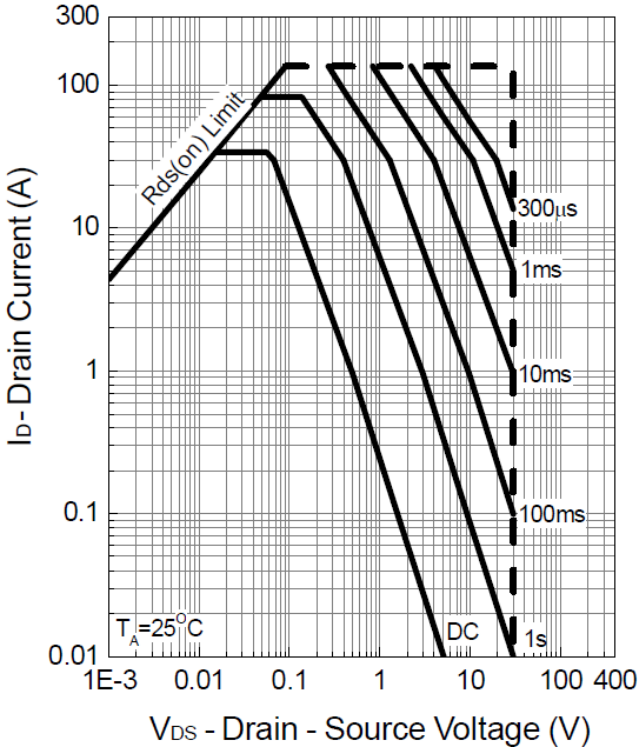


Thermal Transient Impedance

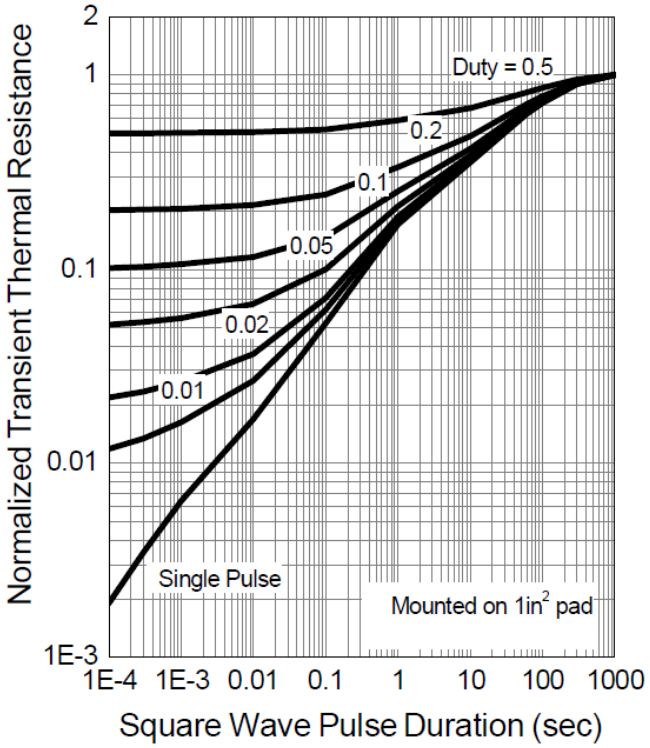


Typical Operating Characteristics(Cont.)

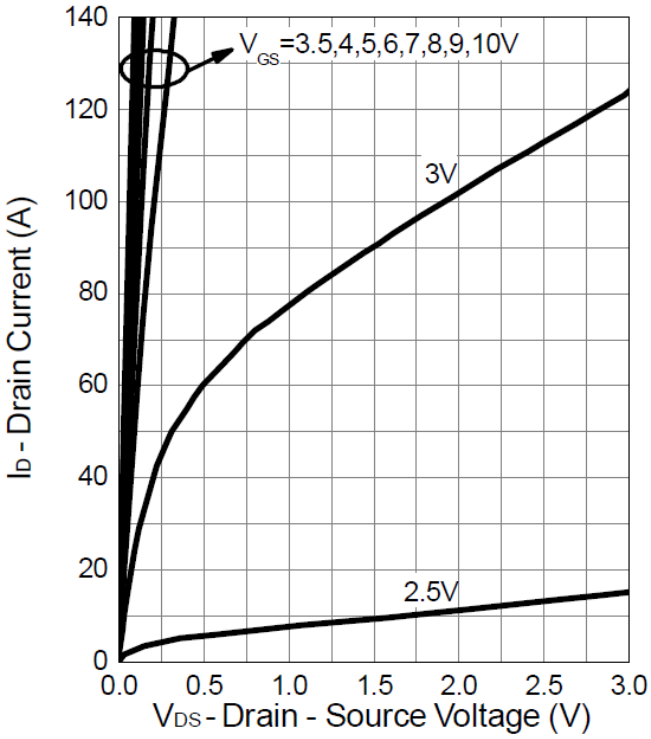
Safe Operation Area



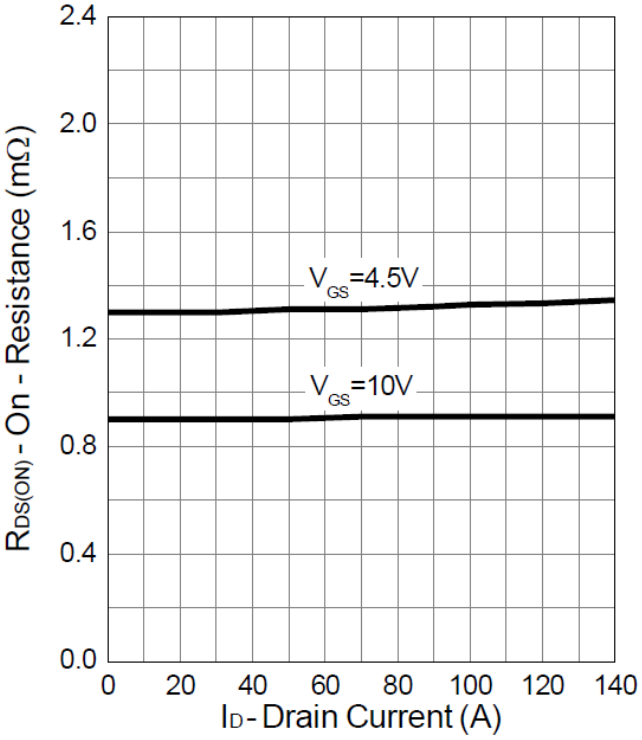
Thermal Transient Impedance



Output Characteristics

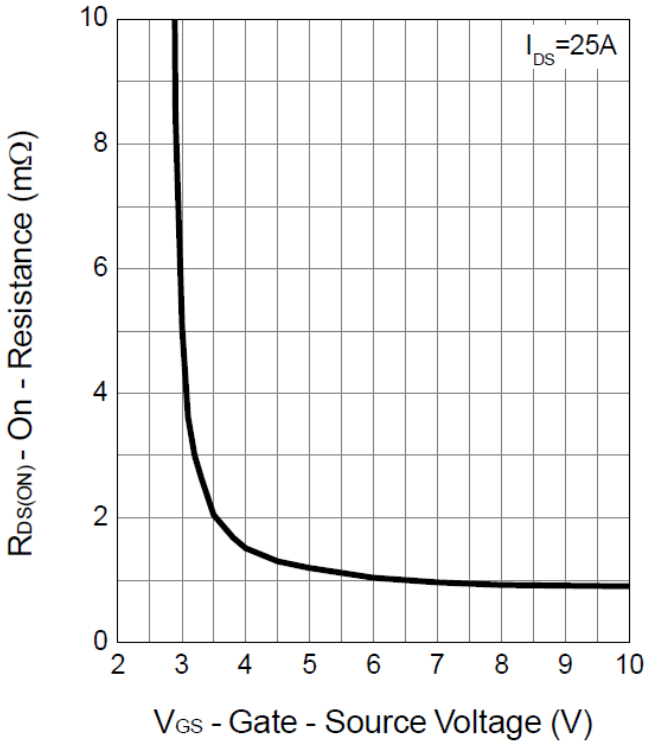


Drain-Source On Resistance

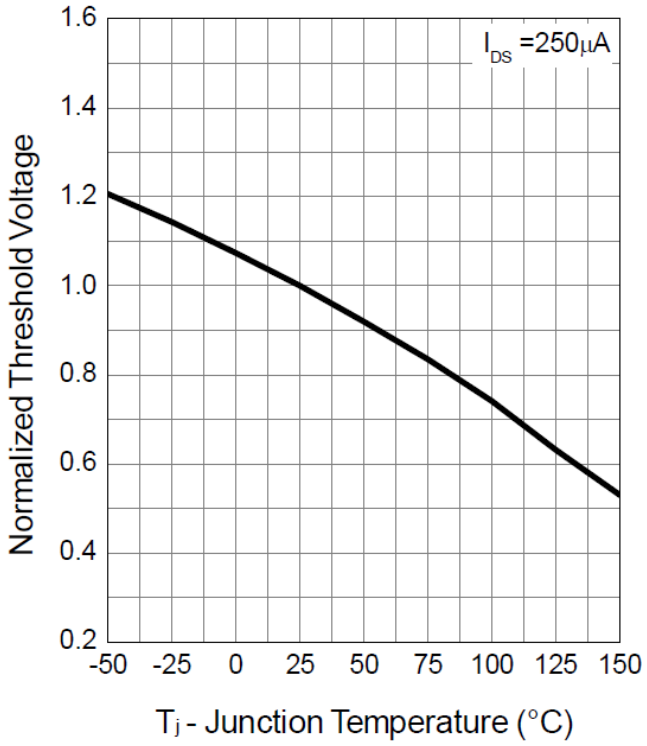


Typical Operating Characteristics (Cont.)

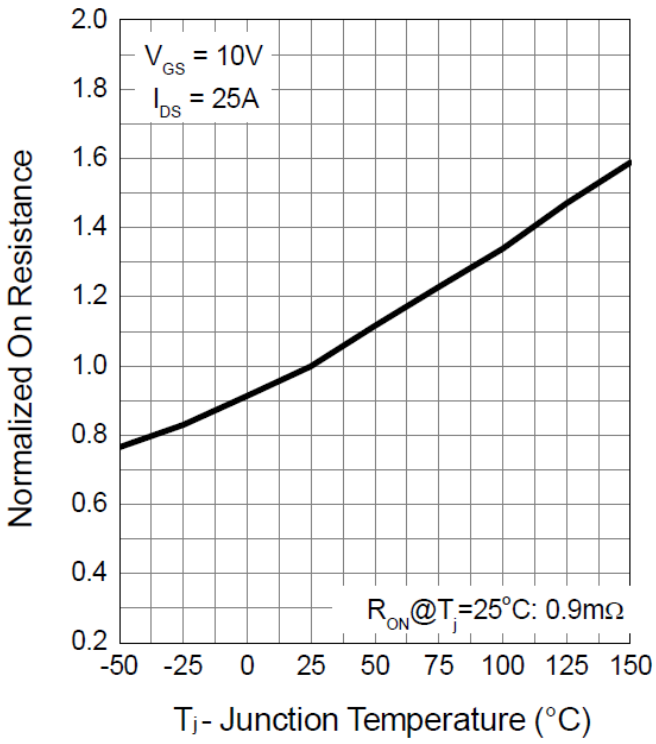
Gate-Source On Resistance



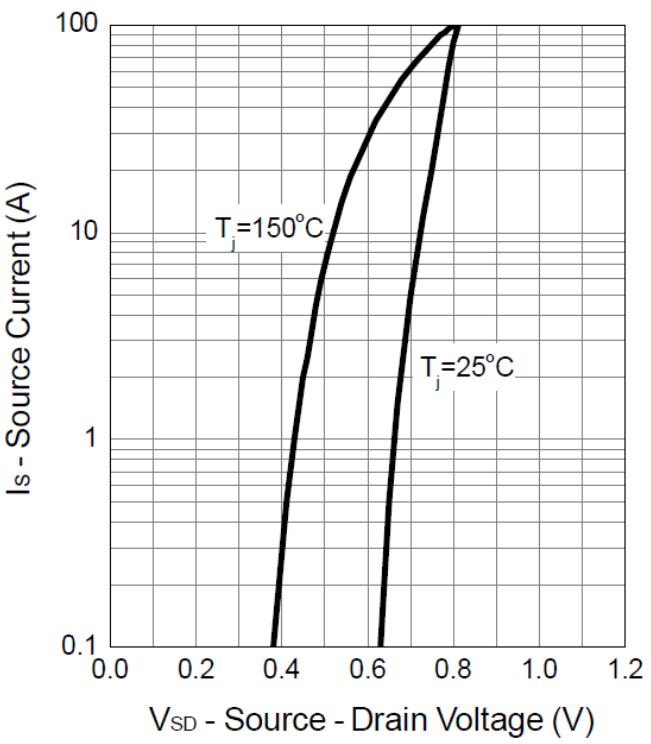
Gate Threshold Voltage



Drain-Source On Resistance

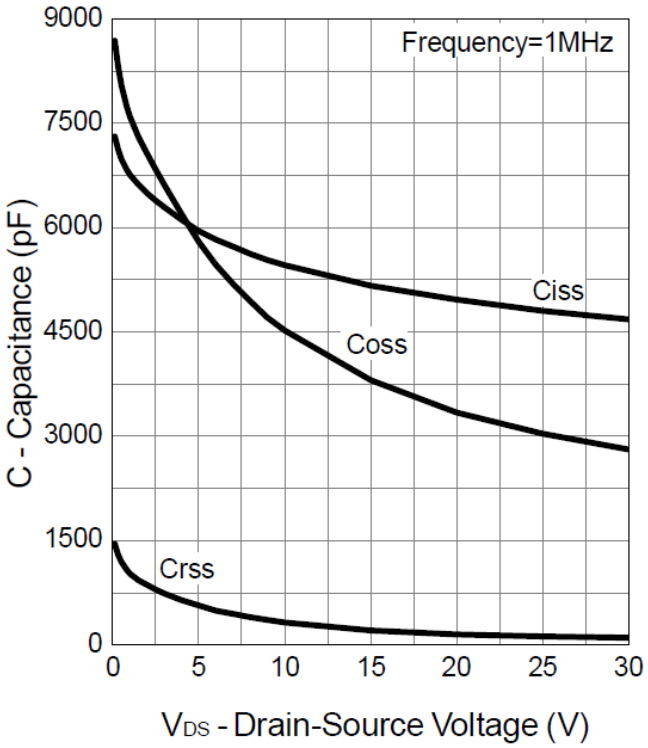


Source-Drain Diode Forward

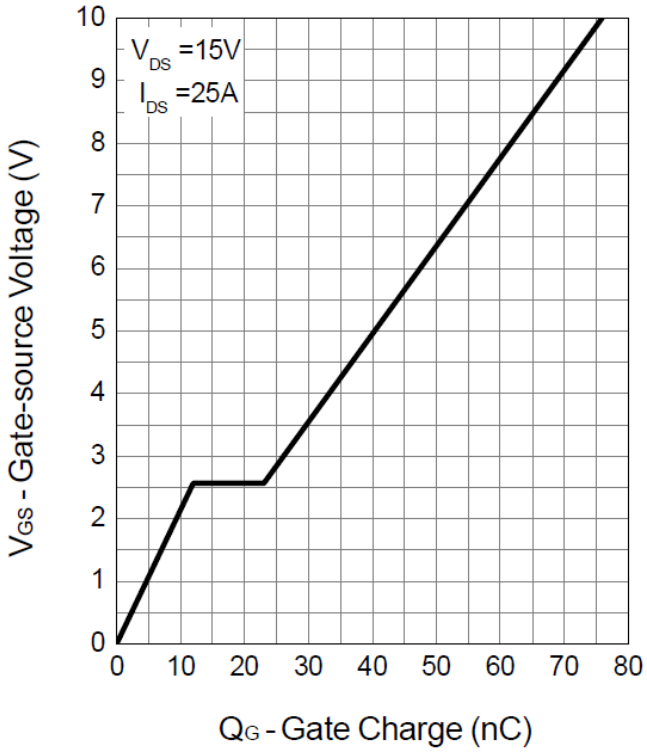


Typical Operating Characteristics (Cont.)

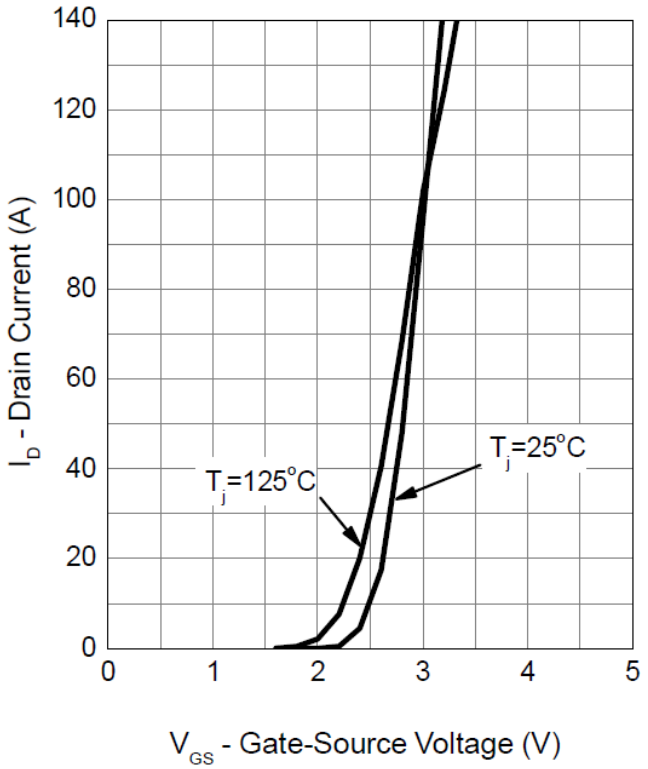
Capacitance



Gate Charge

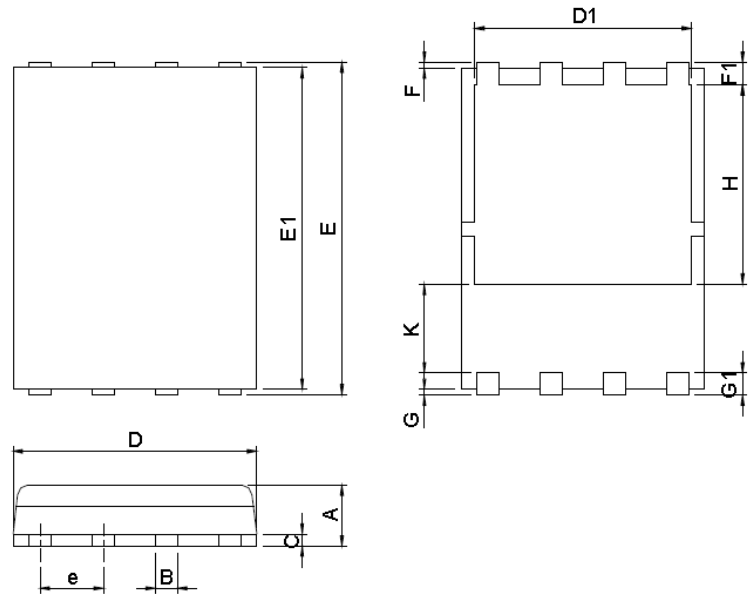


Transfer Characteristics



Package Information

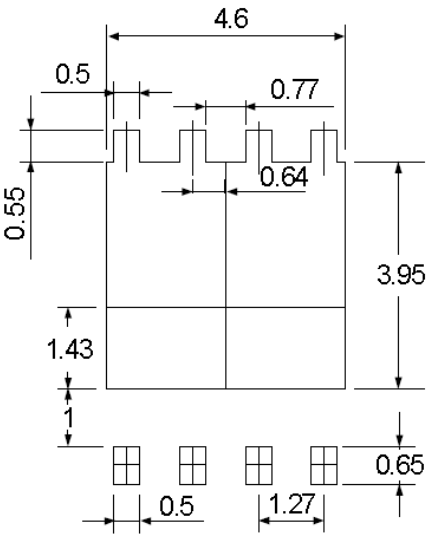
DFN5*6-8 Package



SYMBOL	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	-

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

RECOMMENDED LAND PATTERN



UNIT: mm

Design Notes