N-Channel Enhancement Mode MOSFET TDM3550

DESCRIPTION

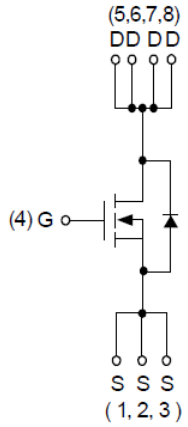
The TDM3550 uses advanced trench technology to provide excellent RDS(ON) and low gate charge. This device is suitable for use as a load switch or in PWM applications.

GENERAL FEATURES

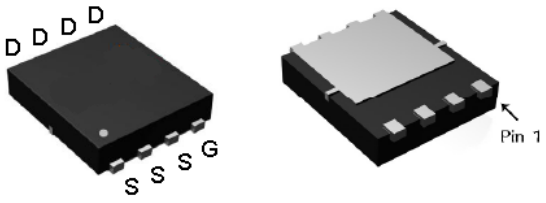
- 40V/100A
  RDS(ON) <1.35mΩ @ VGS=10V
- High Power and current handling capability
- Surface Mount Package
- Lead Free and Green Devices available(RoHS Compliant)

Application

- PWM applications
- Load switch
- Power management
- Powered Systems



N-Channel MOSFET



DFN5x6-8

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	40	V
Gate-Source Voltage	V_{GS}	±20	V
Drain Current @ Continuous (Note 4)	I_D（T_C=25℃）	100	A
	I_D（T_C=100℃）	100	A
Drain Current @ Current-Pulsed (Note 1)	I_{DM}（T_C=25℃）	400	A
Maximum Power Dissipation (Note 5、6)	P_D(T_C=25℃)	150	W
	P_D(T_C=100℃)	75	
Drain Current @ Continuous (Note 2)	I_D（T_A=25℃）	36	A
	I_D（T_A=70℃）	30	A
Maximum Power Dissipation(Note 2)	P_D(T_A=25℃)	2.72	W
	P_D(T_A=70℃)	1.9	
Thermal Resistance,Junction-to-Ambient (Note 2)	$R_{\theta JA}$ (t≤10s)	17	℃/W
	$R_{\theta JA}$ (Steady State)	55	
Thermal Resistance,Junction-to-Case(Note 5)	$R_{\theta JC}$ (Steady State)	1	℃/W
Maximum Operating Junction Temperature	T_J	150	℃
Storage Temperature Range	T_{STG}	-55 To 150	℃

ELECTRICAL CHARACTERISTICS (T_A=25℃unless otherwise noted)

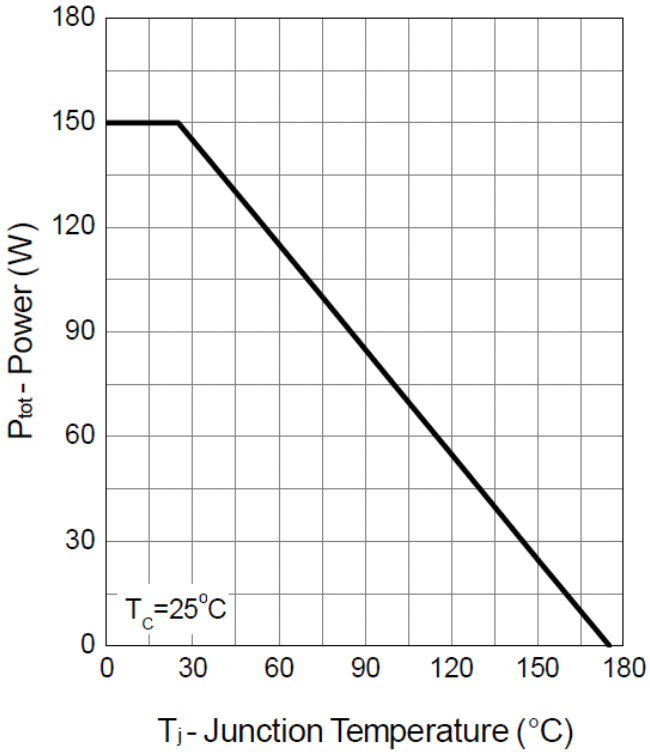
Parameter	Symbol	Condition	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V I_D=250μA	40	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=32V,V_{GS}=0V	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±20V,V_{DS}=0V	-	-	±100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=VGS,I_D=250μA	2	3	4	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=25A	-	1.1	1.35	mΩ
		TJ=125℃	-	1.95	-	
DYNAMIC CHARACTERISTICS (Note3)						
Gate Resistance	R_G	V_{GS}=0V,V_{DS}=0V,F=1MHz	0.6	1	2	Ω
Input Capacitance	C_{iss}	V_{DS}=20V,V_{GS}=0V, F=1.0MHz	-	5020	-	PF
Output Capacitance	C_{oss}		-	1770	-	PF
Reverse Transfer Capacitance	C_{rss}		-	150	-	PF
SWITCHING CHARACTERISTICS (Note 3)						
Turn-on Delay Time	$t_{d(on)}$	V_{DS}=20V, R_L=20Ω, V_{GEN}=10V,R_G=6Ω	-	30	-	nS
Turn-on Rise Time	t_r	I_D=1A	-	11.2	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	66	-	nS
Turn-Off Fall Time	t_f		-	108	-	nS
Total Gate Charge	Q_g	V_{DS}=20V,I_D=20A,V_{GS}=10V	-	64	-	nC
Gate-Source Charge	Q_{gs}		-	22	-	nC
Gate-Drain Charge	Q_{gd}		-	6	-	nC
Body Diode Reverse Recovery Time	T_{rr}	I_F=20A, dI/dt=100A/μs	-	60	-	nS
Body Diode Reverse Recovery Charge	Q_{rr}		-	70	-	nC
DRAIN-SOURCE DIODE CHARACTERISTICS						
Diode Forward Voltage (Note 2)	V_{SD}	V_{GS}=0V,I_S=20A	-	0.77	1.1	V

NOTES:

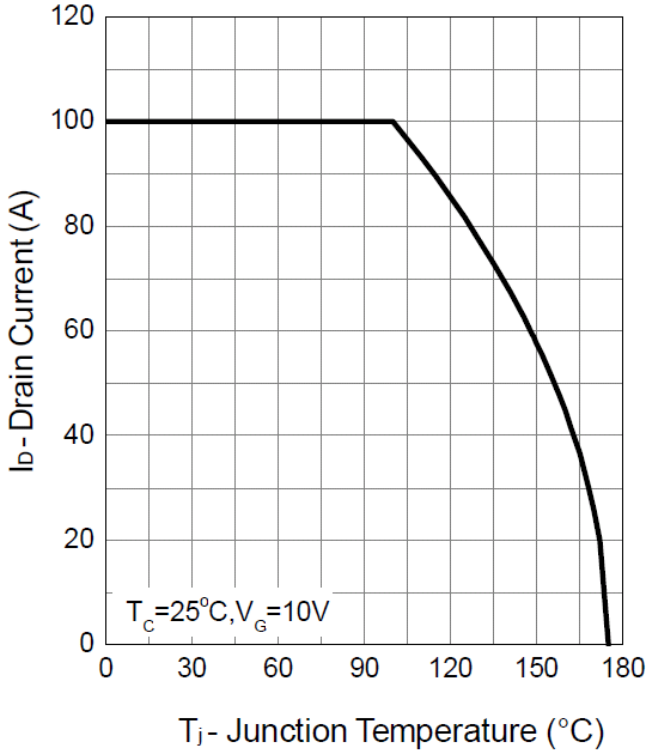
1. Pulse width limited by max. junction temperature.
2. $R_{\theta JA}$ steady state=999s. $R_{\theta JA}$ is measured with the device mounted on 1in2, Fr-4 board with 2oz.Copper
3. Guaranteed by design, not subject to production testing
4. Maximum continue current is limited by package and equal to 100A.
5. $R_{\theta JC}$ steady state t<0.1s. It is more useful by using large thermal heat sink and minimizes variation of case temperature w/o cumulative effect of heat. (JESD51-1)
6. Power dissipation (T_c) is based on $R_{\theta Jc}$ and the maximum junction temperature is equal to 175°C.

Typical Operating Characteristics

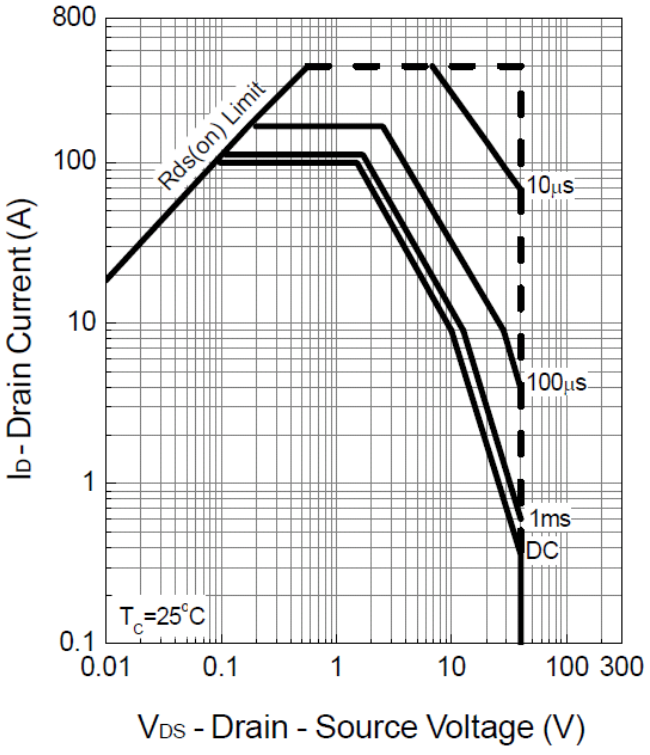
Power Dissipation



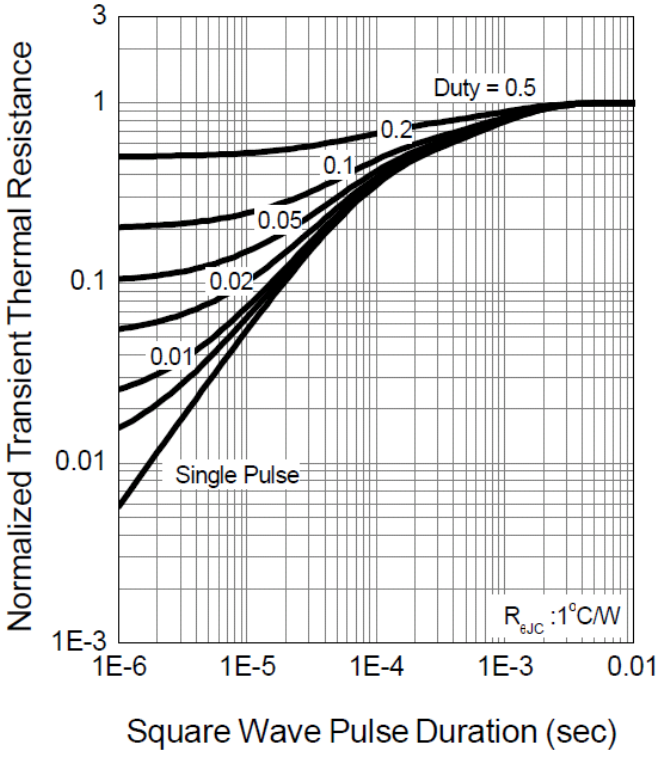
Drain Current



Safe Operation Area

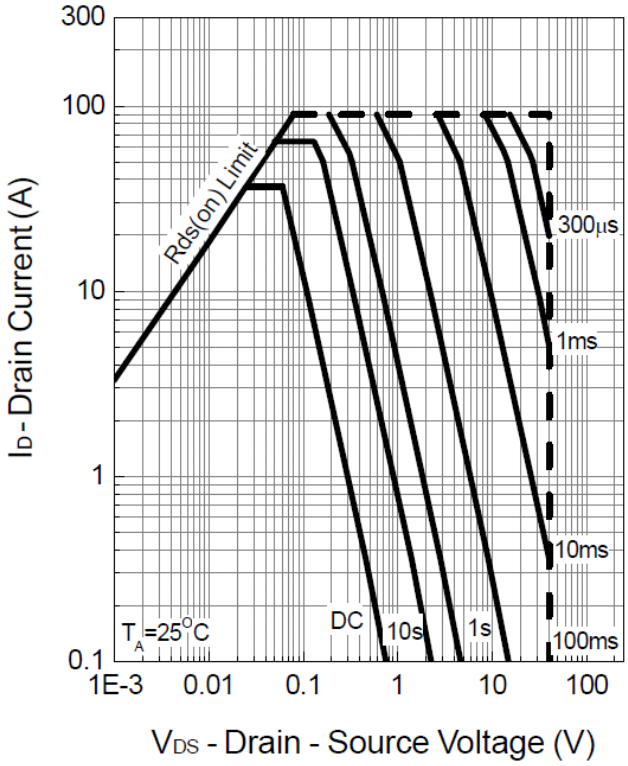


Thermal Transient Impedance

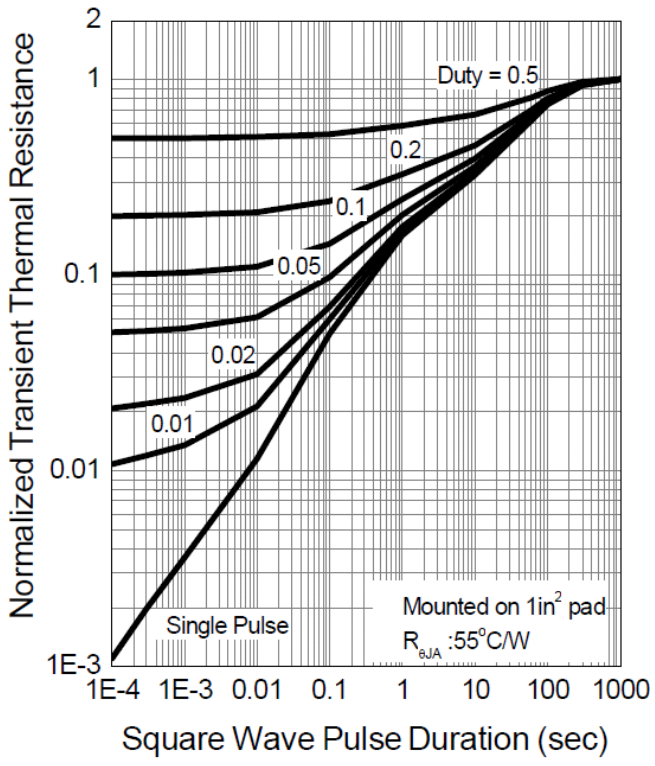


Typical Operating Characteristics(Cont.)

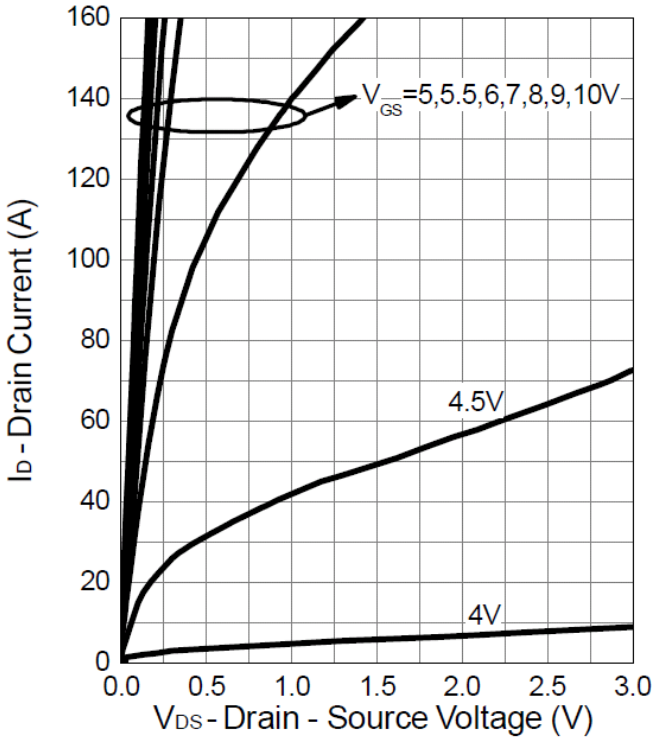
Safe Operation Area



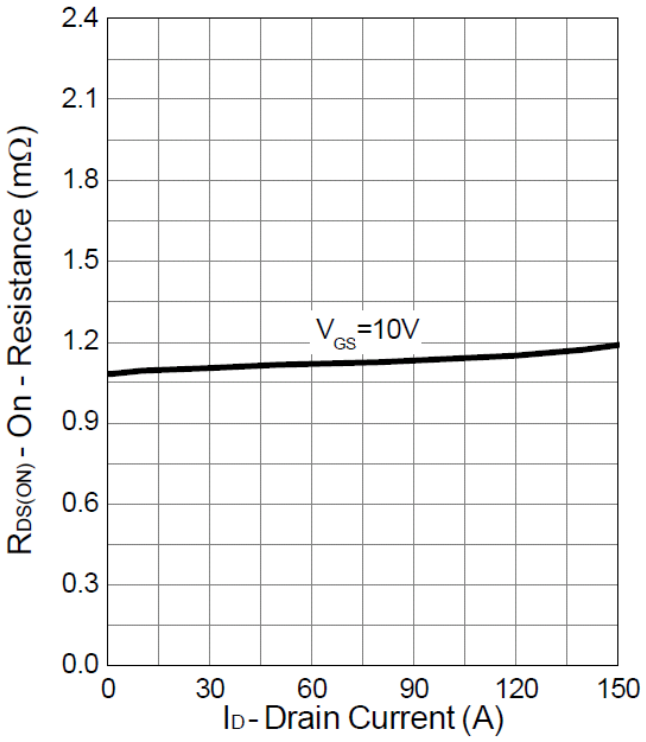
Thermal Transient Impedance



Output Characteristics

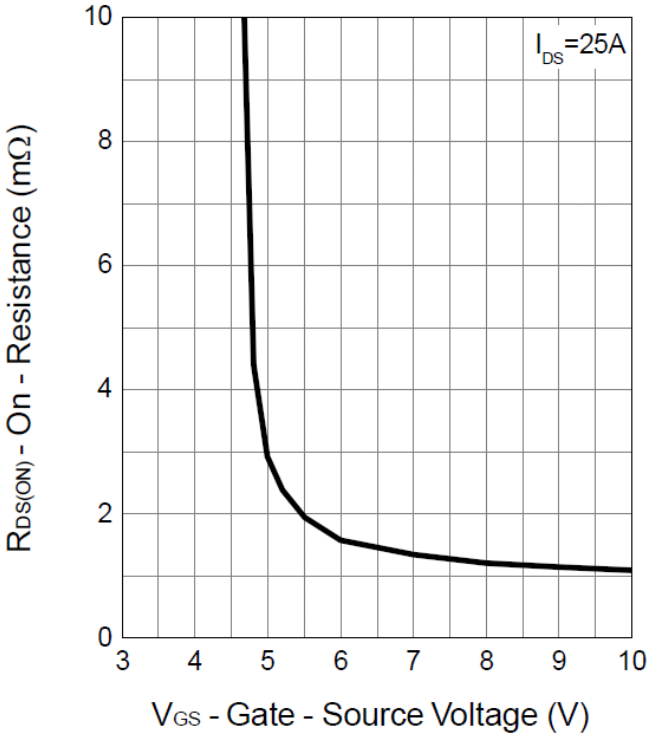


Drain-Source On Resistance

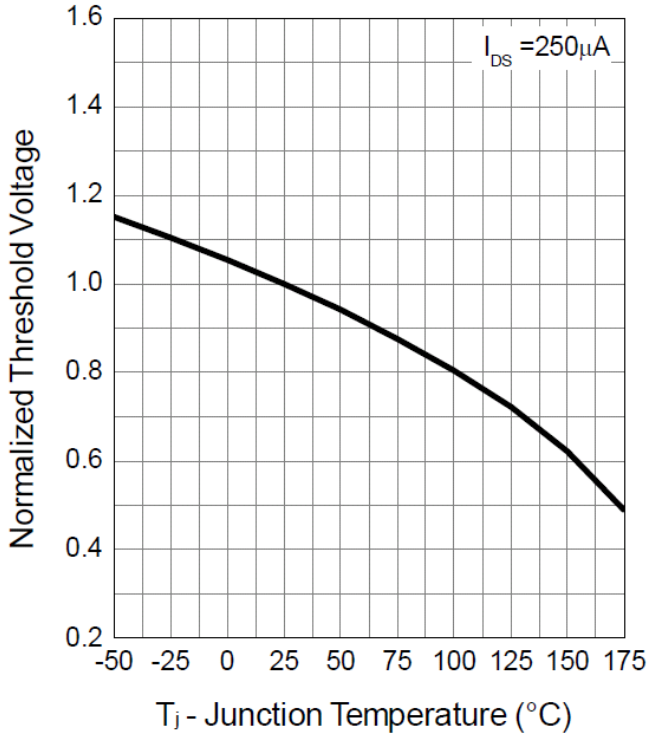


Typical Operating Characteristics (Cont.)

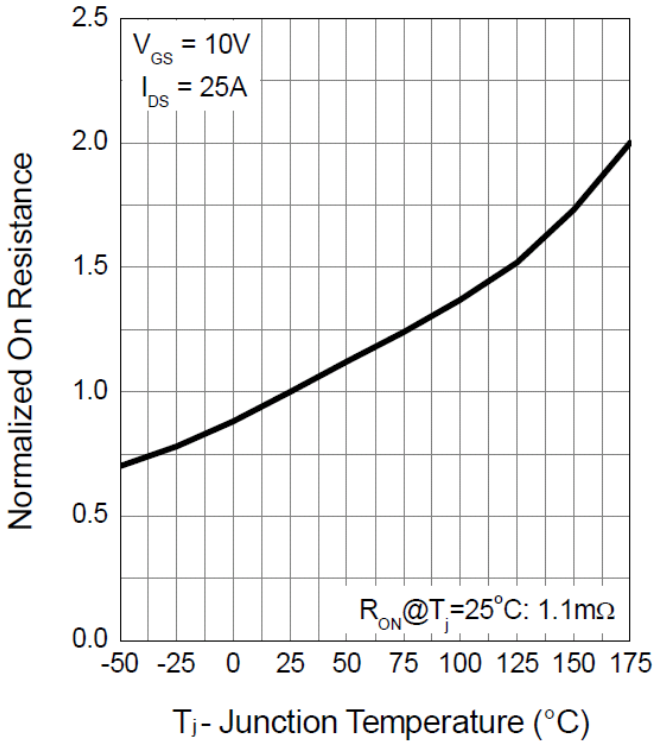
Gate-Source On Resistance



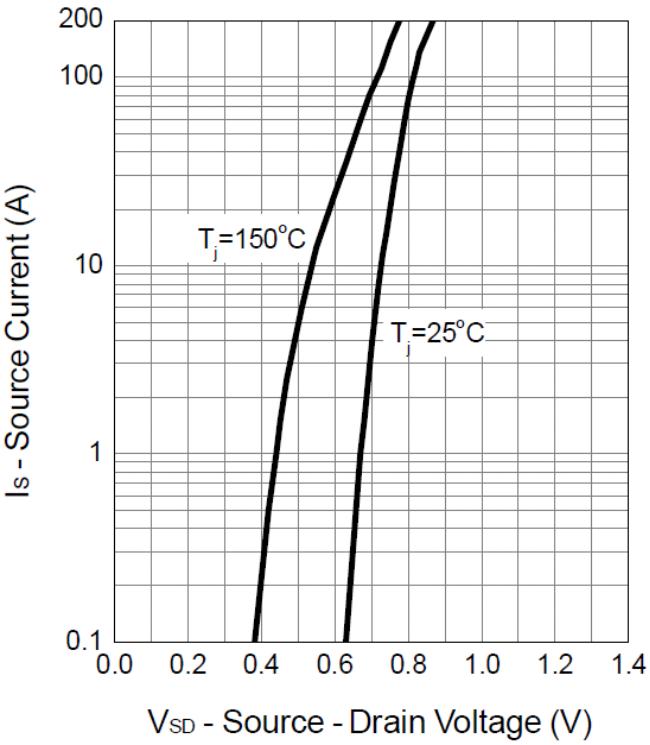
Gate Threshold Voltage



Drain-Source On Resistance

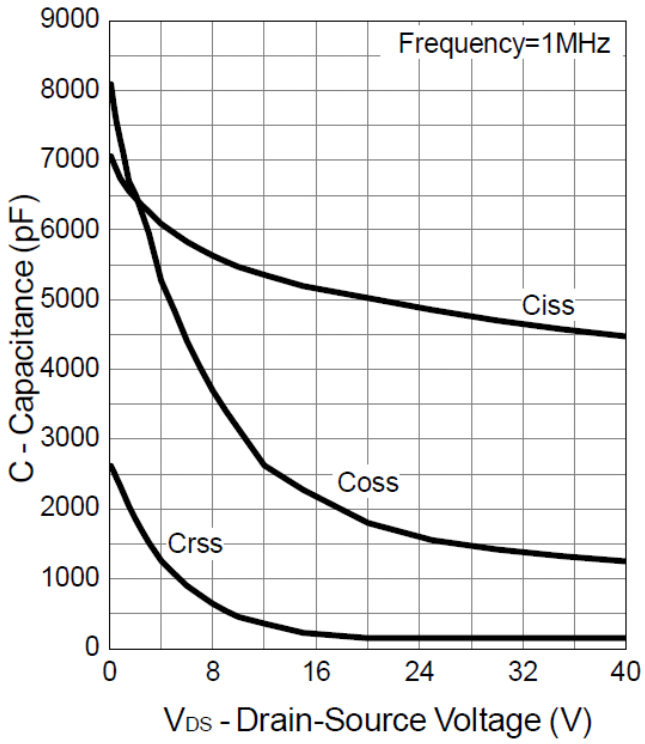


Source-Drain Diode Forward

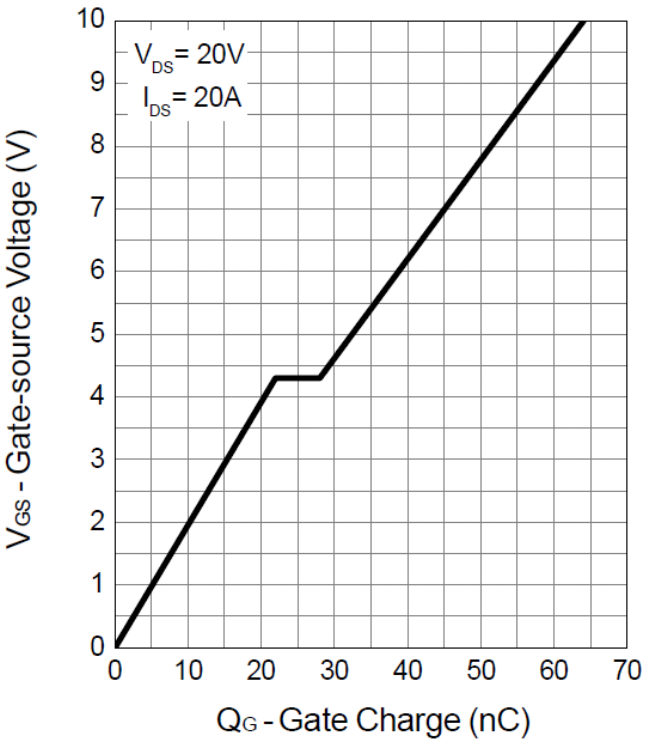


Typical Operating Characteristics (Cont.)

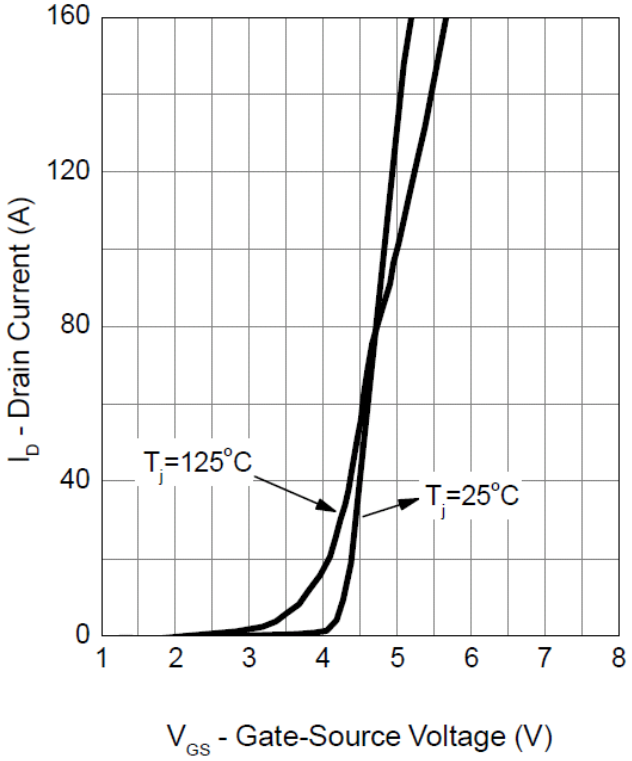
Capacitance



Gate Charge

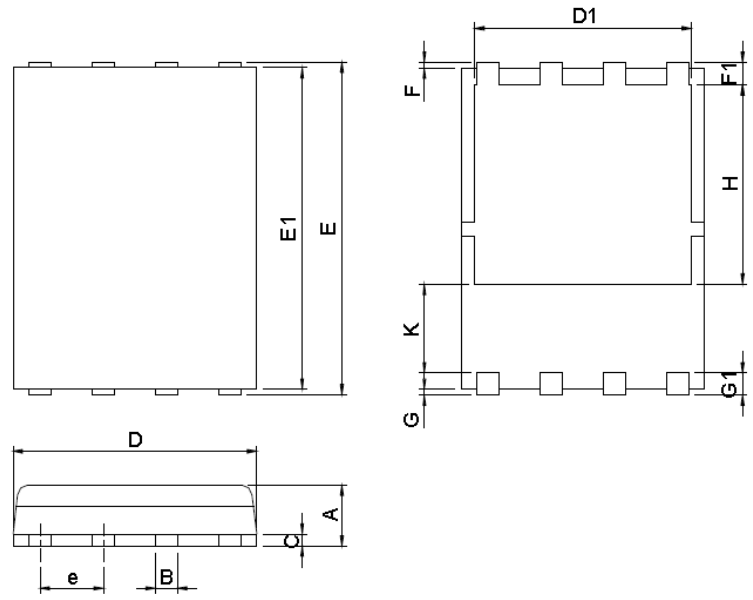


Transfer Characteristics



Package Information

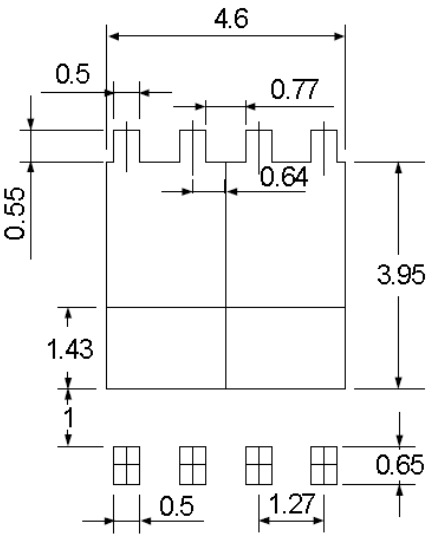
DFN5*6-8 Package



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