

N-Channel Enhancement Mode MOSFET

TDM3550

DESCRIPTION

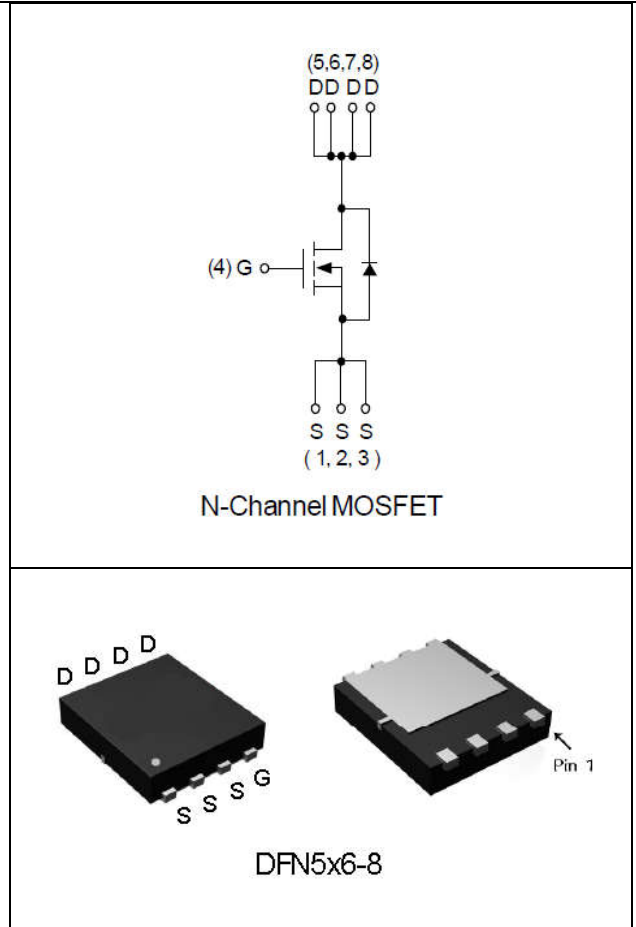
The TDM3550 uses advanced trench technology to provide excellent RDS(ON) and low gate charge. This device is suitable for use as a load switch or in PWM applications.

GENERAL FEATURES

- 40V/160A
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



ABSOLUTE MAXIMUM RATINGS(TA=25°C 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°C)	160	A
	I _D (T _C =100°C)	153	A
Drain Current @ Current-Pulsed (Note 1)	I _{DM} (T _C =25°C)	400	A
Maximum Power Dissipation (Note 5、6)	P _D (T _C =25°C)	150	W
	P _D (T _C =100°C)	75	
Drain Current @ Continuous (Note 2)	I _D (T _A =25°C)	36	A
	I _D (T _A =70°C)	30	A
Maximum Power Dissipation(Note 2)	P _D (T _A =25°C)	2.72	W
	P _D (T _A =70°C)	1.9	
Thermal Resistance,Junction-to-Ambient (Note 2)	R _{θJA} (t<10s)	17	°C/W
	R _{θJA} (Steady State)	55	
Thermal Resistance,Junction-to-Case(Note 5)	R _{θJC} (Steady State)	1	°C/W
Maximum Operating Junction Temperature	T _J	150	°C
Storage Temperature Range	T _{STG}	-55 To 150	°C

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

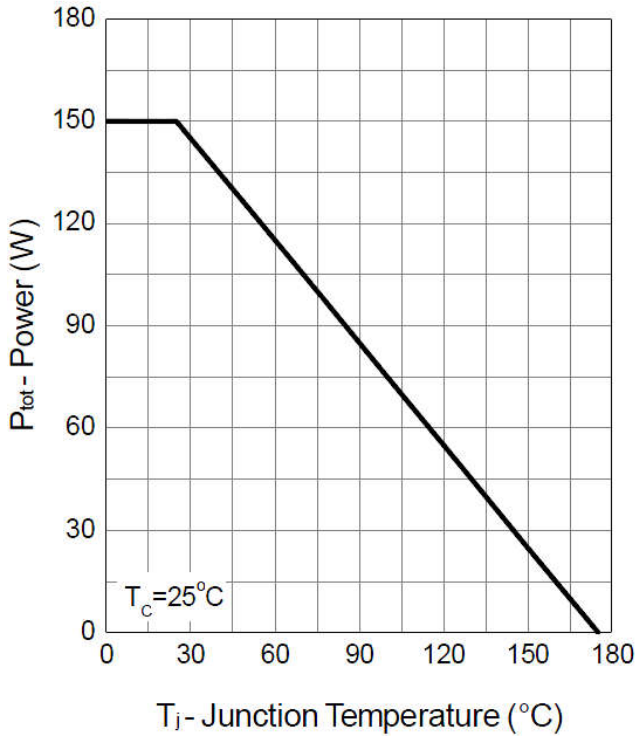
Parameter	Symbol	Condition	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	40	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=32V, V_{GS}=0V$	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	2	3	4	V
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=25A$	-	1.1	1.35	m Ω
			$T_J=125^{\circ}\text{C}$	-	1.95	
DYNAMIC CHARACTERISTICS (Note3)						
Gate Resistance	R_G	$V_{GS}=0V, V_{DS}=0V, F=1\text{MHz}$	0.6	1	2	Ω
Input Capacitance	C_{iss}	$V_{DS}=20V, V_{GS}=0V, F=1.0\text{MHz}$	-	5020	-	PF
Output Capacitance	C_{oss}		-	1770	-	PF
Reverse Transfer Capacitance	C_{rss}		-	150	-	PF
SWITCHING CHARACTERISTICS (Note 3)						
Turn-on Delay Time	$t_{d(on)}$	$V_{DS}=20V, R_L=20\Omega, V_{GEN}=10V, R_G=6\Omega$ $I_D=1A$	-	30	-	nS
Turn-on Rise Time	t_r		-	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}	$I_F=20A, di/dt=100A/\mu s$	-	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:

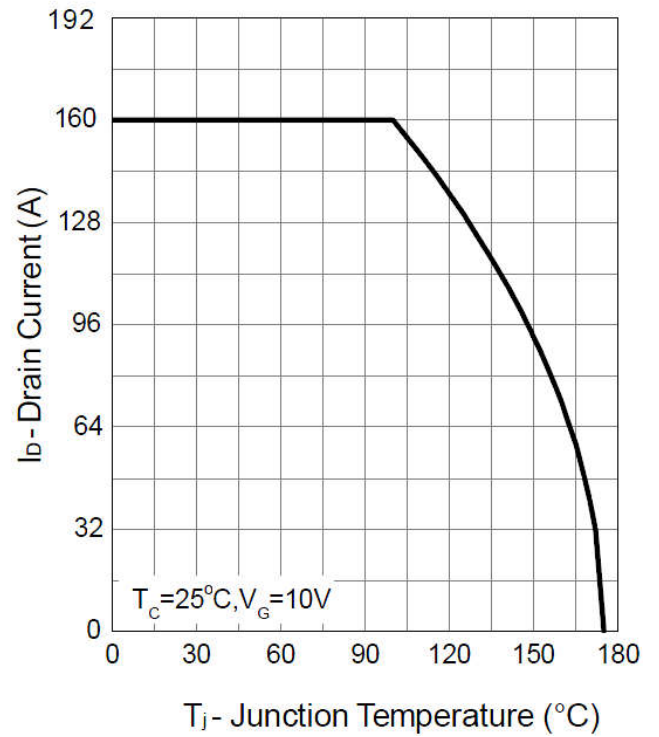
- Pulse width limited by max. junction temperature.
- $R_{\theta JA}$ steady state=999s. $R_{\theta JA}$ is measured with the device mounted on 1in2, Fr-4 board with 2oz.Copper
- Guaranteed by design, not subject to production testing
- Maximum continue current is limited by package and equal to 160A.
- $R_{\theta JC}$ 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)
- Power dissipation (T_c) is based on $R_{\theta JC}$ and the maximum junction temperature is equal to 175°C .

Typical Operating Characteristics

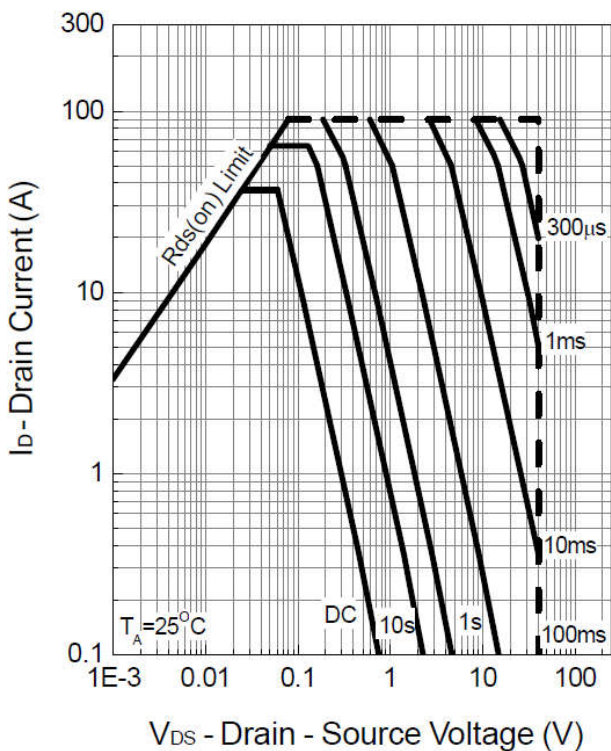
Power Dissipation



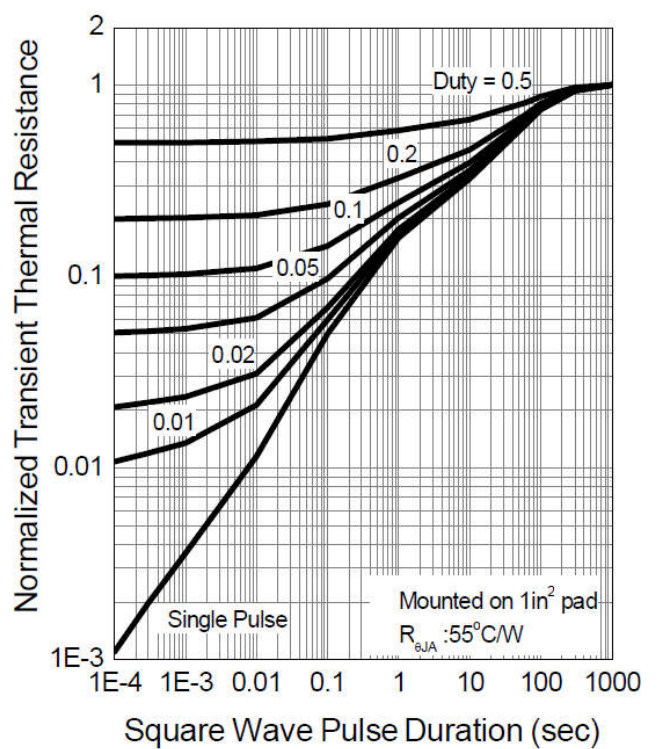
Drain Current



Safe Operation Area

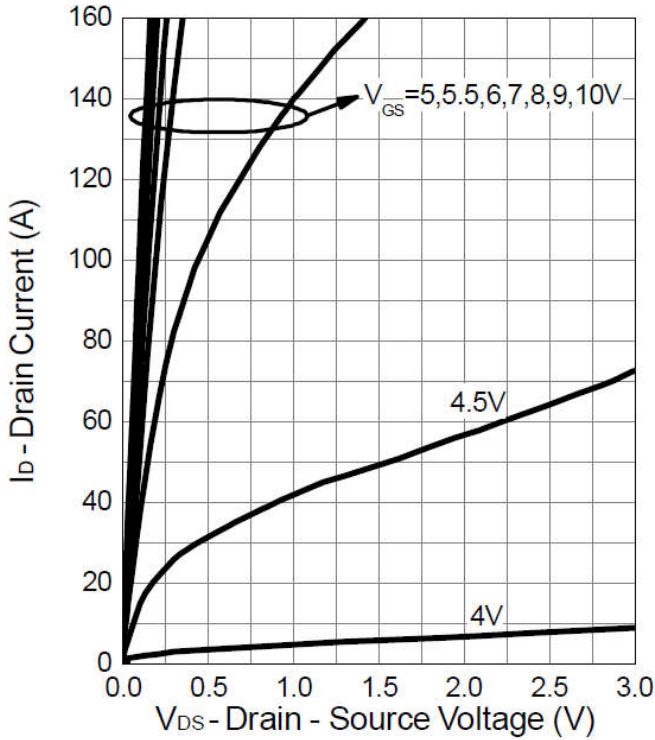


Thermal Transient Impedance

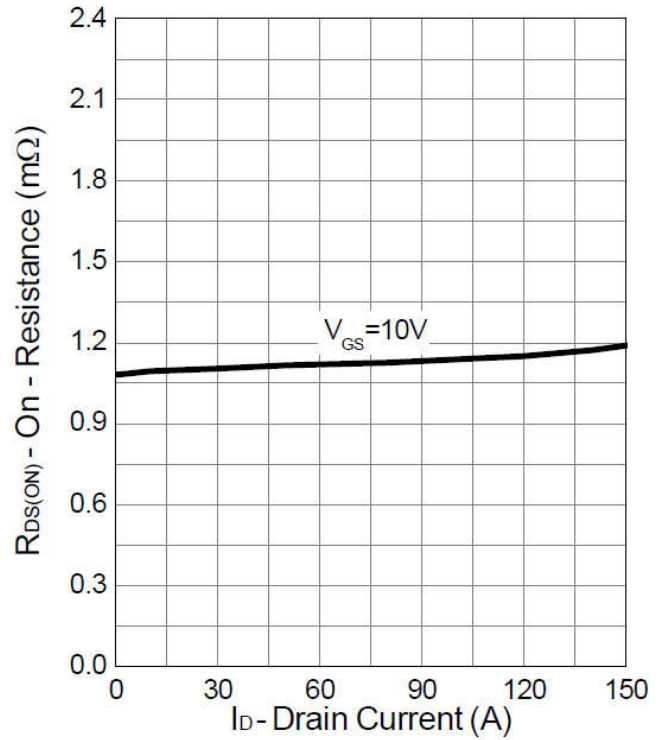


Typical Operating Characteristics(Cont.)

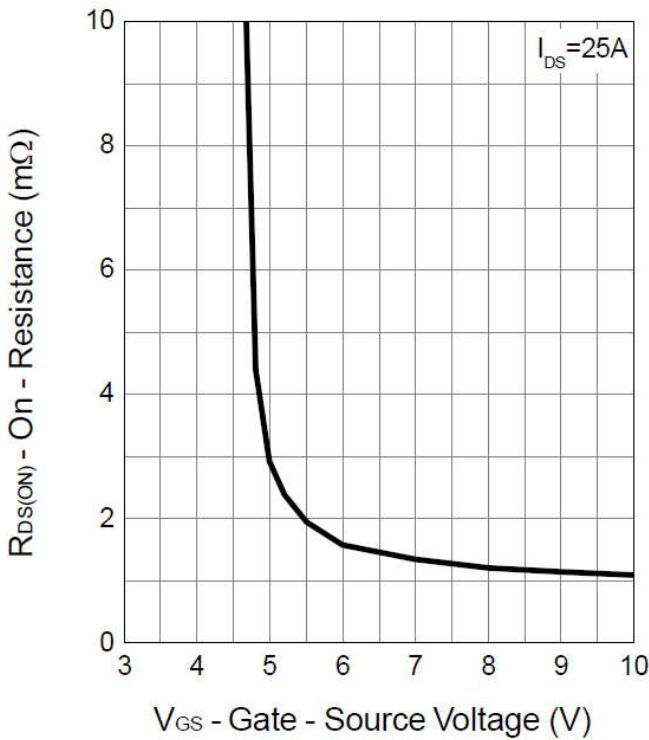
Output Characteristics



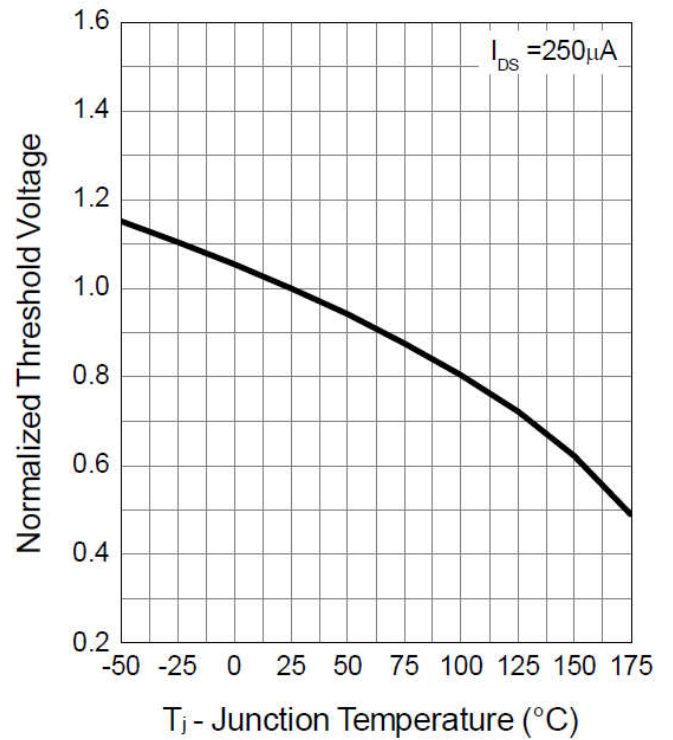
Drain-Source On Resistance



Gate-Source On Resistance

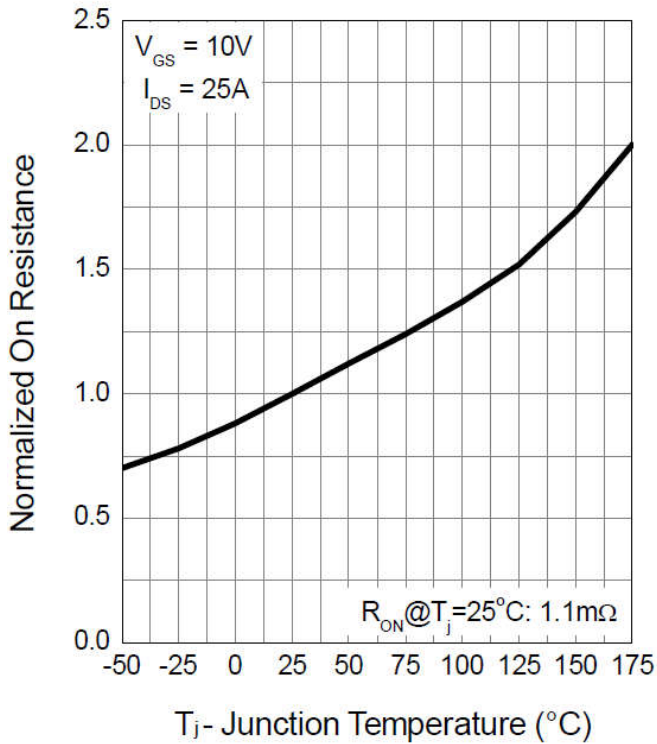


Gate Threshold Voltage

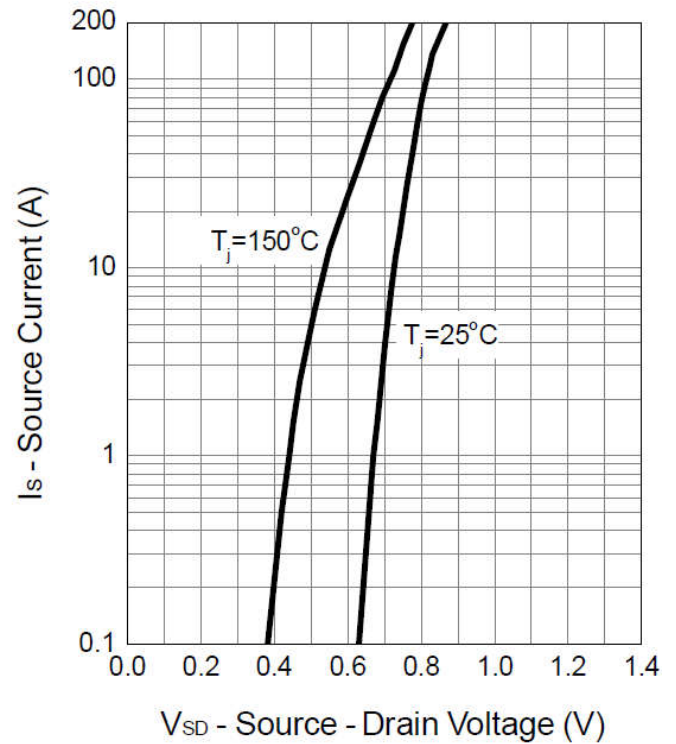


Typical Operating Characteristics (Cont.)

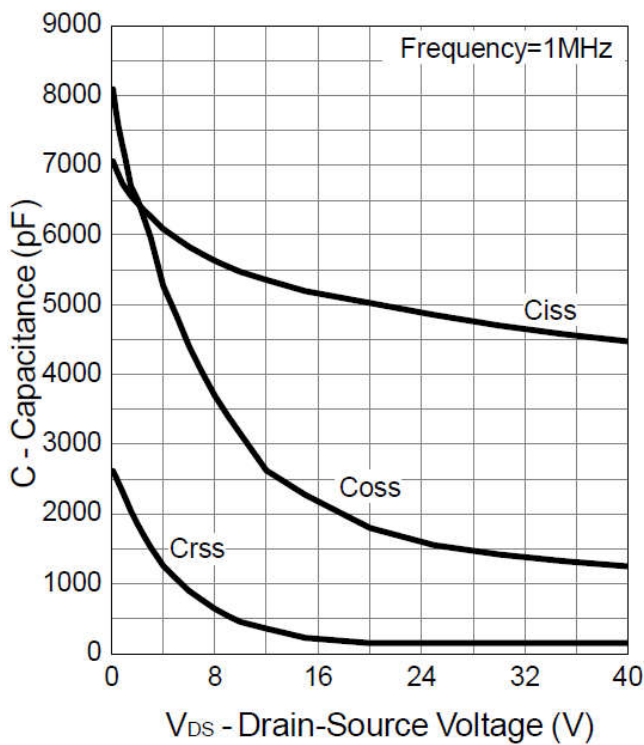
Drain-Source On Resistance



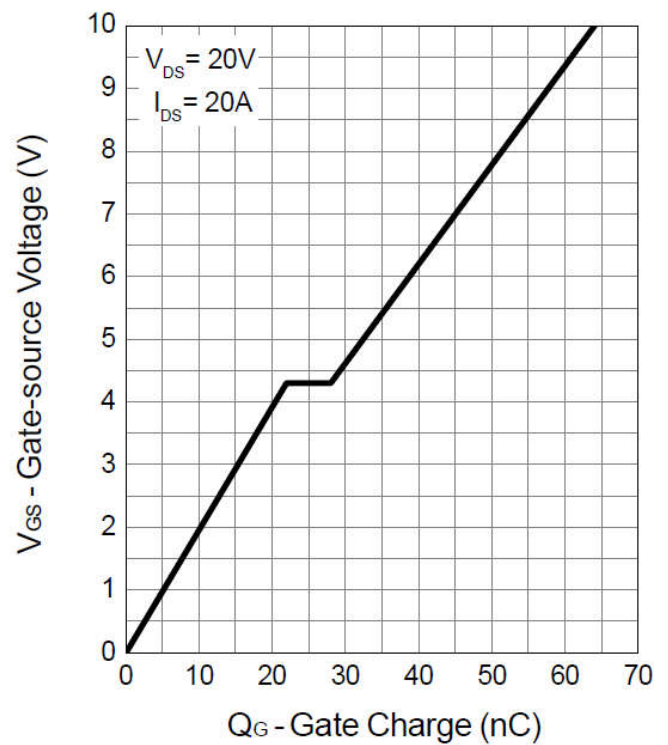
Source-Drain Diode Forward



Capacitance

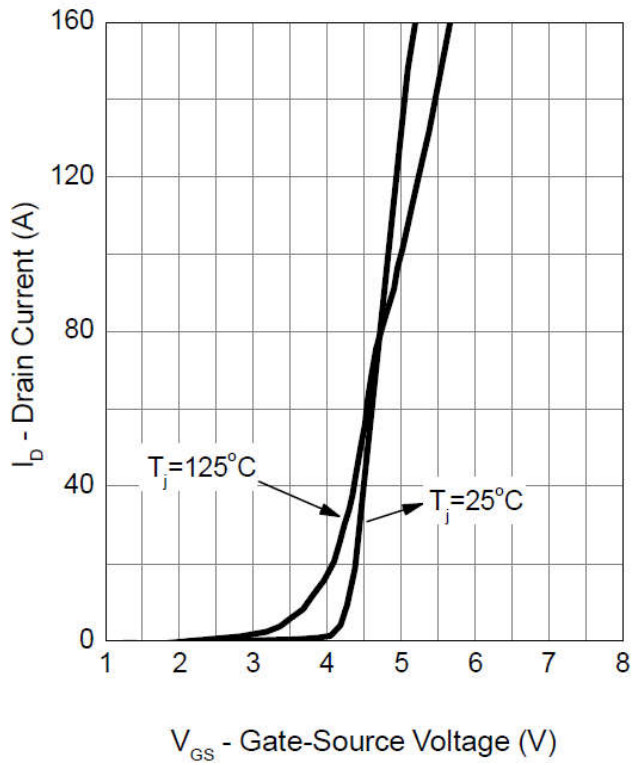


Gate Charge



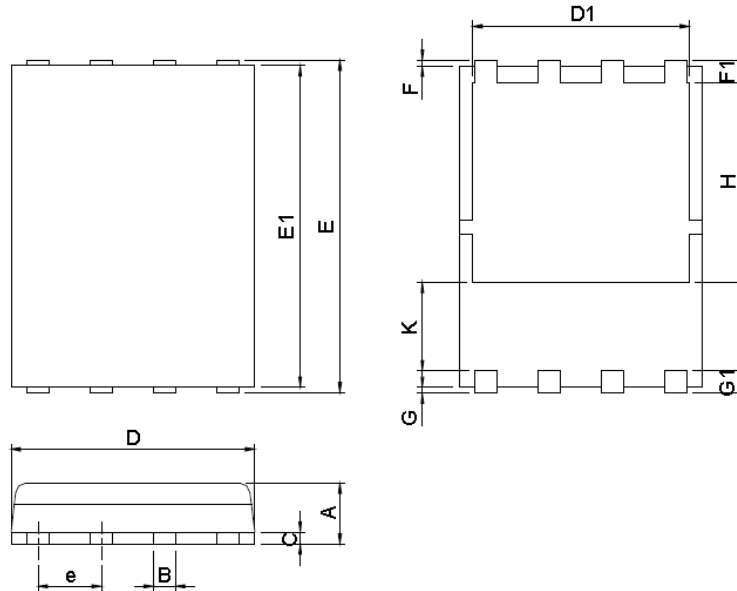
Typical Operating Characteristics (Cont.)

Transfer Characteristics



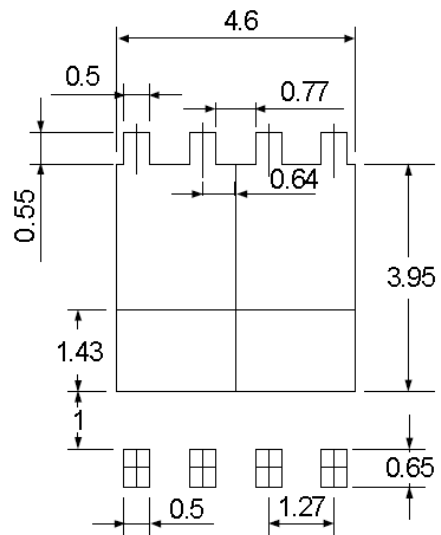
Package Information

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