

N-Channel Enhancement Mode MOSFET

TDM3532

DESCRIPTION

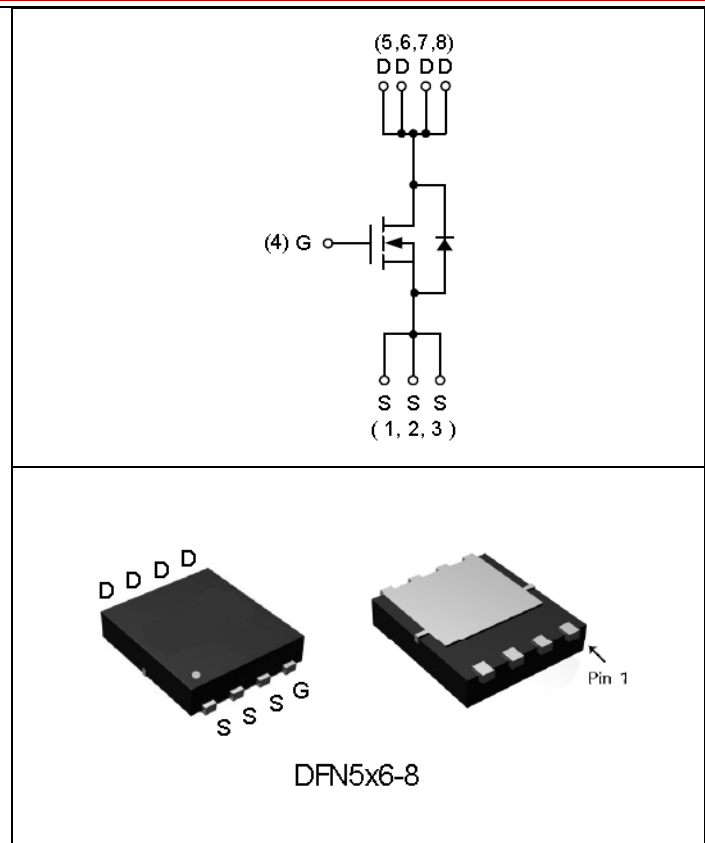
The TDM3532 uses advanced trench technology to provide excellent RDS(ON) and low gate charge. This device is suitable for use as a load switch or in PWM applications.

GENERAL FEATURES

- RDS(ON) < 3mΩ @ VGS=4.5V
RDS(ON) < 1.9mΩ @ VGS=10V
- High Power and current handling capability
- Lead free product is available
- Surface Mount Package

Application

- PWM applications
- Load switch
- Power management



ABSOLUTE MAXIMUM RATINGS(TA=25°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°C)	42.5	A
Drain Current @ Continuous (Note 1)	I _D (T _C =25°C)	131	A
	I _D (T _C =100°C)	124	A
Drain Current @ Current-Pulsed (Note 2)	I _{DM} (T _C =25°C)	160	A
Maximum Power Dissipation	P _D (T _C =25°C)	78	W
	P _D (T _C =100°C)	31	W
Drain Current @ Continuous (Note 3)	I _D (T _A =25°C)	28	A
	I _D (T _A =70°C)	22	A
Maximum Power Dissipation (Note 3)	P _D (T _A =25°C)	2.3	W
	P _D (T _A =70°C)	1.5	W
Thermal Resistance-Junction to Case	R _{θJC}	1.6	°C/W
Thermal Resistance, Junction-to-Ambient (Note 3)	R _{θJA} (t≤10s)	20	°C/W
	R _{θJA} (Steady State)	55	°C/W
Maximum Operating Junction Temperature	T _J	150	°C
Storage Temperature Range	T _{STG}	-55 To 150	°C
Avalanche Current, Single pulse (Note 4)	I _{AS} (L=0.1mH)	43	A
Avalanche Energy, Single pulse (Note 4)	E _{AS} (L=0.1mH)	92	mJ

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

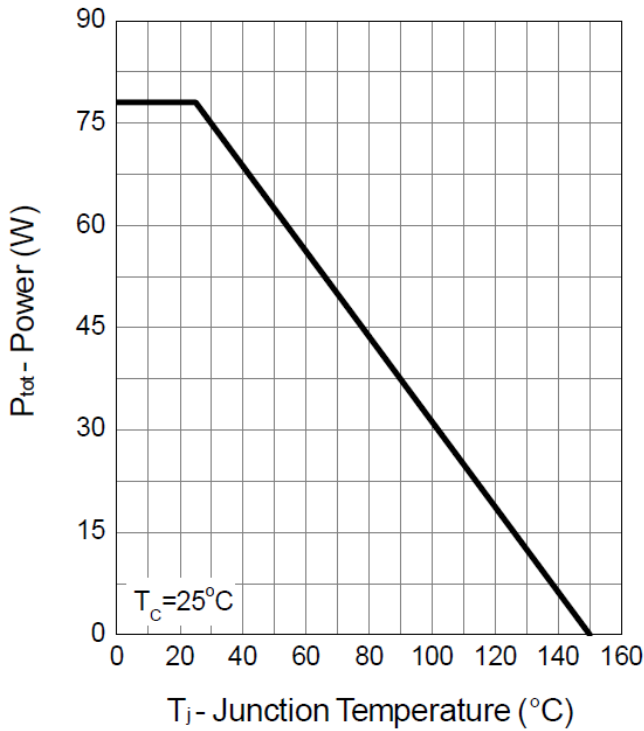
Parameter	Symbol	Condition	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	30	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=24V, V_{GS}=0V$	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA
ON CHARACTERISTICS (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1.3	1.6	2.3	V
Drain-Source On-State Resistance (Note 5)	$R_{DS(on)}$	$V_{GS}=4.5V, I_D=12A$	-	2.2	3	$m\Omega$
		$V_{GS}=10V, I_D=20A$	-	1.5	1.9	$m\Omega$
		$T_J=125^{\circ}\text{C}$	-	2.2	-	$m\Omega$
DYNAMIC CHARACTERISTICS (Note 6)						
Gate Resistance	R_G	$V_{DS}=0V, V_{GS}=0V, F=1.0\text{MHz}$	-	0.9	2	Ω
Input Capacitance	C_{iss}	$V_{DS}=15V, V_{GS}=0V, F=1.0\text{MHz}$	-	2800	3660	PF
Output Capacitance	C_{oss}		-	1900	2485	PF
Reverse Transfer Capacitance	C_{rss}		-	140	180	PF
SWITCHING CHARACTERISTICS (Note 6)						
Turn-on Delay Time	$t_{d(on)}$	$V_{DS}=15V, R_L=15\Omega, V_{GEN}=10V, R_G=6\Omega, I_D=1A$	-	15.5	-	nS
Turn-on Rise Time	t_r		-	11	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	35	-	nS
Turn-Off Fall Time	t_f		-	40	-	nS
Total Gate Charge	Q_g	$V_{DS}=15V, I_D=20A, V_{GS}=4.5V$	-	21.2	-	nC
Gate-Source Charge	Q_{gs}		-	4.3	-	nC
Gate-Drain Charge	Q_{gd}		-	8.3	-	nC
Body Diode Reverse Recovery Time	T_{rr}	$I_F=20A, dI/dt=100A/\mu s$	-	50	-	nS
Body Diode Reverse Recovery Charge	Q_{rr}		-	45	-	nC
DRAIN-SOURCE DIODE CHARACTERISTICS						
Diode Forward Voltage (Note 5)	V_{SD}	$V_{GS}=0V, I_S=20A$	-	0.8	1.1	V

NOTES:

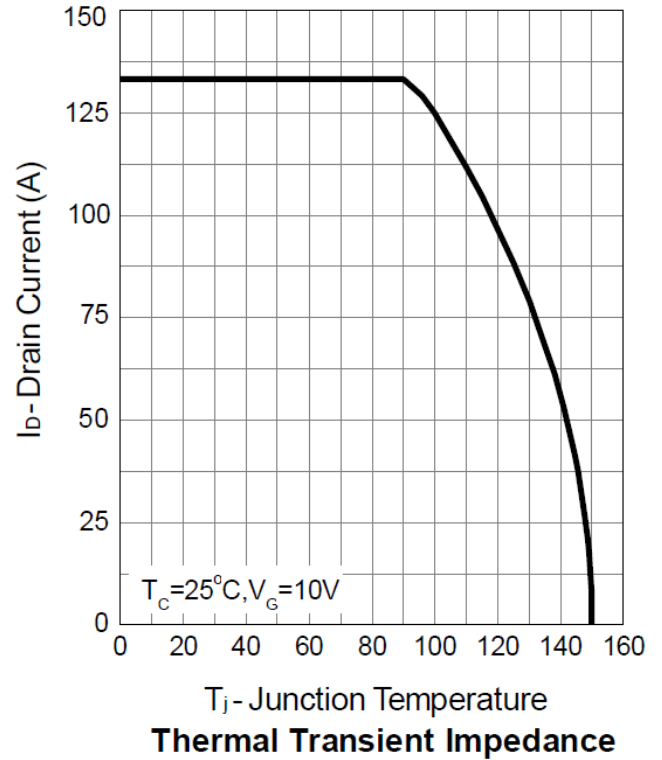
1. continue current is limited by bonding wire.
2. Pulse width limited by max. junction temperature.
3. $R_{\theta JA}$ steady state $t=999s$.
4. UIS tested and pulse width limited by maximum junction temperature 150°C
5. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
6. Guaranteed by design, not subject to production testing

Typical Operating Characteristics

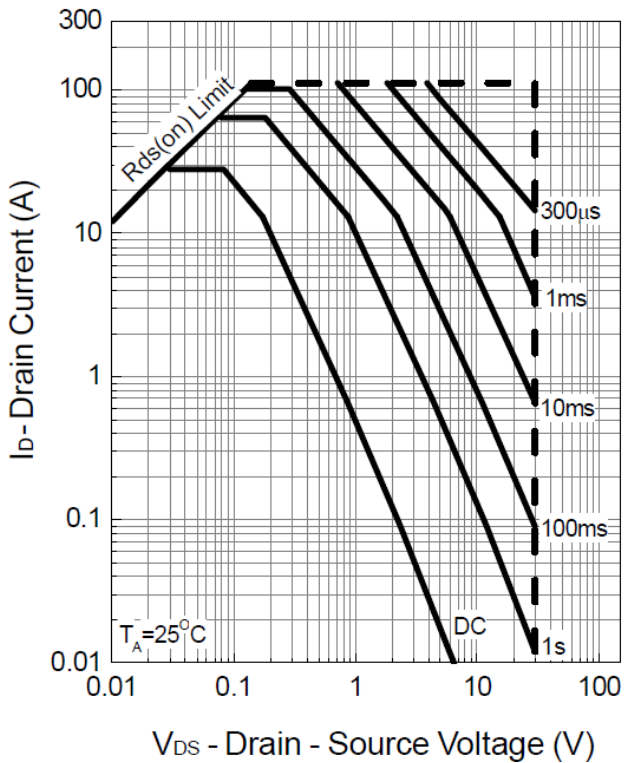
Power Dissipation



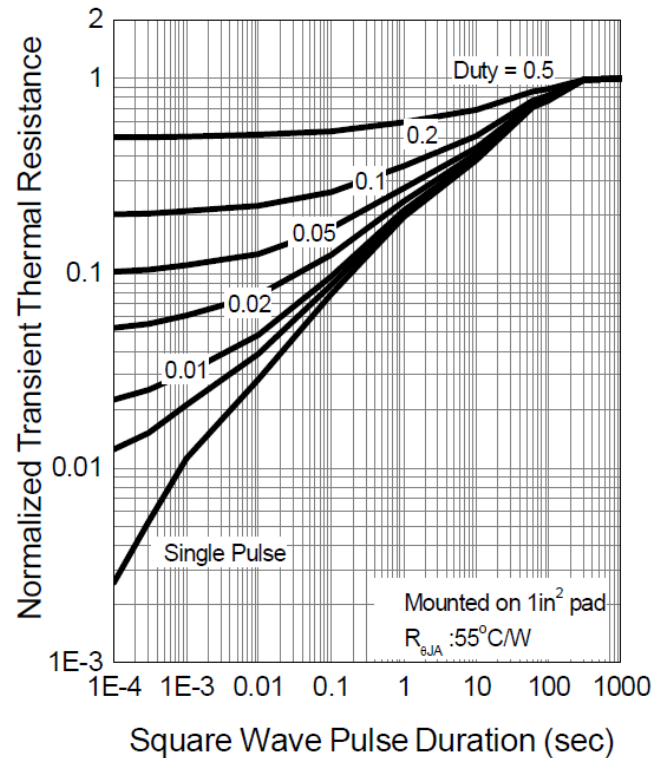
Drain Current



Safe Operation Area

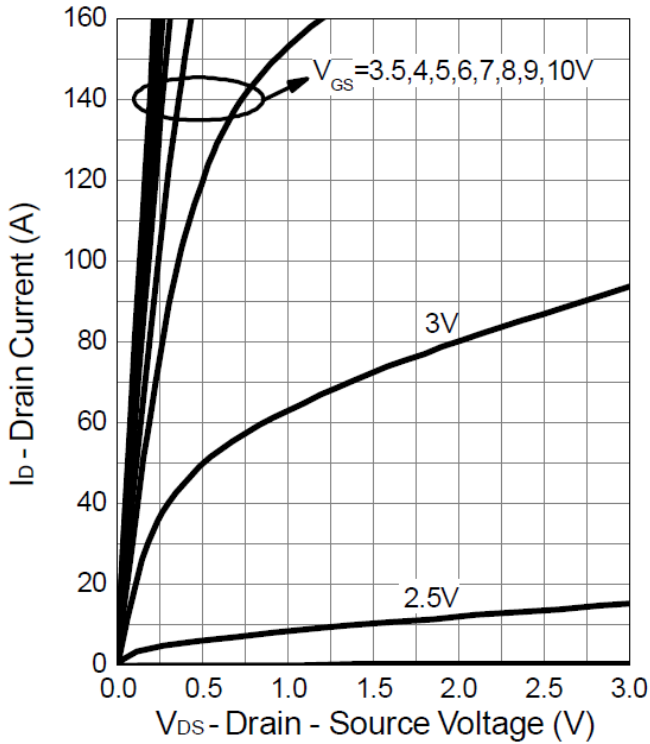


Thermal Transient Impedance

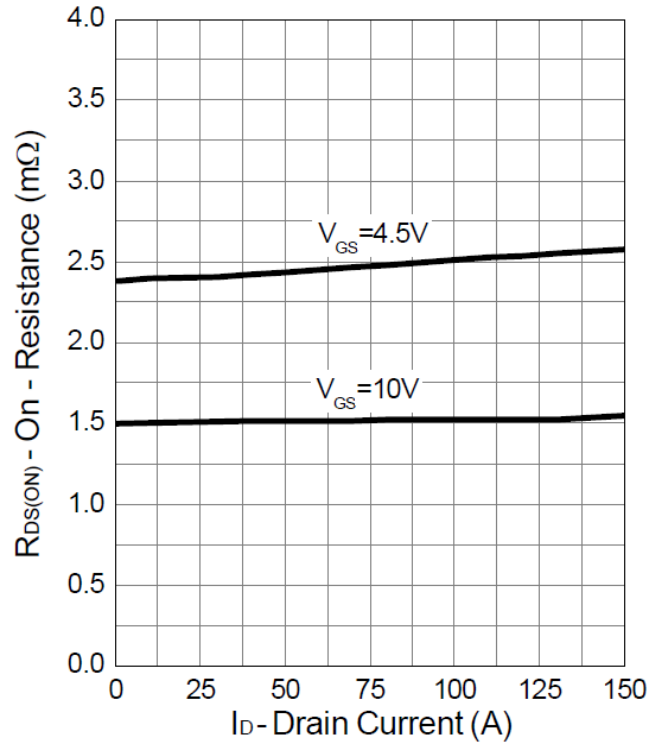


Typical Operating Characteristics(Cont.)

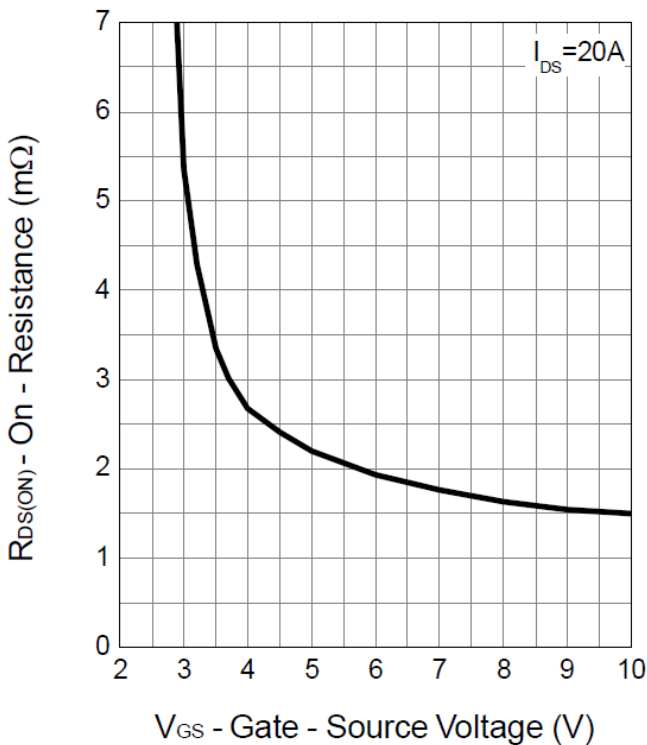
Output Characteristics



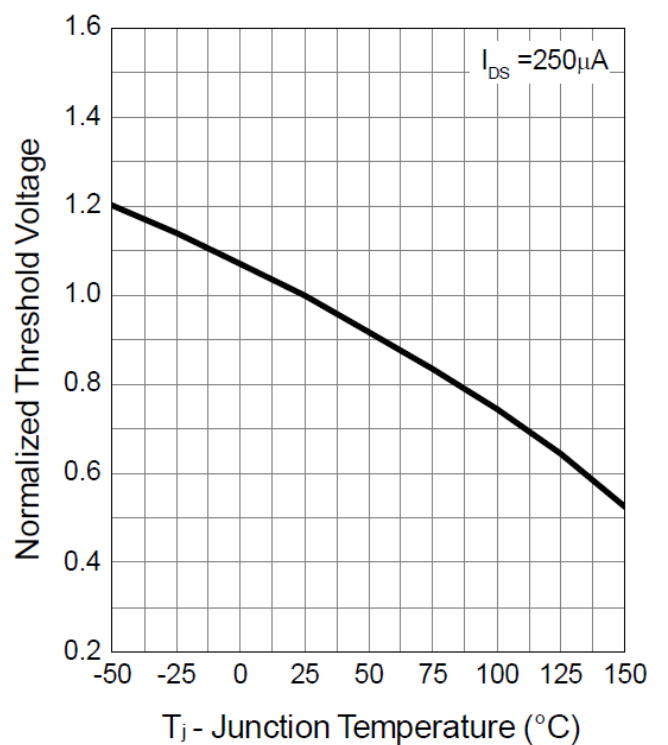
Drain-Source On Resistance



Gate-Source On Resistance

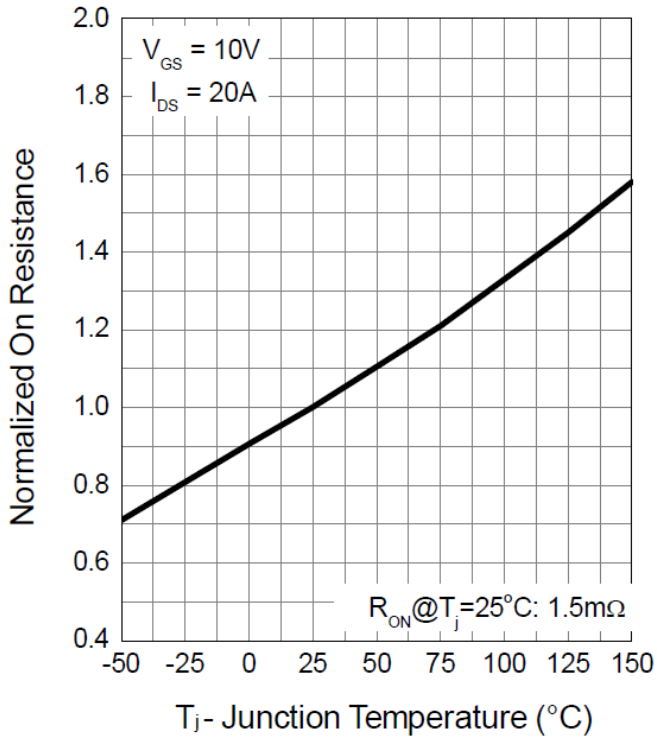


Gate Threshold Voltage

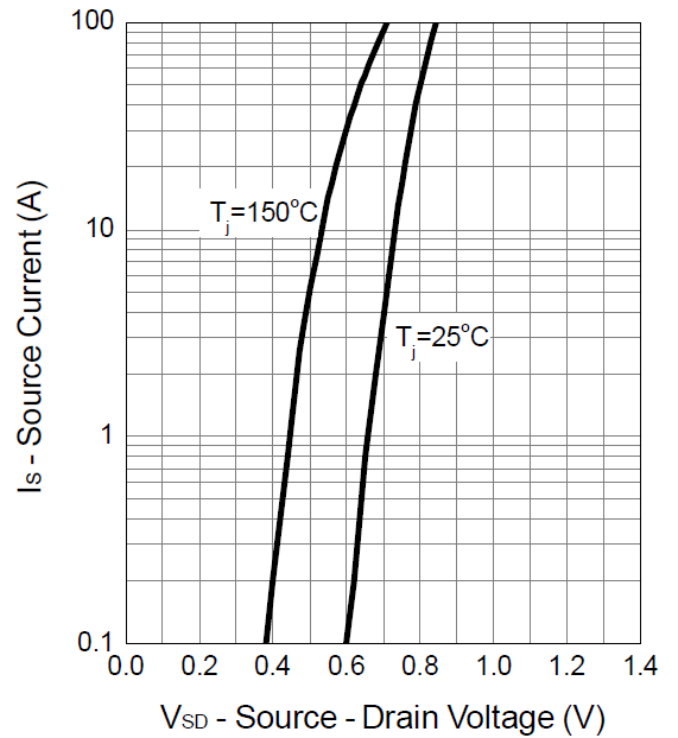


Typical Operating Characteristics (Cont.)

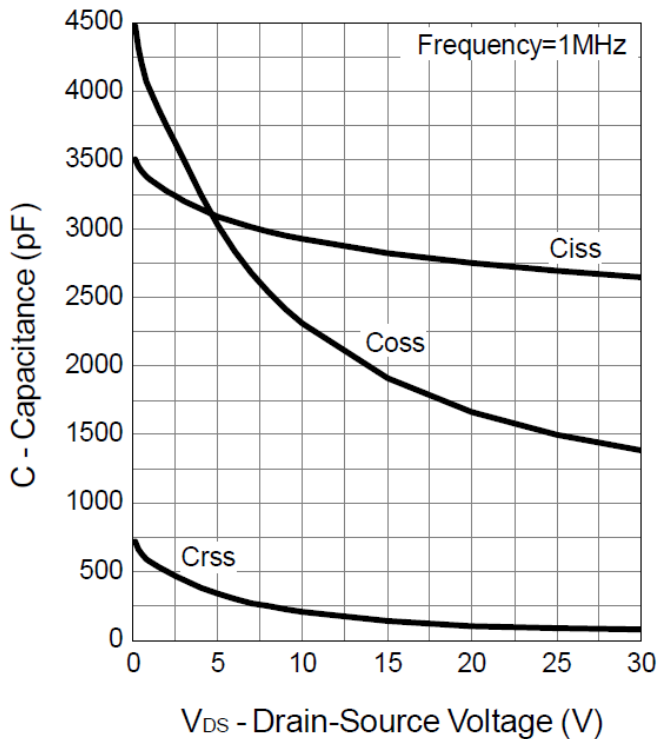
Drain-Source On Resistance



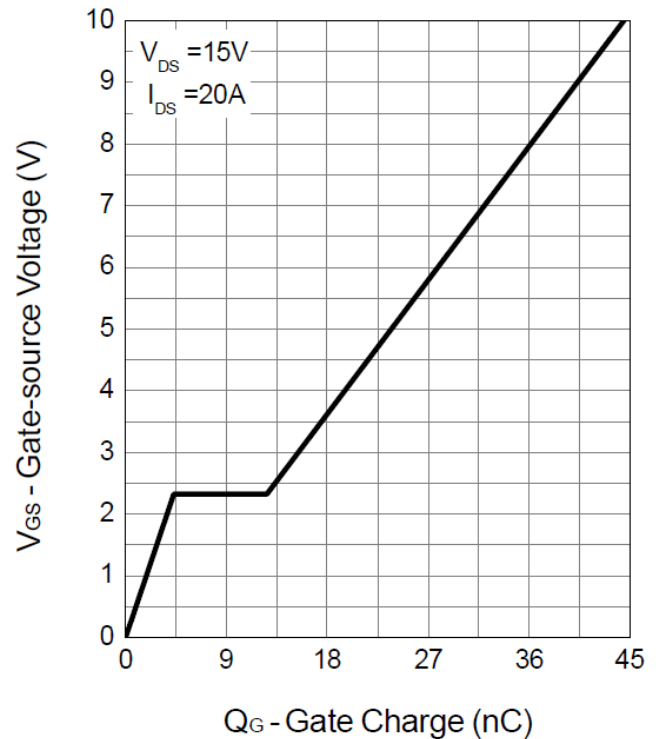
Source-Drain Diode Forward



Capacitance

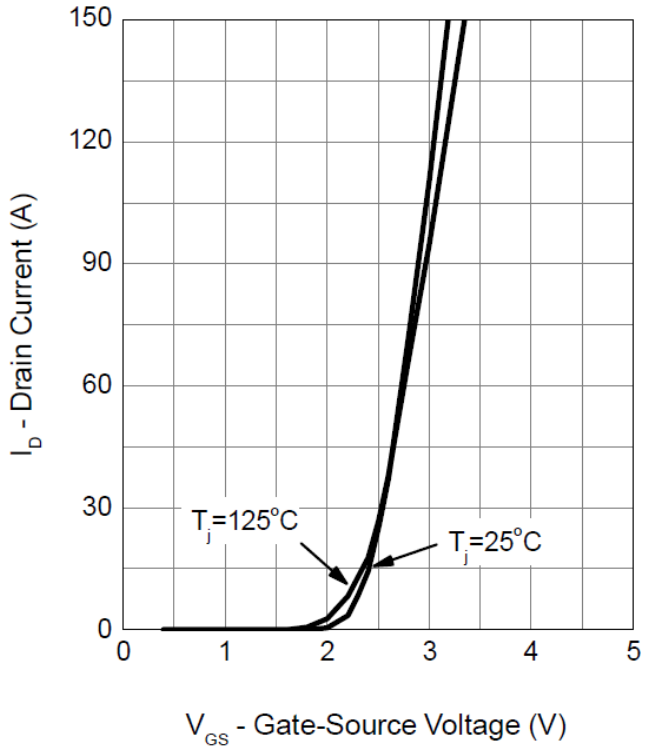


Gate Charge



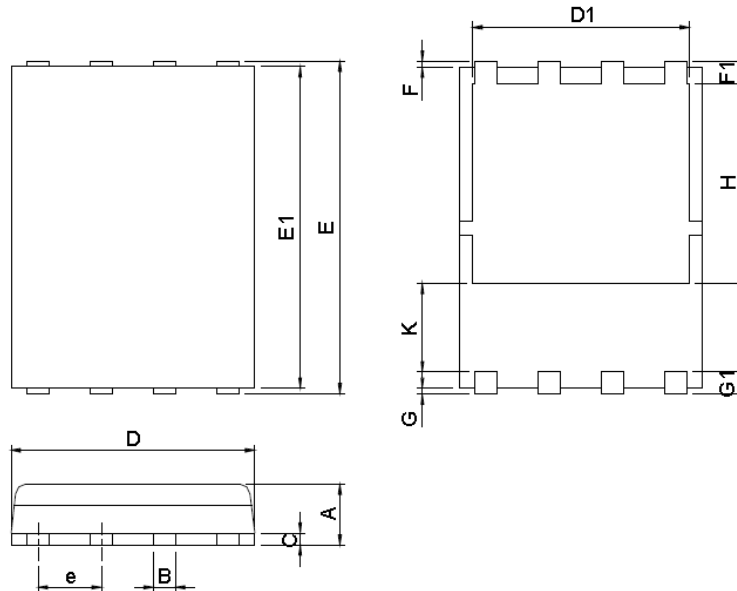
Typical Operating Characteristics (Cont.)

Transfer Characteristics



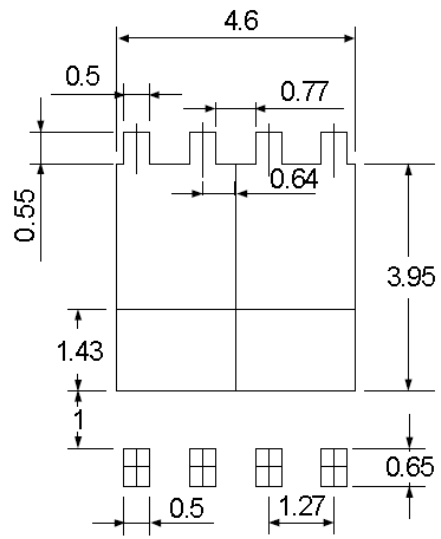
Package Information

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