

N-Channel Enhancement Mode MOSFET

TDM3532

DESCRIPTION

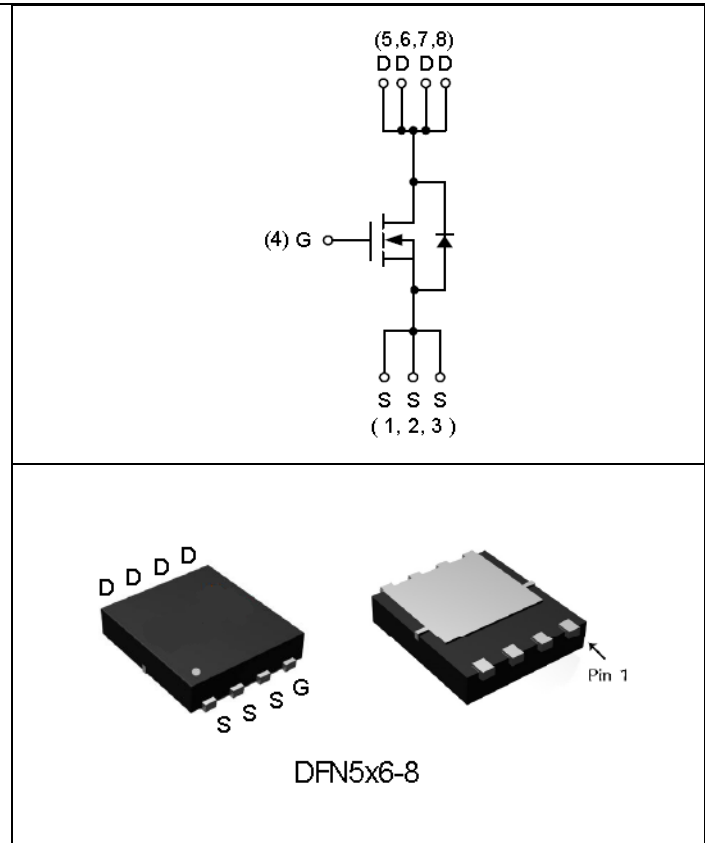
The TDM3532 uses advanced trench technology to provide excellent RDS(ON) and low gate charge. This device is suitable for use as a load switch or in PWM applications.

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)	80	A
	I _D (T _C =100°C)	75	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

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

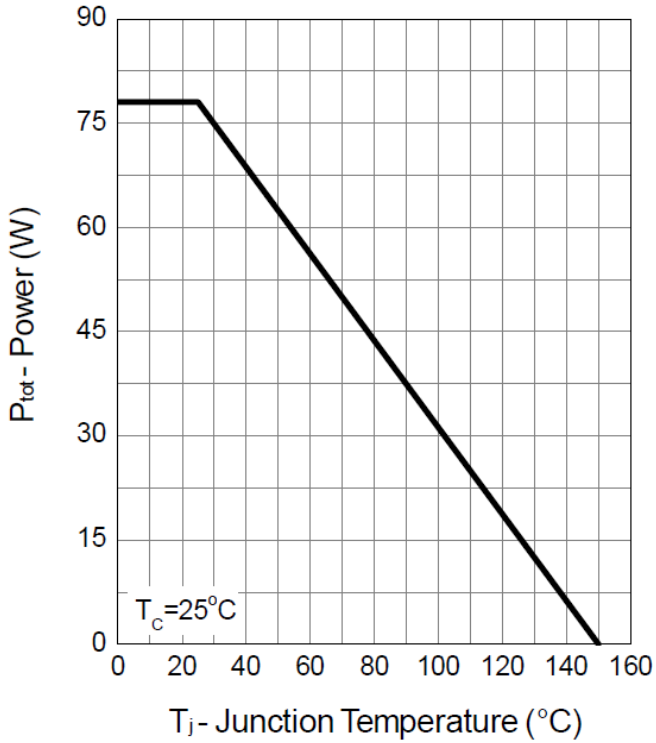
Parameter	Symbol	Condition	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	30	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=24V, V_{GS}=0V$	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA
ON CHARACTERISTICS (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:

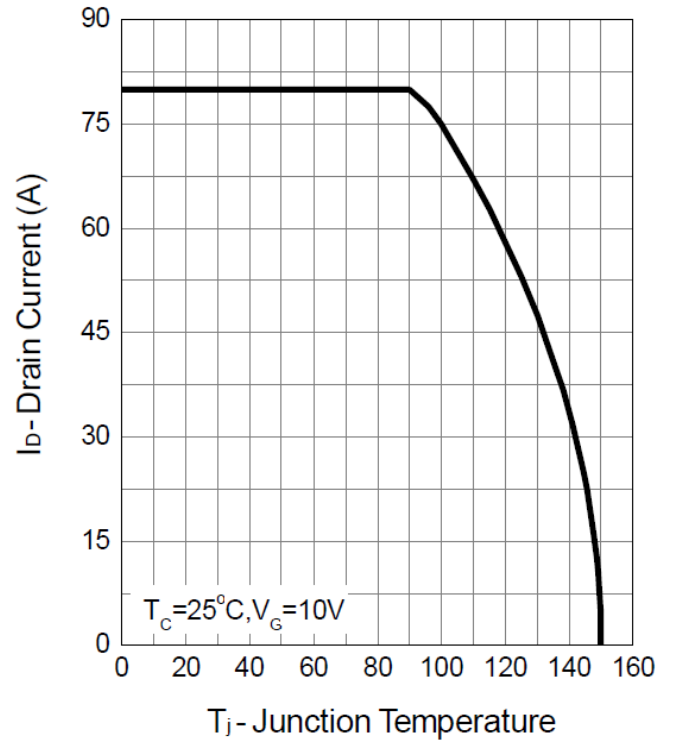
1. continue current is limited by bonding wire.
2. Pulse width limited by max. junction temperature.
3. $R_{\theta JA}$ steady state $t=999s$.
4. UIS tested and pulse width limited by maximum junction temperature 150°C
5. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
6. Guaranteed by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

Typical Operating Characteristics

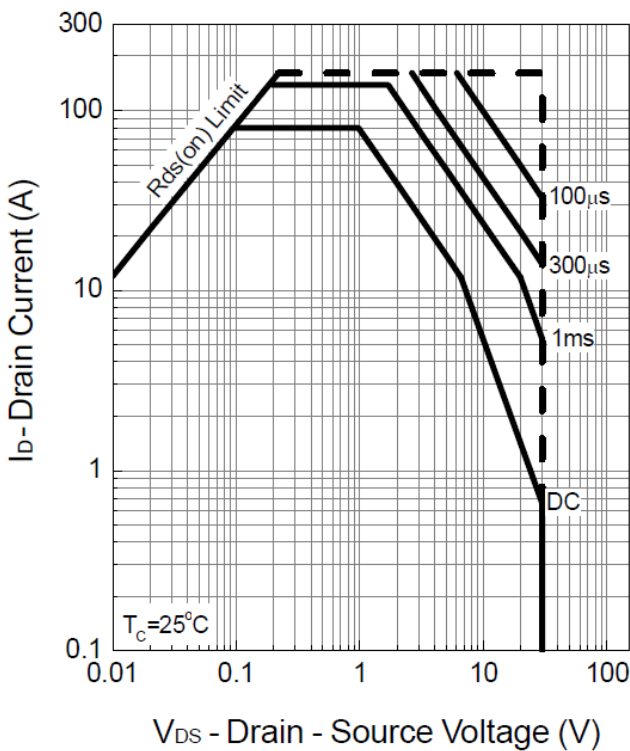
Power Dissipation



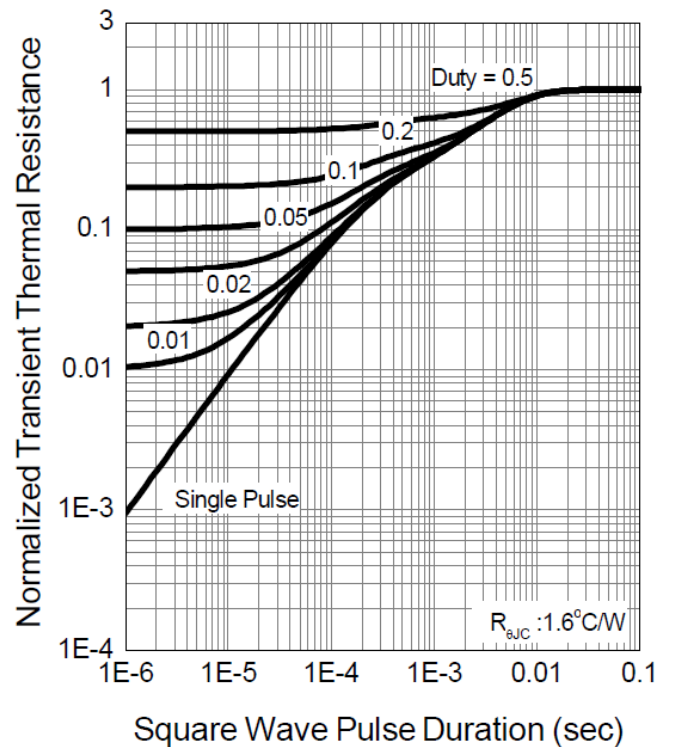
Drain Current



Safe Operation Area

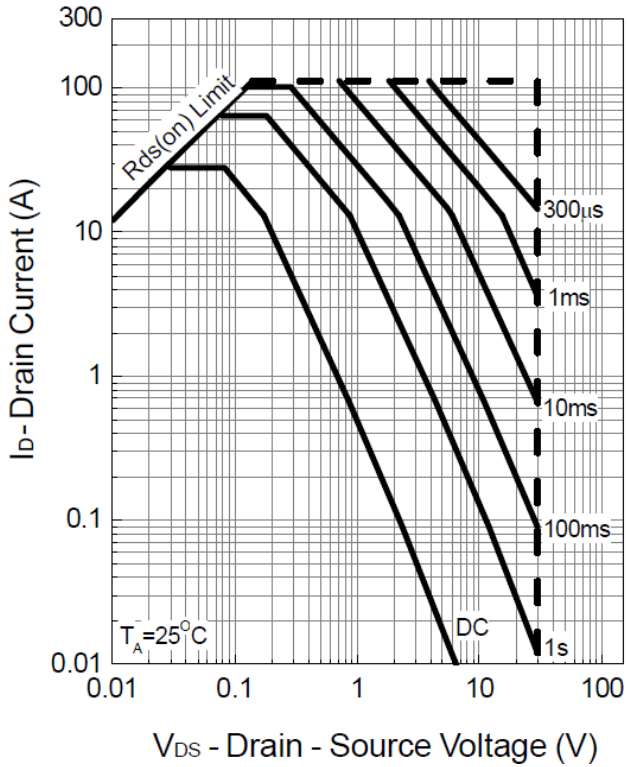


Thermal Transient Impedance

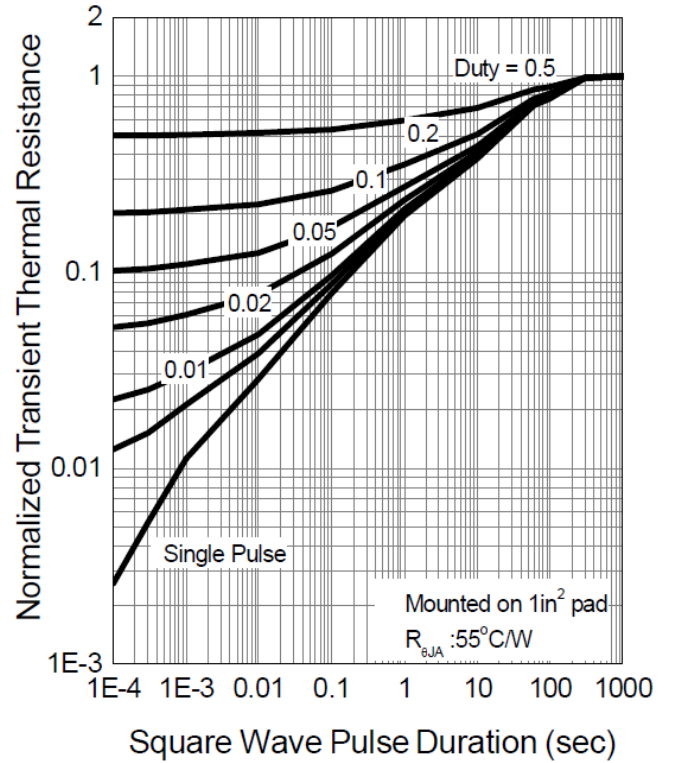


Typical Operating Characteristics(Cont.)

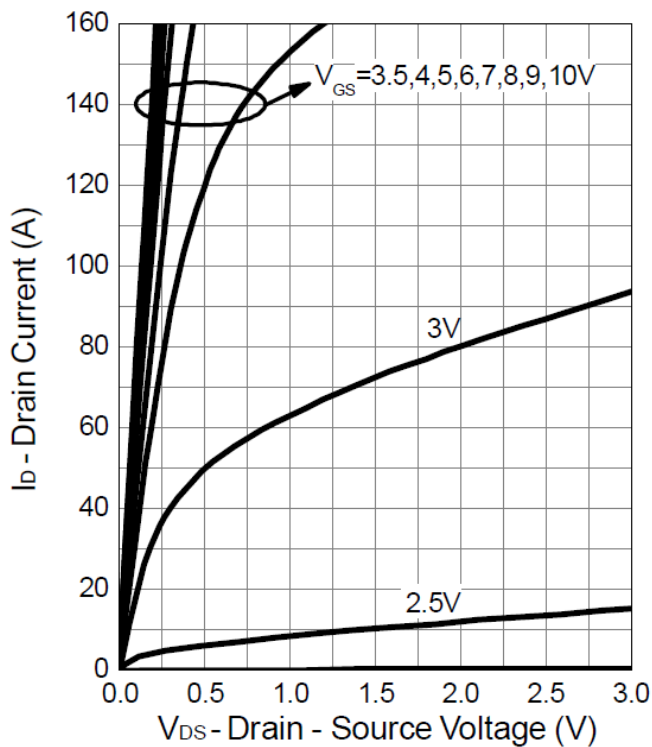
Safe Operation Area



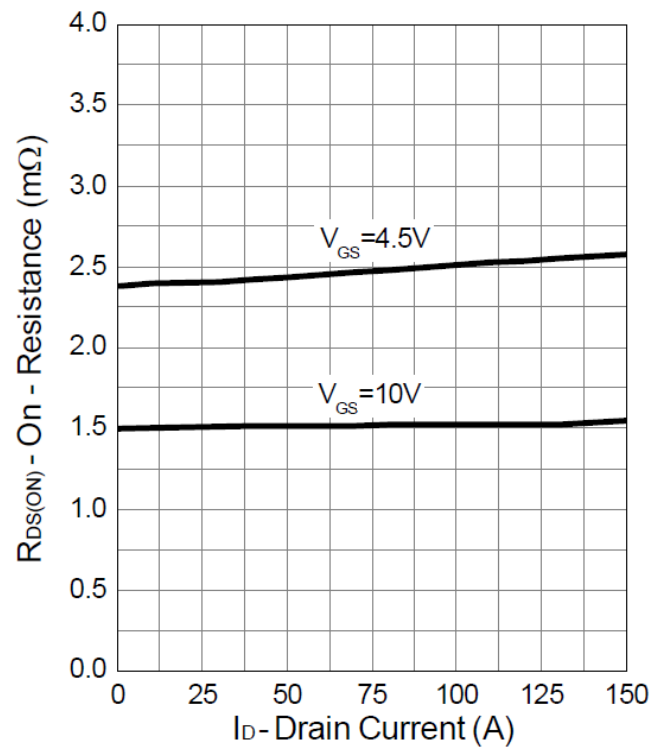
Thermal Transient Impedance



Output Characteristics

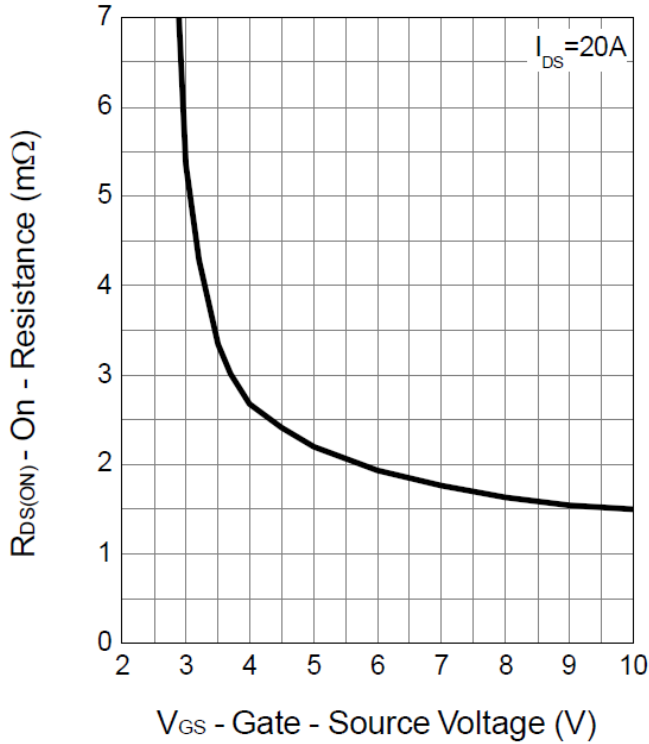


Drain-Source On Resistance

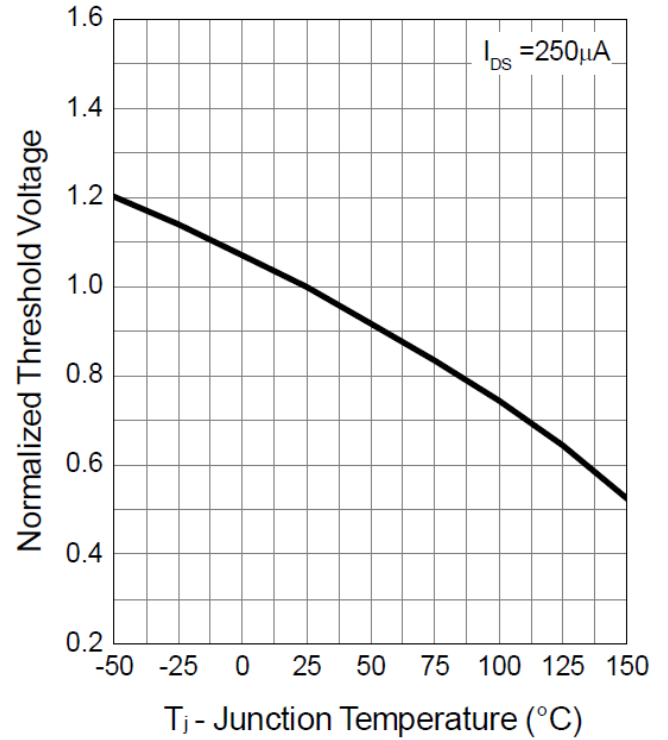


Typical Operating Characteristics (Cont.)

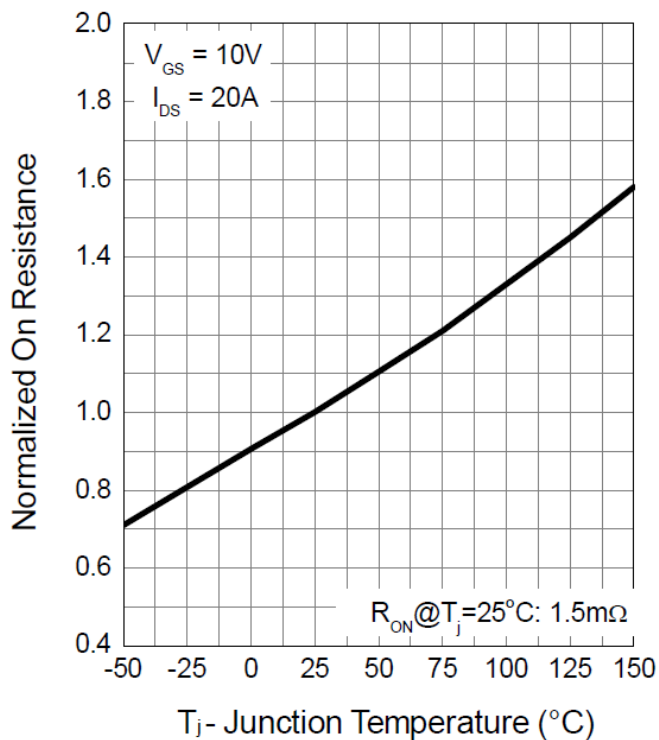
Gate-Source On Resistance



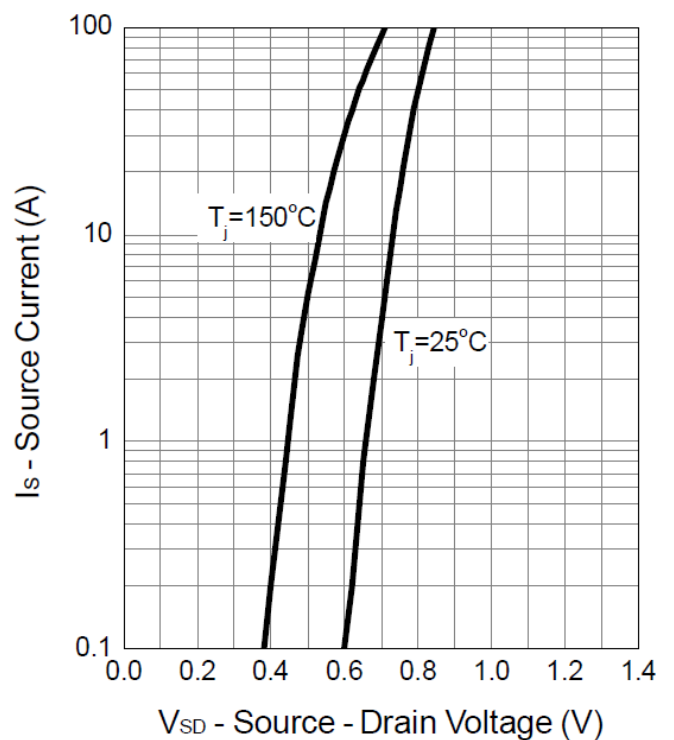
Gate Threshold Voltage



Drain-Source On Resistance

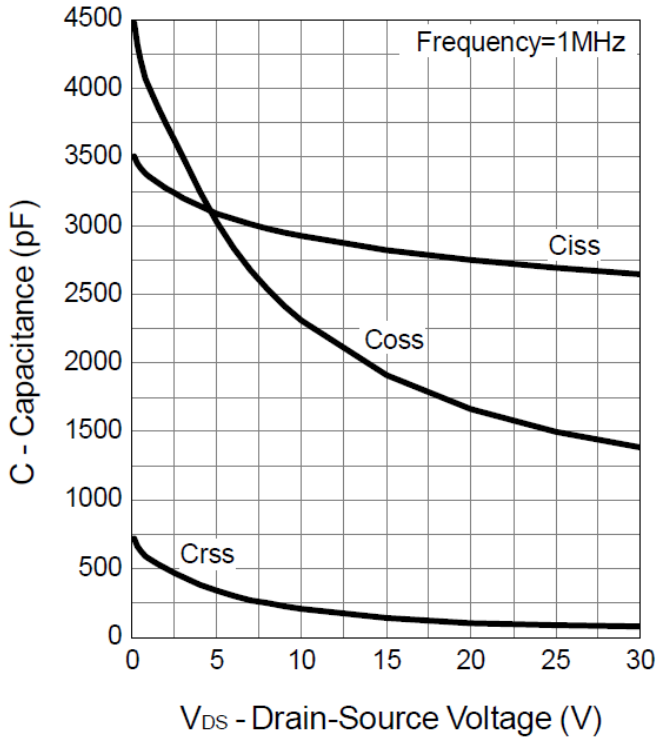


Source-Drain Diode Forward

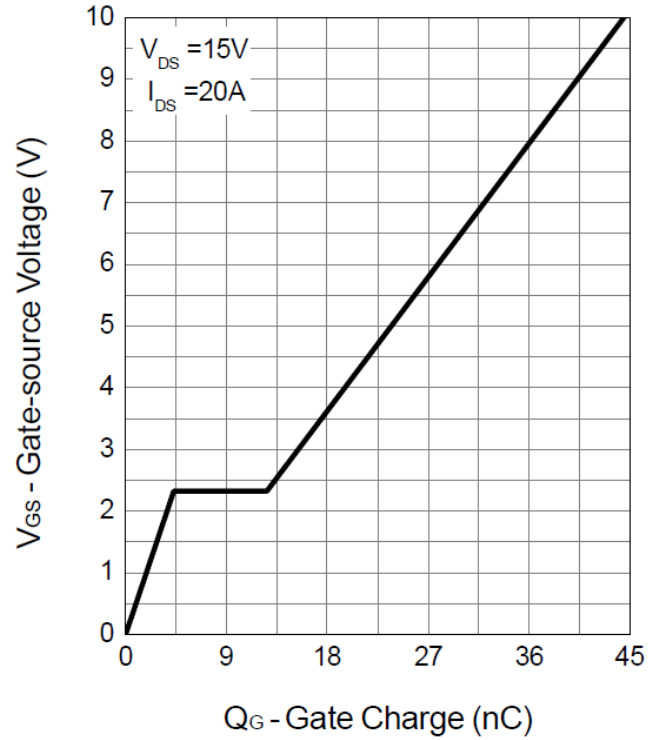


Typical Operating Characteristics (Cont.)

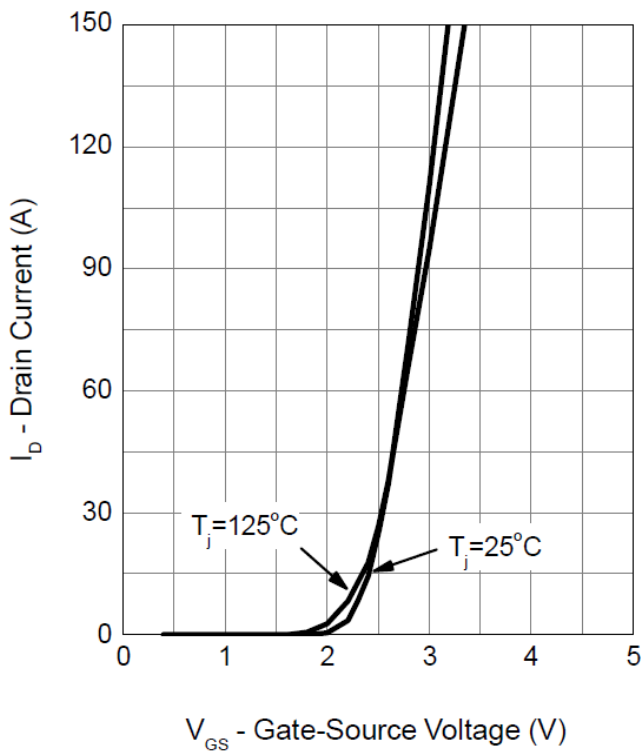
Capacitance



Gate Charge

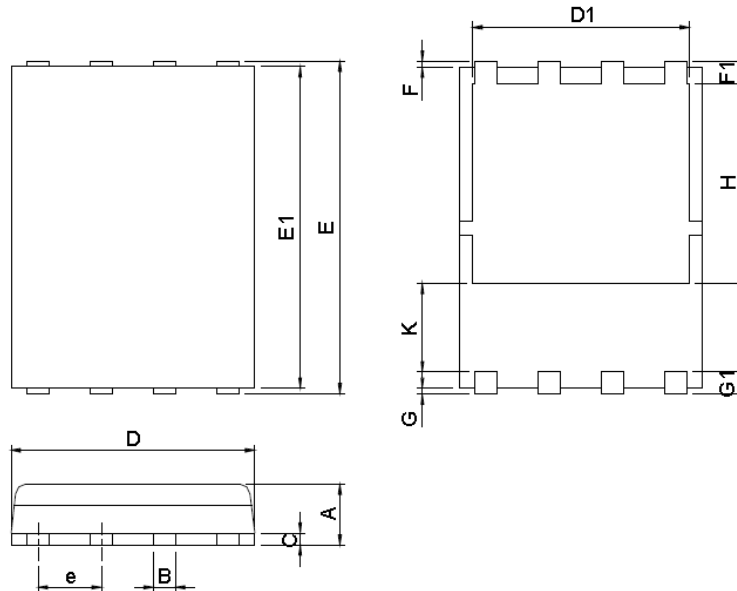


Transfer Characteristics



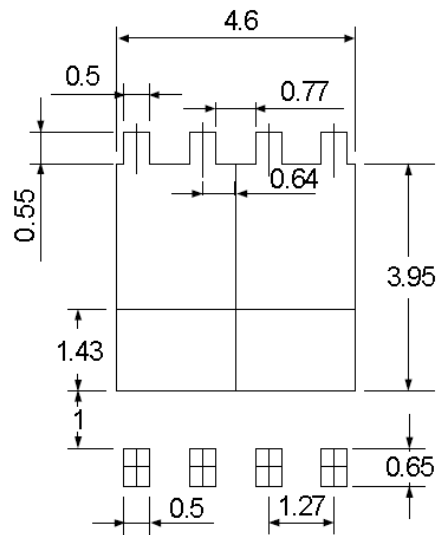
Package Information

DFN5*6-8 Package



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