

N-Channel Enhancement Mode MOSFET

TDM31522

DESCRIPTION

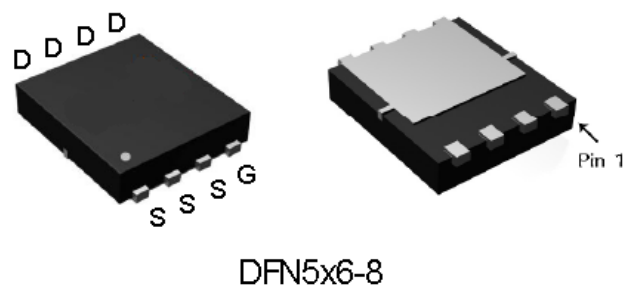
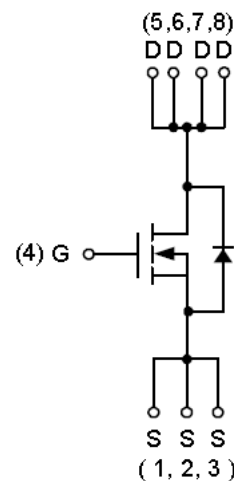
The TDM31522 uses advanced trench technology to provide excellent RDS(ON) and low gate charge. This device is suitable for use as a load switch or in PWM applications.

GENERAL FEATURES

- RDS(ON) < 38mΩ @ VGS=10V
- Reliable and Rugged
- Lead free product is available
- DFN5X6-8 Package

Application

- PWM applications
- Load switch
- Power management



ABSOLUTE MAXIMUM RATINGS($T_A=25^{\circ}C$ unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V _{DS}	150	V
Gate-Source Voltage	V _{GS}	±25	V
Diode Continuous Forward Current	I _S (T _C =25°C)	16	A
Drain Current @ Continuous	I _D (T _C =25°C)	32	A
	I _D (T _C =100°C)	20	A
Drain Current @ Current-Pulsed (Note 1)	I _{DM} (T _C =25°C)	96	A
Maximum Power Dissipation	P _D (T _C =25°C)	96	W
	P _D (T _C =100°C)	38	W
Drain Current @ Continuous	I _D (T _A =25°C)	7.4	A
	I _D (T _A =70°C)	5.9	A
Maximum Power Dissipation (T _A =25°C)	P _D (T _A =25°C)	5	W
	P _D (T _A =70°C)	3.2	W
Avalanche Energy, Single pulse(L=0.5mH)	E _{AS}	42	mJ

N-Channel Enhancement Mode MOSFET
TDM31522
THERMAL CHARACTERISTICS

Thermal Resistance-Junction to Case	$R_{\theta JC}$	1.3	°C/W
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA} (t \leq 10s)$	25	°C/W
	$R_{\theta JA} (Steady State)$	60	°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)

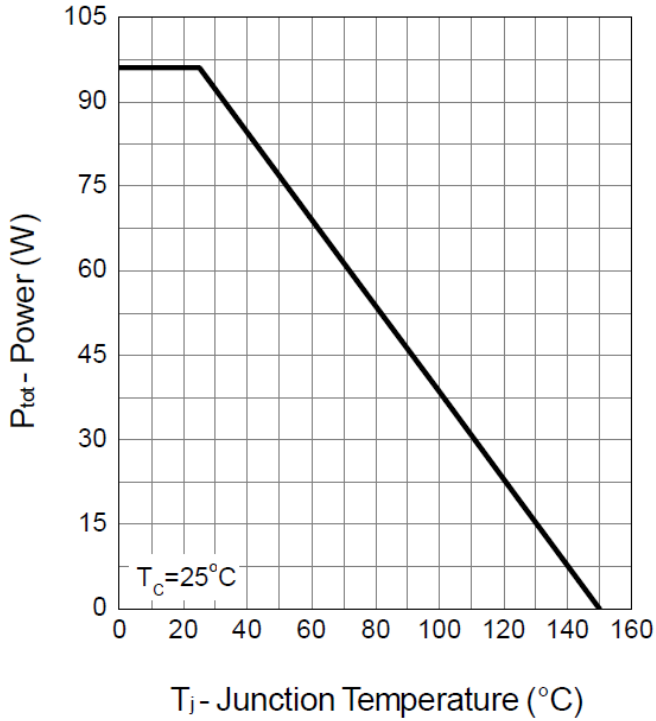
Parameter	Symbol	Condition	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	150	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=120V, V_{GS}=0V$	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 25V, V_{DS}=0V$	-	-	± 100	nA
ON CHARACTERISTICS (Note 2)						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	2	3	4	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=16A$	-	32	38	m Ω
DYNAMIC CHARACTERISTICS (Note 3)						
Gate Resistance	R_G	$V_{DS}=0V, V_{GS}=0V, F=1.0MHz$	-	1.0	-	Ω
Input Capacitance	C_{iss}	$V_{DS}=30V, V_{GS}=0V, F=1.0MHz$	-	2550	3320	PF
Output Capacitance	C_{oss}		-	190	-	PF
Reverse Transfer Capacitance	C_{rss}		-	50	-	PF
SWITCHING CHARACTERISTICS (Note 3)						
Turn-on Delay Time	$t_{d(on)}$	$V_{DS}=30V, R_L=30\Omega, V_{GEN}=10V, R_G=6\Omega$ $I_D=1A$	-	23	42	nS
Turn-on Rise Time	t_r		-	9	17	nS
Turn-Off Delay Time	$t_{d(off)}$		-	42	76	nS
Turn-Off Fall Time	t_f		-	19	35	nS
Total Gate Charge	Q_g	$V_{DS}=75V, I_D=16A, V_{GS}=10V$	-	41	58	nC
Gate-Source Charge	Q_{gs}		-	15	-	nC
Gate-Drain Charge	Q_{gd}		-	8	-	nC
Body Diode Reverse Recovery Time	T_{rr}	$I_F=10A, di/dt=100A/\mu s$	-	90	-	nS
Body Diode Reverse Recovery Charge	Q_{rr}		-	220	-	nC
DRAIN-SOURCE DIODE CHARACTERISTICS						
Diode Forward Voltage (Note 2)	V_{SD}	$V_{GS}=0V, I_S=8A$	-	0.8	1.3	V

NOTES:

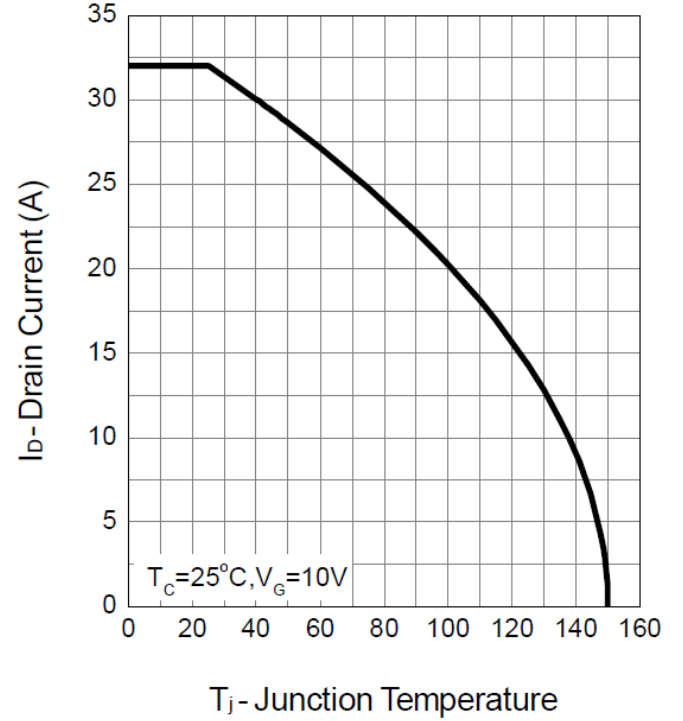
1. Pulse width limited by max. junction temperature.
2. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
3. Guaranteed by design, not subject to production testing

Typical Operating Characteristics

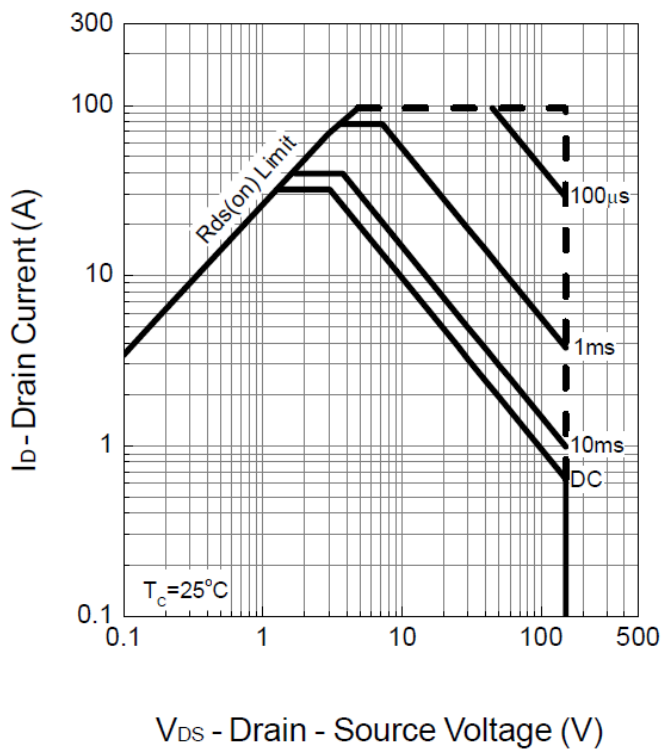
Power Dissipation



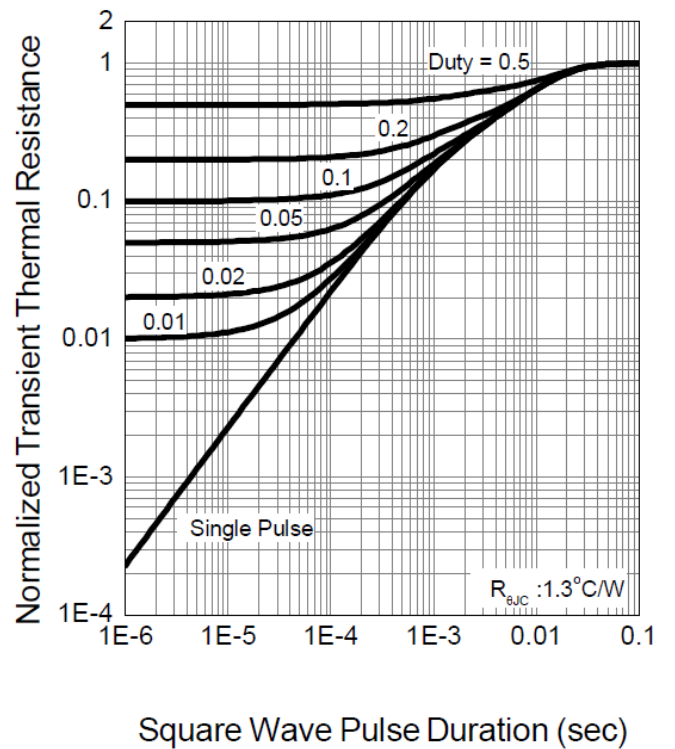
Drain Current



Safe Operation Area

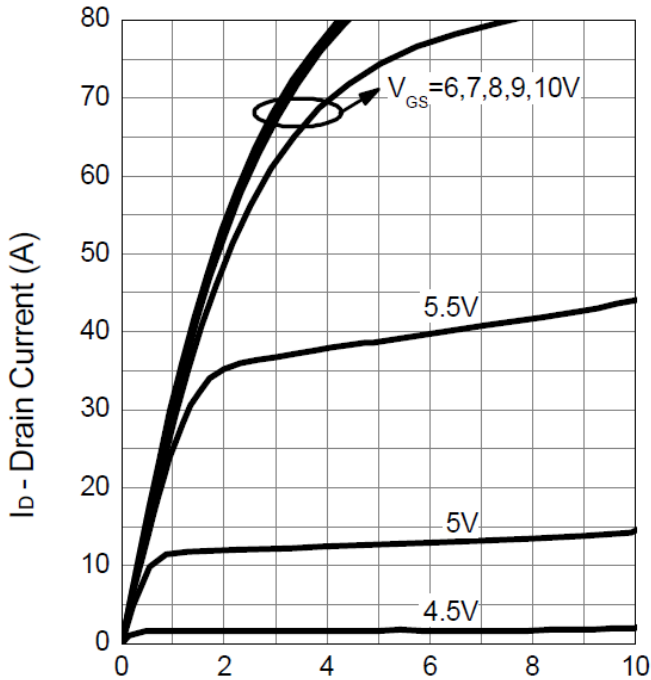


Thermal Transient Impedance



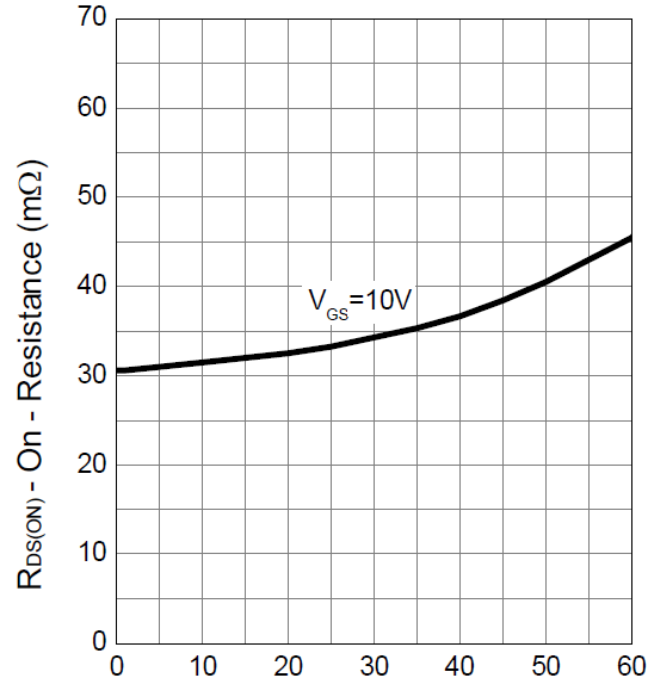
Typical Operating Characteristics (Cont.)

Output Characteristics



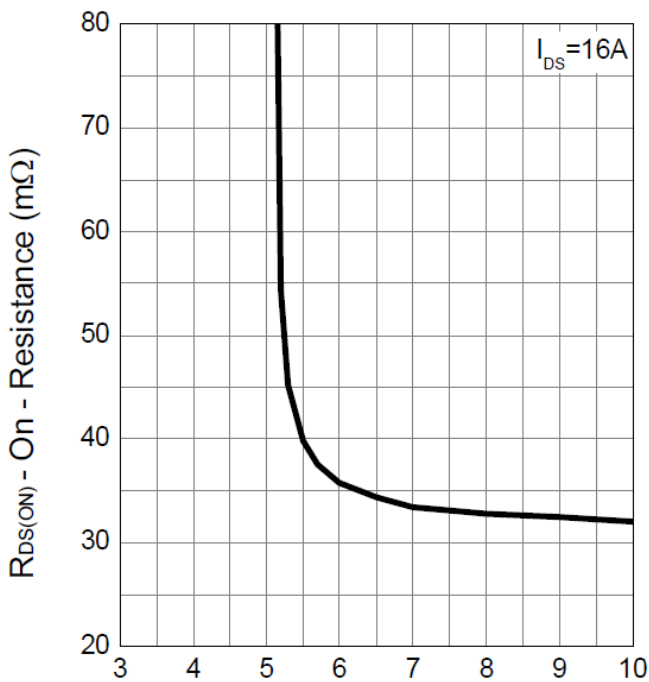
V_{DS} - Drain - Source Voltage (V)

Drain-Source On Resistance



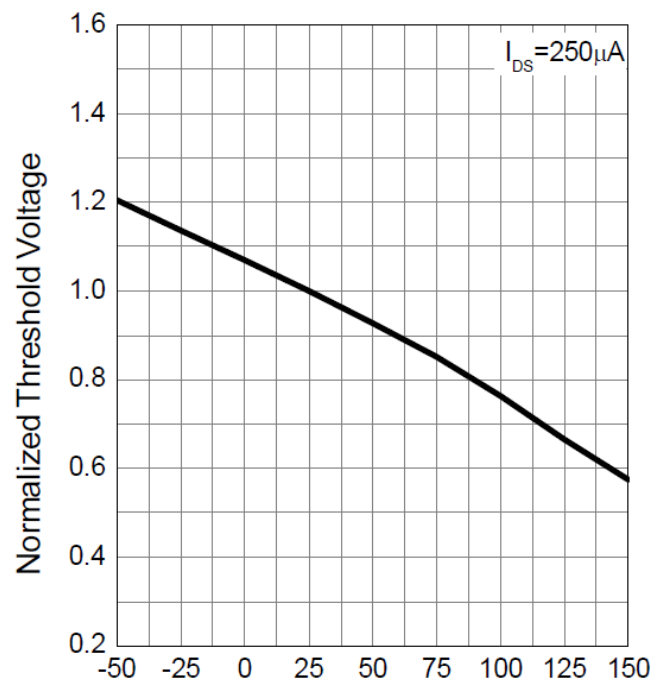
I_D - Drain Current (A)

Gate-Source On Resistance



V_{GS} - Gate - Source Voltage (V)

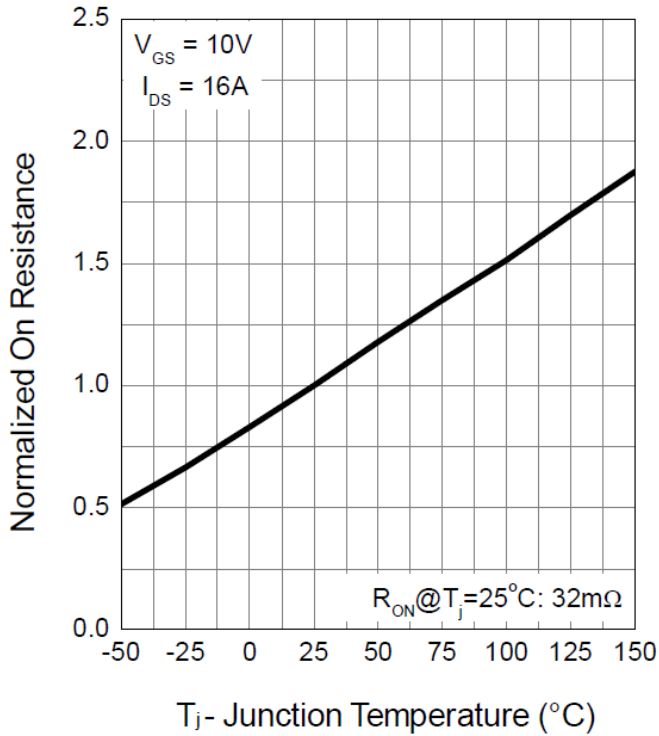
Gate Threshold Voltage



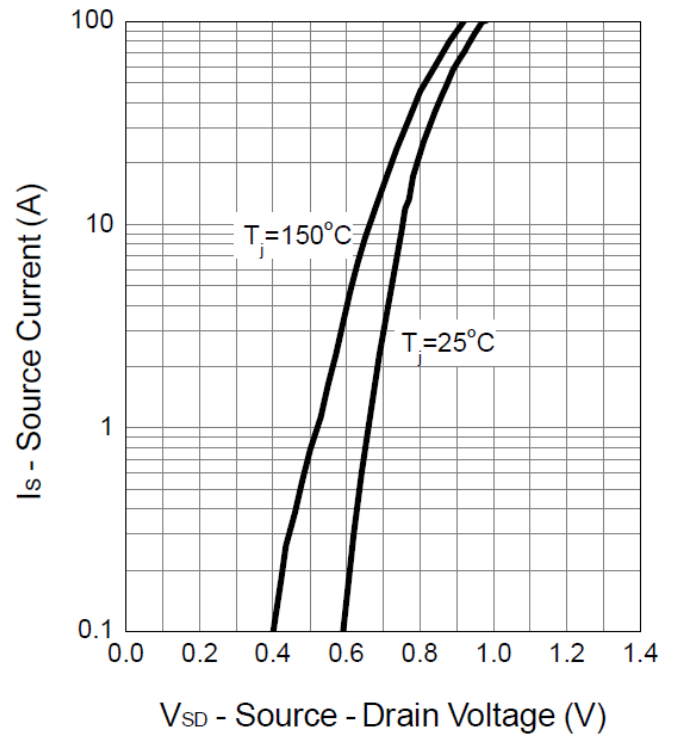
T_j - Junction Temperature ($^{\circ}C$)

Typical Operating Characteristics (Cont.)

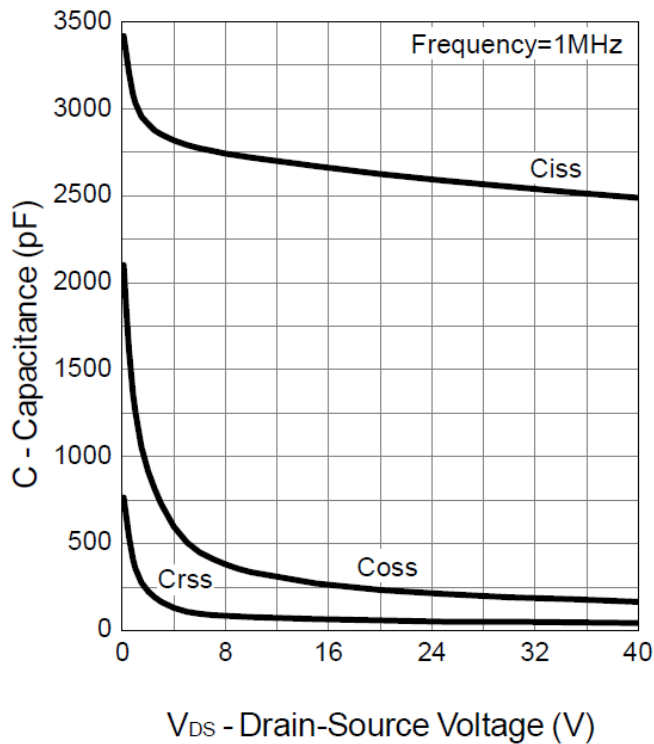
Drain-Source On Resistance



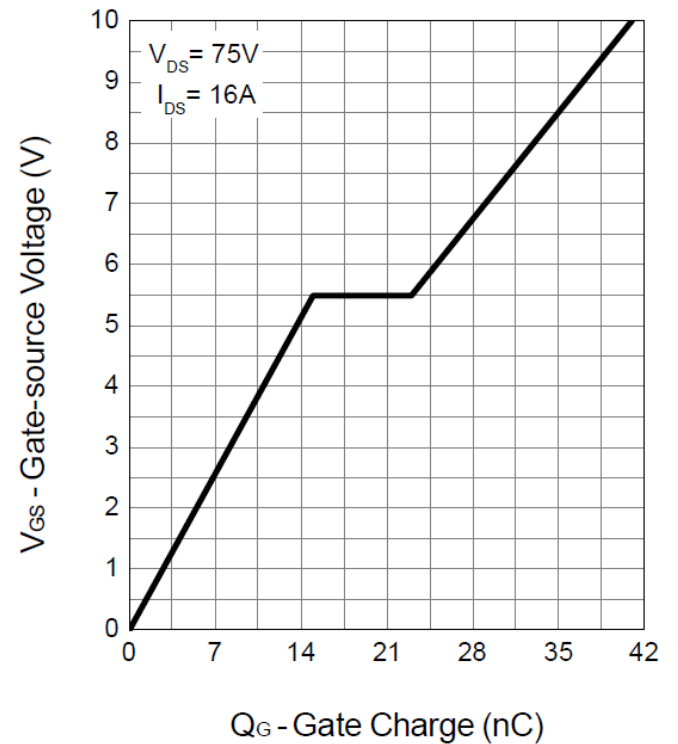
Source-Drain Diode Forward



Capacitance

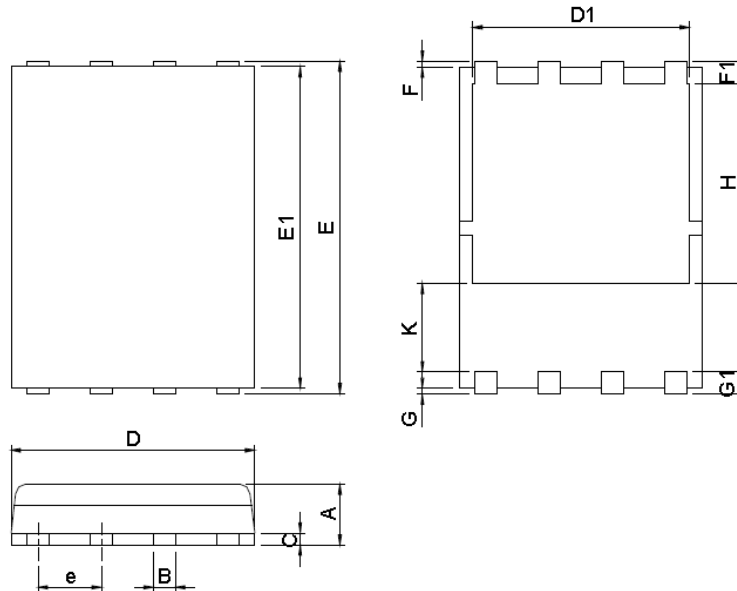


Gate Charge



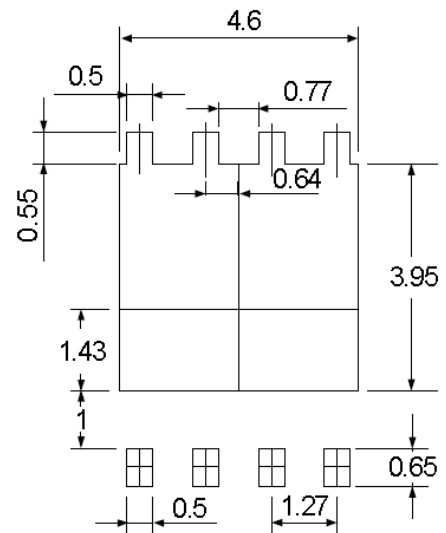
Package Information

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	-

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