N-Channel Enhancement Mode MOSFET TDM31522

DESCRIPTION

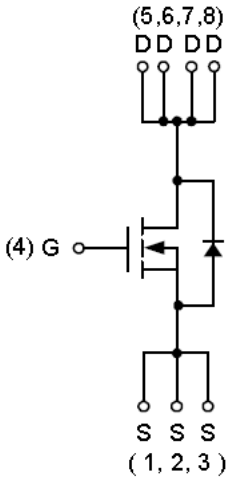
The TDM31522 uses advanced trench technology to provide excellent RDS(ON) and low gate charge. This device is suitable for use as a load switch or in PWM applications.

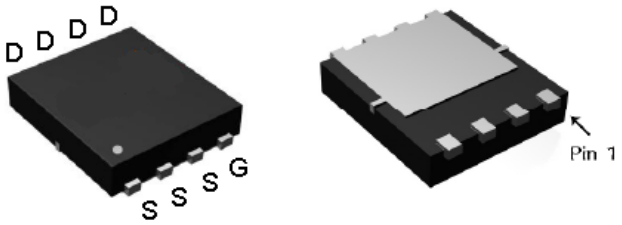
GENERAL FEATURES

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

Application

- PWM applications
- Load switch
- Power management





DFN5x6-8

ABSOLUTE MAXIMUM RATINGS(T_A=25℃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 (Tc=25℃)	16	A
Drain Current @ Continuous	I_D (Tc=25℃)	32	A
	I_D (Tc=100℃)	20	A
Drain Current @ Current-Pulsed (Note 1)	I_{DM} (Tc=25℃)	96	A
Maximum Power Dissipation	P_D(Tc=25℃)	96	W
	P_D(Tc=100℃)	38	W
Drain Current @ Continuous	I_D (TA=25℃)	7.4	A
	I_D (TA=70℃)	5.9	A
Maximum Power Dissipation (TA=25℃)	P_D (TA=25℃)	5	W
	P_D (TA=70℃)	3.2	W
Avalanche Energy, Single pulse(L=0.5mH)	E_{AS}	42	mJ

THERMAL CHARACTERISTICS

Thermal Resistance-Junction to Case	$R_{\theta JC}$	1.3	℃/W
Thermal Resistance,Junction-to-Ambient	$R_{\theta JA}$（t≤10s）	25	℃/W
	$R_{\theta JA}$（Steady State）	60	℃/W
Maximum Operating Junction Temperature	T_J	150	℃
Storage Temperature Range	T_{STG}	-55 To 150	℃

ELECTRICAL CHARACTERISTICS (T_A=25℃unless otherwise noted)

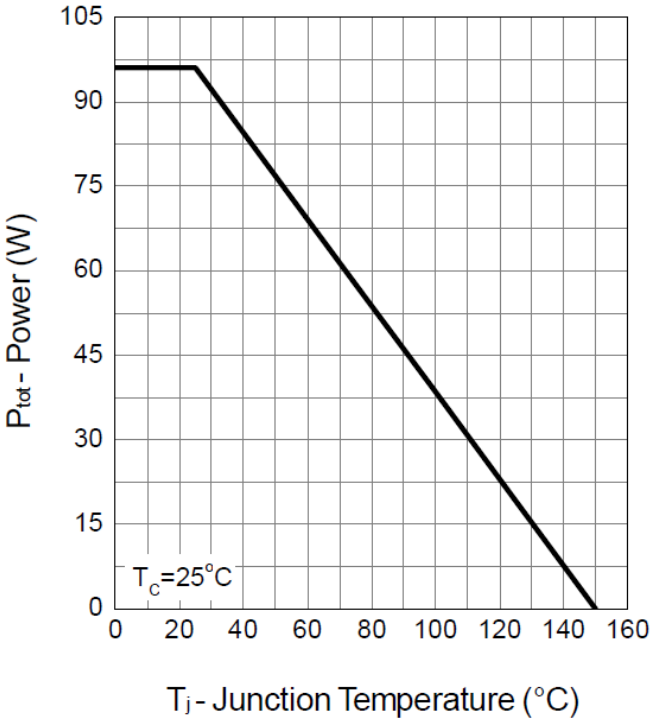
Parameter	Symbol	Condition	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V I_D=250μA	150	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=120V,V_{GS}=0V	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±25V,V_{DS}=0V	-	-	±100	nA
ON CHARACTERISTICS (Note 2)						
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=16A	-	32	38	mΩ
DYNAMIC CHARACTERISTICS (Note3)						
Gate Resistance	R_G	V_{DS}=0V,V_{GS}=0V, F=1.0MHz	-	1.0	-	Ω
Input Capacitance	Ciss	V_{DS}=30V,V_{GS}=0V, F=1.0MHz	-	2550	3320	PF
Output Capacitance	Coss		-	190	-	PF
Reverse Transfer Capacitance	Crss		-	50	-	PF
SWITCHING CHARACTERISTICS (Note 3)						
Turn-on Delay Time	$t_{d(on)}$	V_{DS}=30V, R_L=30Ω, V_{GEN}=10V,R_G=6Ω	-	23	42	nS
Turn-on Rise Time	t_r	I_D=1A	-	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	Trr	I_F=10A, dI/dt=100A/μs	-	90	-	nS
Body Diode Reverse Recovery Charge	Qrr		-	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:

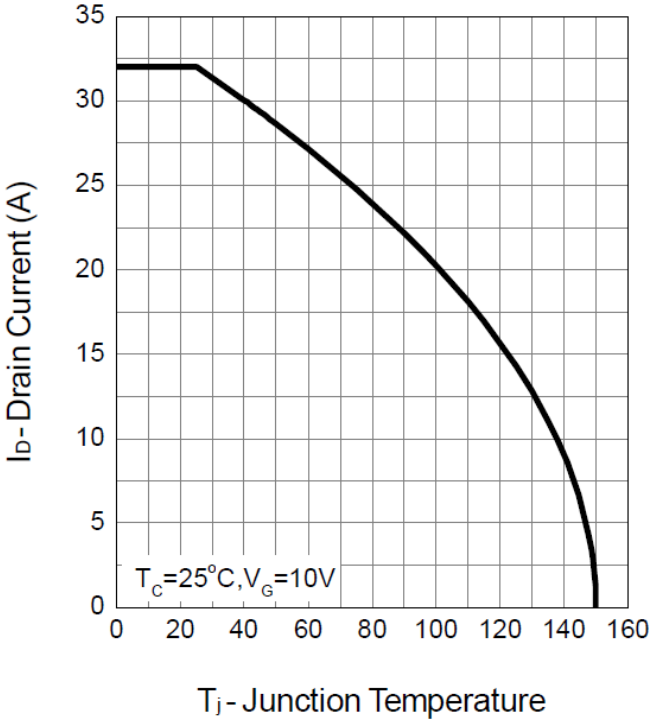
1. Pulse width limited by max. junction temperature.
2. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
3. Guaranteed by design, not subject to production testing

Typical Operating Characteristics

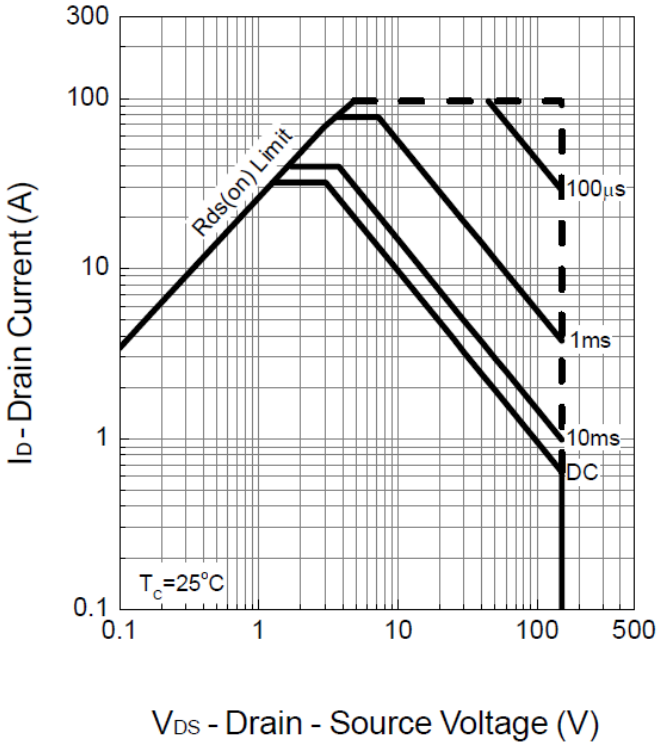
Power Dissipation



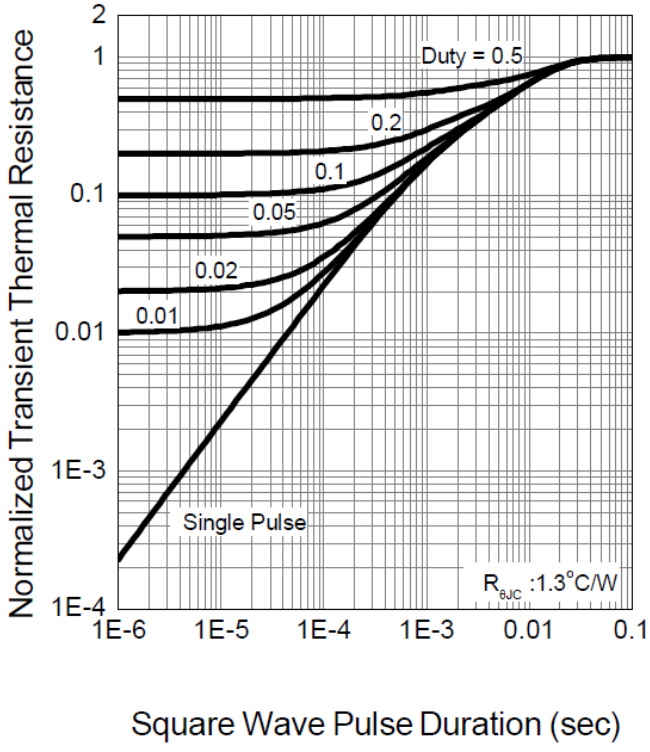
Drain Current



Safe Operation Area

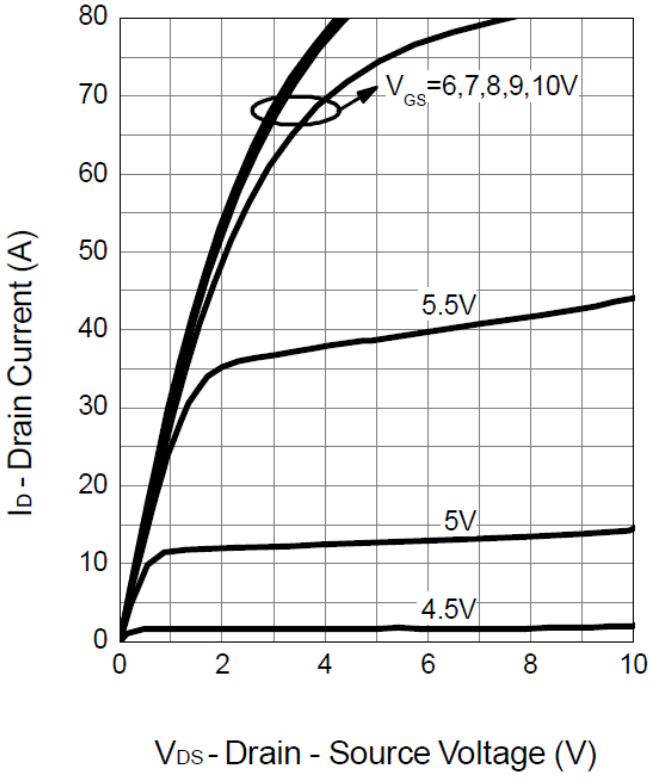


Thermal Transient Impedance

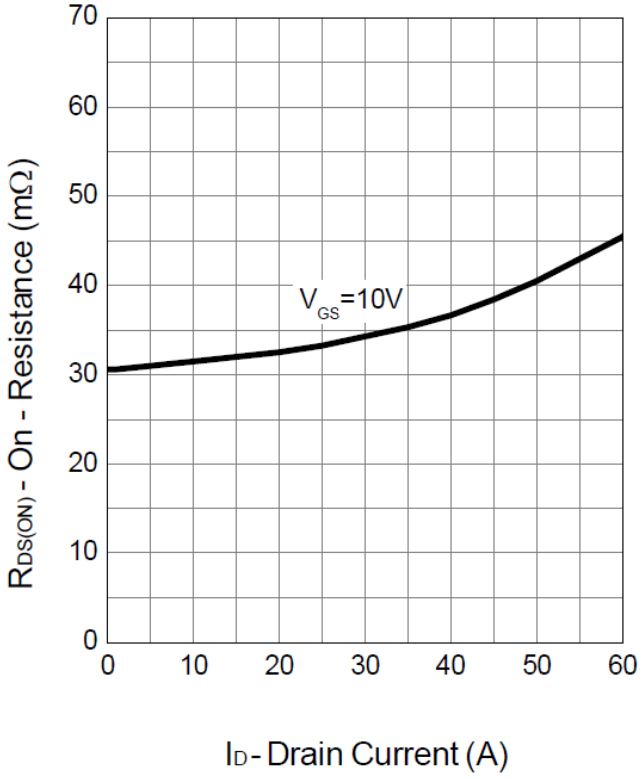


Typical Operating Characteristics (Cont.)

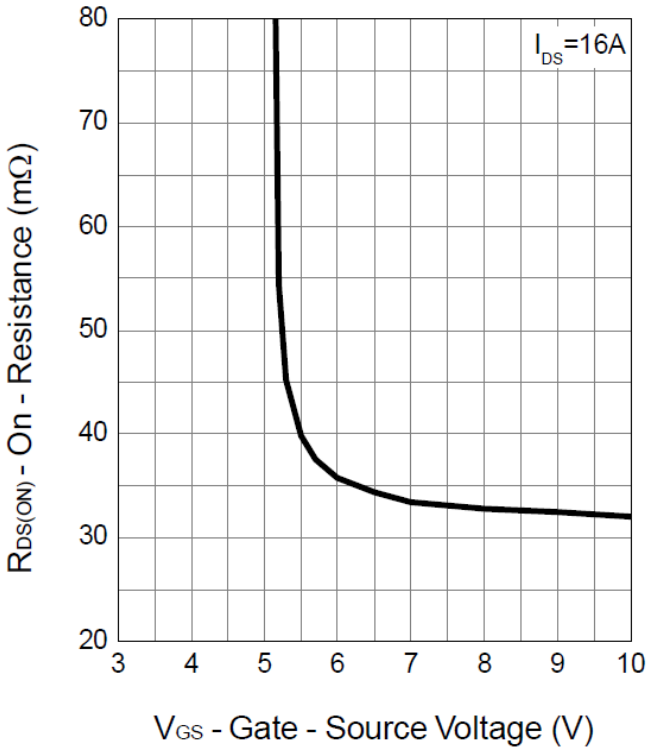
Output Characteristics



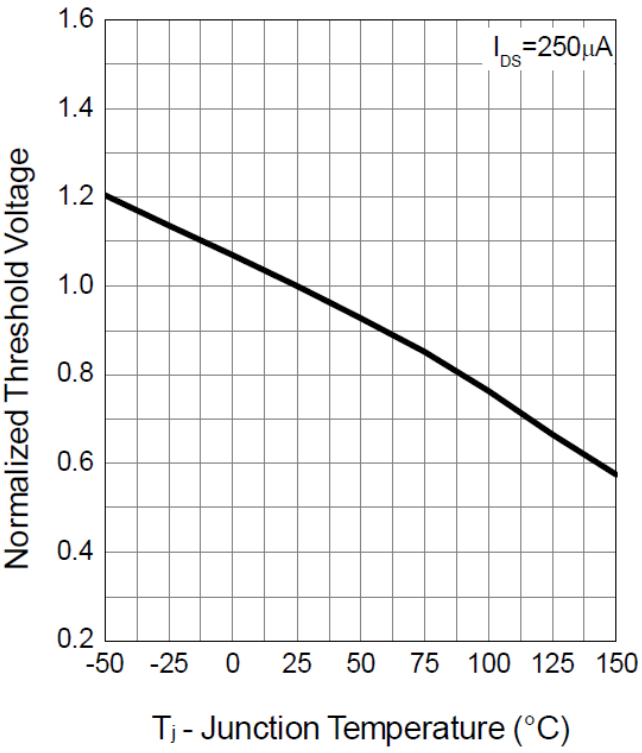
Drain-Source On Resistance



Gate-Source On Resistance

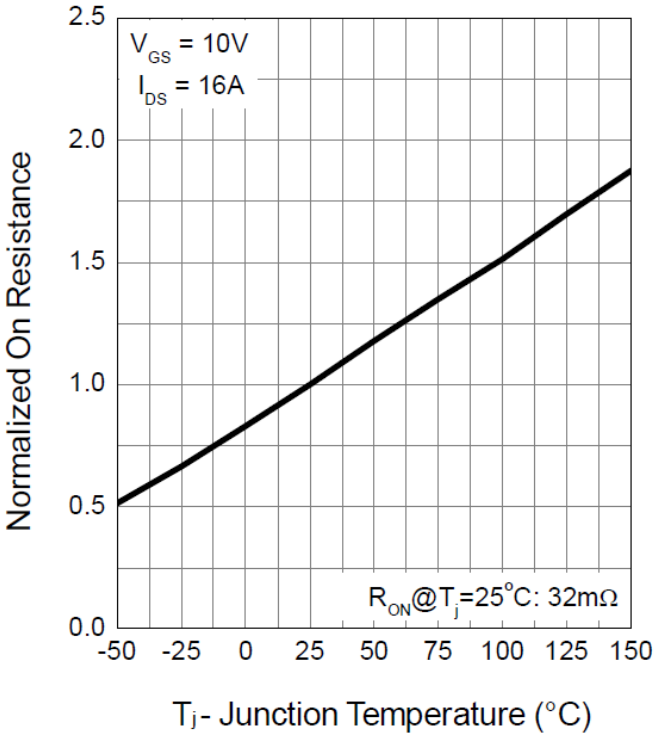


Gate Threshold Voltage

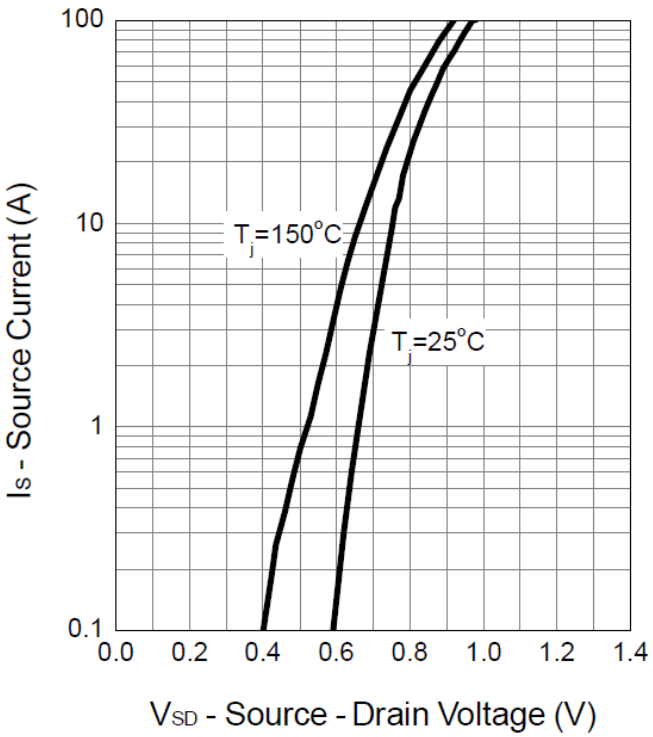


Typical Operating Characteristics (Cont.)

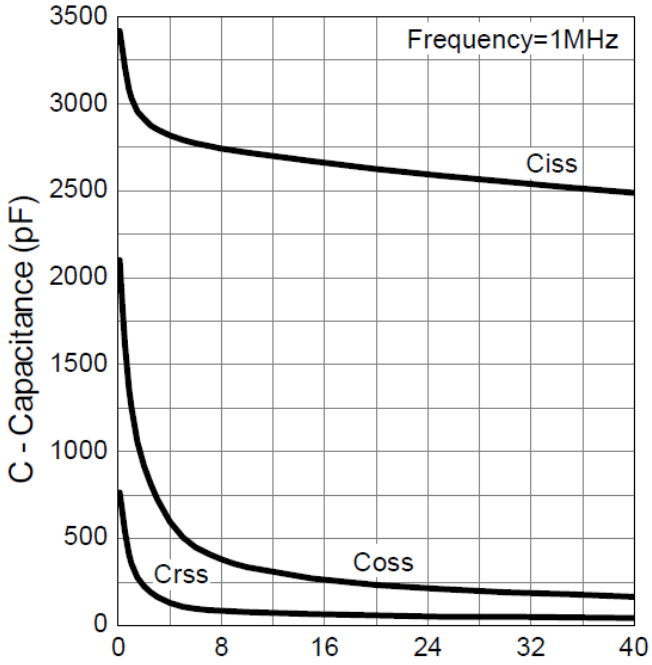
Drain-Source On Resistance



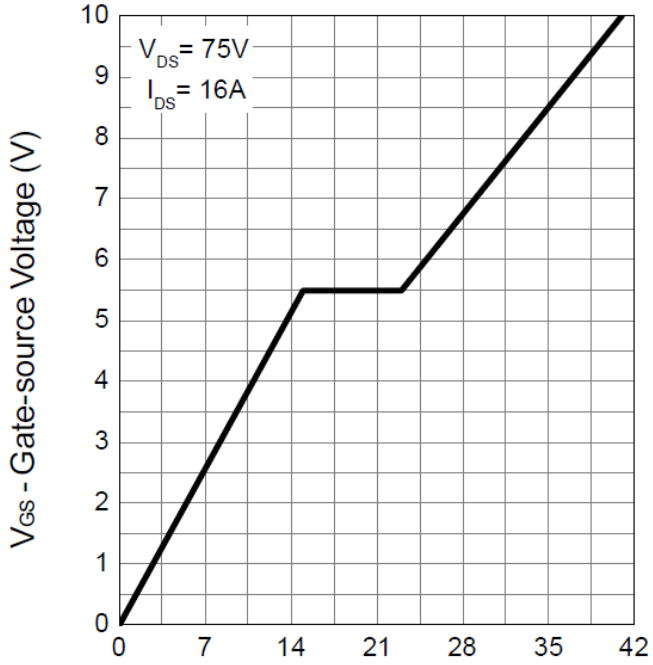
Source-Drain Diode Forward



Capacitance

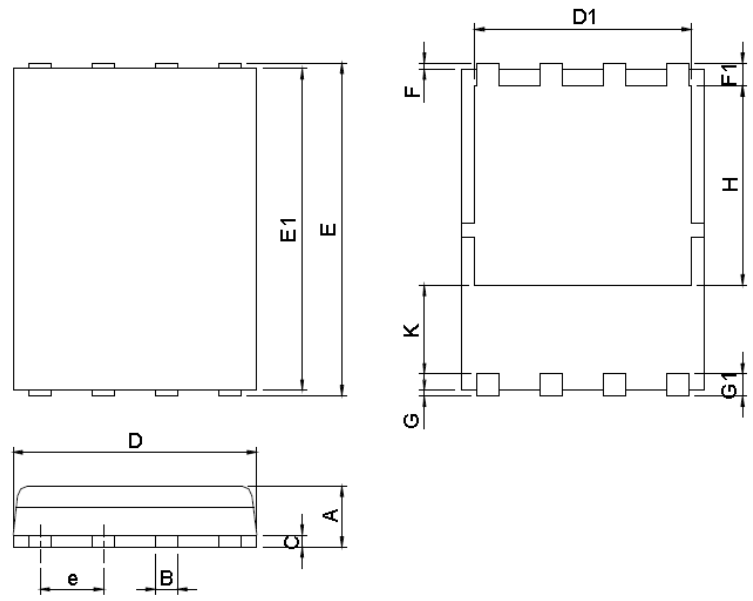


Gate Charge



Package Information

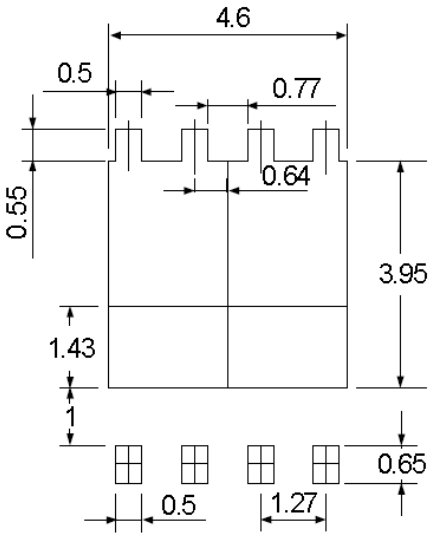
DFN5*6-8 Package



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