N-Channel Enhancement Mode MOSFET TDM3408

DESCRIPTION

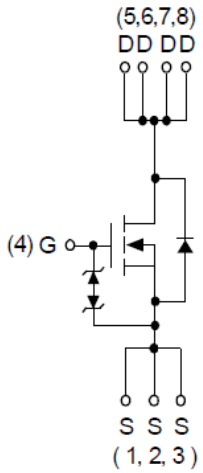
The TDM3408 uses advanced trench technology to provide excellent RDS(ON) and low gate charge. This device is suitable for use as a load switch or in PWM applications.

GENERAL FEATURES

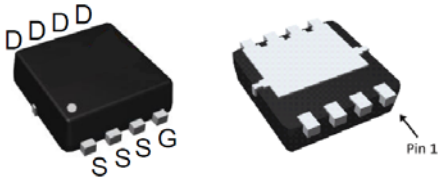
- RDS(ON) < 17.5mΩ @ VGS=4.5V
  RDS(ON) < 10.8mΩ @ VGS=10V
- High Power and current handling capability
- ESD protection
- Lead free product is available
- Surface Mount Package

Application

- PWM applications
- Load switch
- Power management



N-Channel MOSFET



PPAK-3*3-8

ABSOLUTE MAXIMUM RATINGS(T_A=25℃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	5	A
Drain Current @ Continuous	I_D（T_C=25℃）	20	A
Drain Current @ Current-Pulsed (Note 1)	I_{DM}（T_C=25℃）	48	A
Maximum Power Dissipation	P_D（T_C=25℃）	21	W
Drain Current @ Continuous	I_D（T_A=25℃）	9.2	A
	I_D（T_A=70℃）	7.4	A
Maximum Power Dissipation	P_D（T_A=25℃）	1.4	W
	P_D（T_A=70℃）	0.9	W
Thermal Resistance,Junction-to-Ambient (Note 4)	$R_{\theta JA}$（t≤10s）	35	℃/W
	$R_{\theta JA}$（Steady State）	70	℃/W
Maximum Operating Junction Temperature	T_J	150	℃
Storage Temperature Range	T_{STG}	-55 To 150	℃

ELECTRICAL CHARACTERISTICS (T_A=25℃unless otherwise noted)

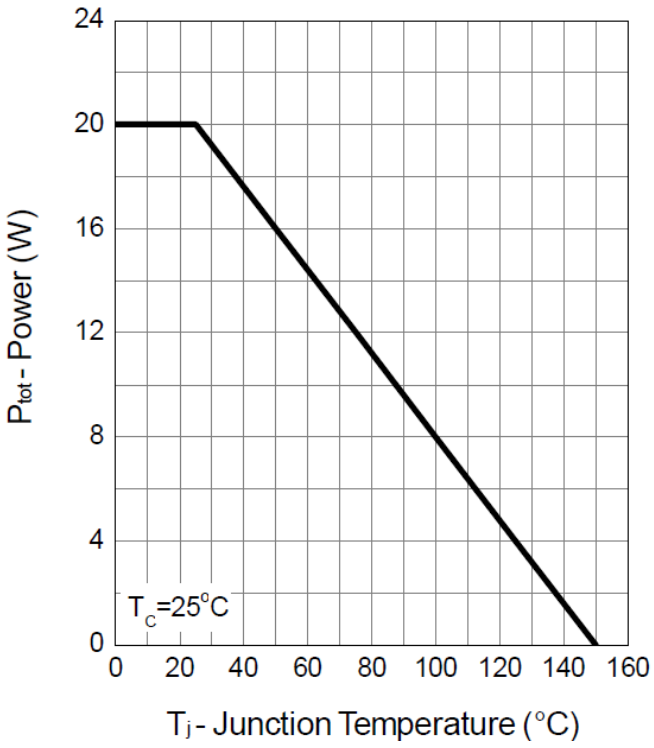
Parameter	Symbol	Condition	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V I_D=250μA	30	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=24V,V_{GS}=0V	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±20V,V_{DS}=0V	-	-	±10	μA
ON CHARACTERISTICS (Note 2)						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=VGS,I_D=250μA	1.4	1.7	2.5	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=4.5V, I_D=8A	-	12.3	17.5	mΩ
		V_{GS}=10V, I_D=10A	-	8.2	10.8	mΩ
DYNAMIC CHARACTERISTICS (Note3)						
Gate Resistance	R_G	V_{DS}=20V,V_{GS}=0V, F=1.0MHz	-	1.4	2.5	Ω
Input Capacitance	C_{iss}	V_{DS}=15V,V_{GS}=0V, F=1.0MHz	-	455	600	PF
Output Capacitance	C_{oss}		-	320	-	PF
Reverse Transfer Capacitance	C_{rss}		-	22	-	PF
SWITCHING CHARACTERISTICS (Note 3)						
Turn-on Delay Time	$t_{d(on)}$	V_{DS}=15V, R_L=15Ω, V_{GEN}=10V,R_G=6Ω	-	8.5	16	nS
Turn-on Rise Time	t_r	I_D=1A	-	10	18	nS
Turn-Off Delay Time	$t_{d(off)}$		-	14	26	nS
Turn-Off Fall Time	t_f		-	10.6	19	nS
Total Gate Charge	Q_g	V_{DS}=10V,I_D=10A,V_{GS}=10V	-	8	12	nC
Gate-Source Charge	Q_{gs}		-	1.6	-	nC
Gate-Drain Charge	Q_{gd}		-	1.2	-	nC
Body Diode Reverse Recovery Time	T_{rr}	I_F=10A, dI/dt=100A/μs	-	20.5	-	nS
Body Diode Reverse Recovery Charge	Q_{rr}		-	7.2	-	nC
DRAIN-SOURCE DIODE CHARACTERISTICS						
Diode Forward Voltage (Note 2)	V_{SD}	V_{GS}=0V,I_S=5A	-	0.8	1.3	V

NOTES:

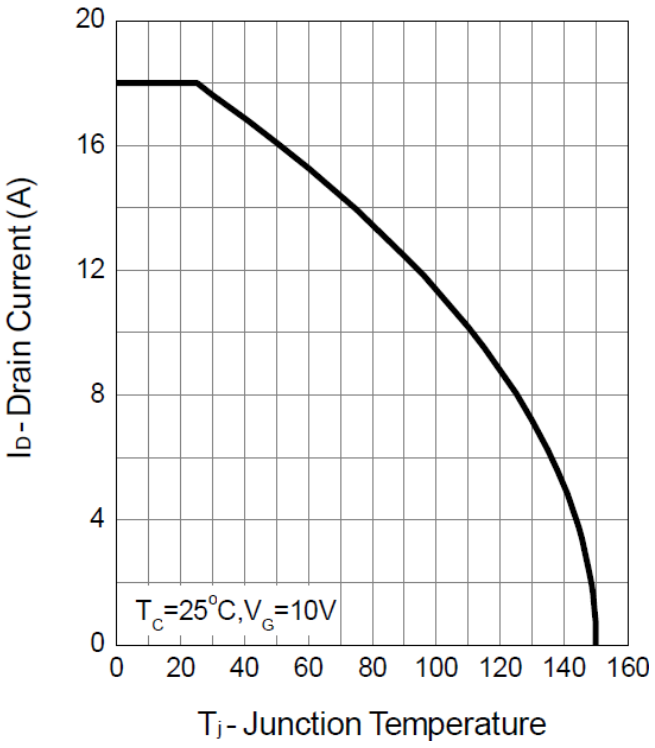
1. Pulse width limited by max. junction temperature.
2. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
3. Guaranteed by design, not subject to production testing
4. $R_{\theta JA}$ steady state t=100s. $R_{\theta JA}$ is measured with the device mounted on 1in2, FR-4 board with 2oz. Copper.

Typical Operating Characteristics

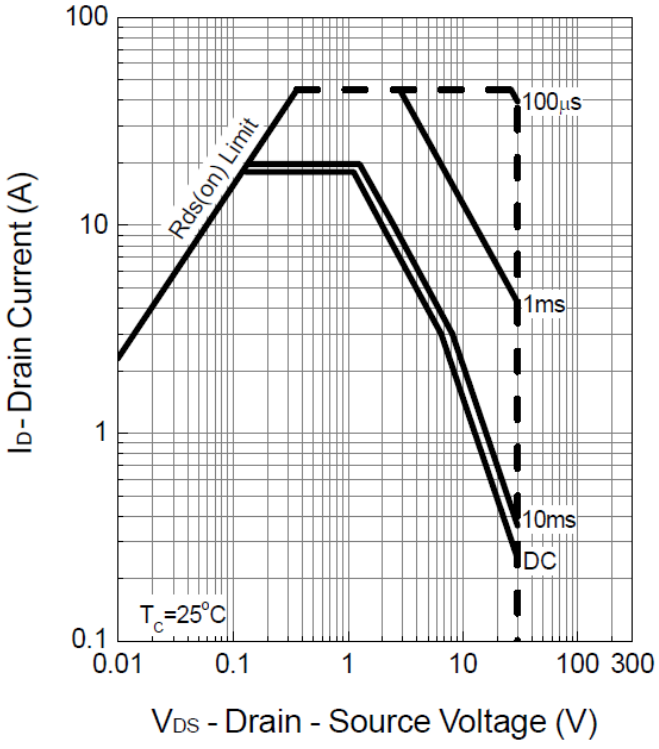
Power Dissipation



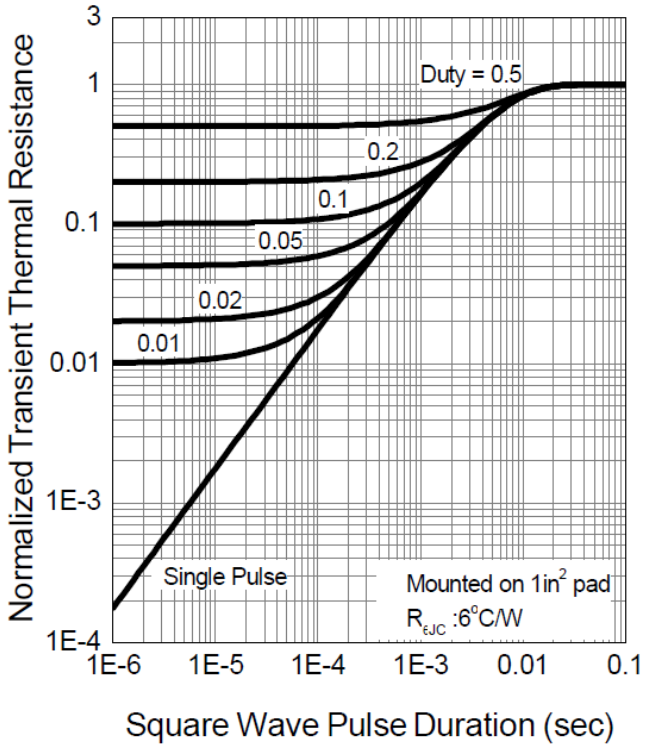
Drain Current



Safe Operation Area

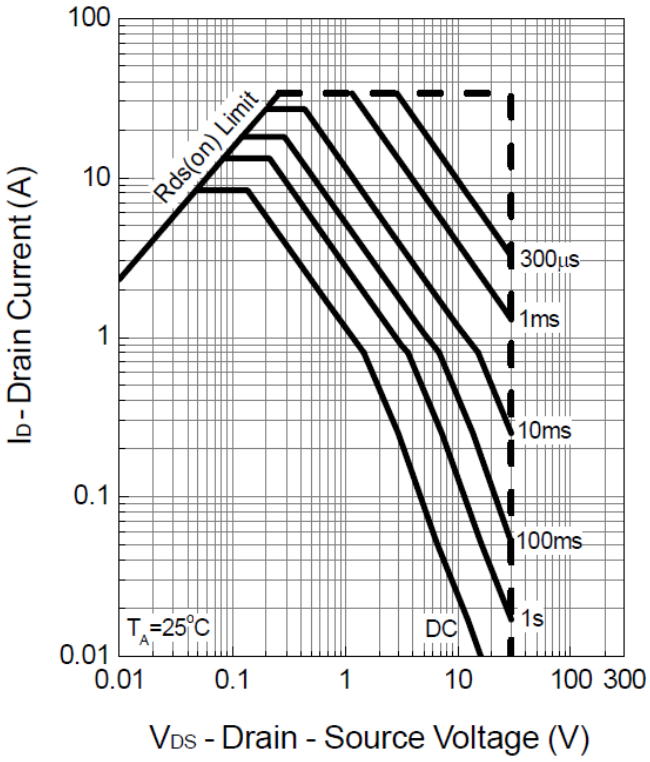


Thermal Transient Impedance

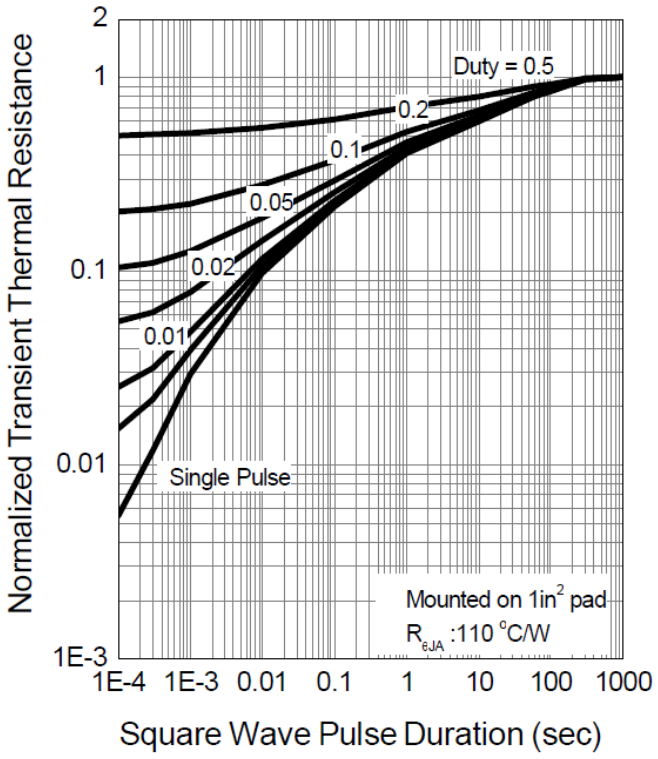


Typical Operating Characteristics(Cont.)

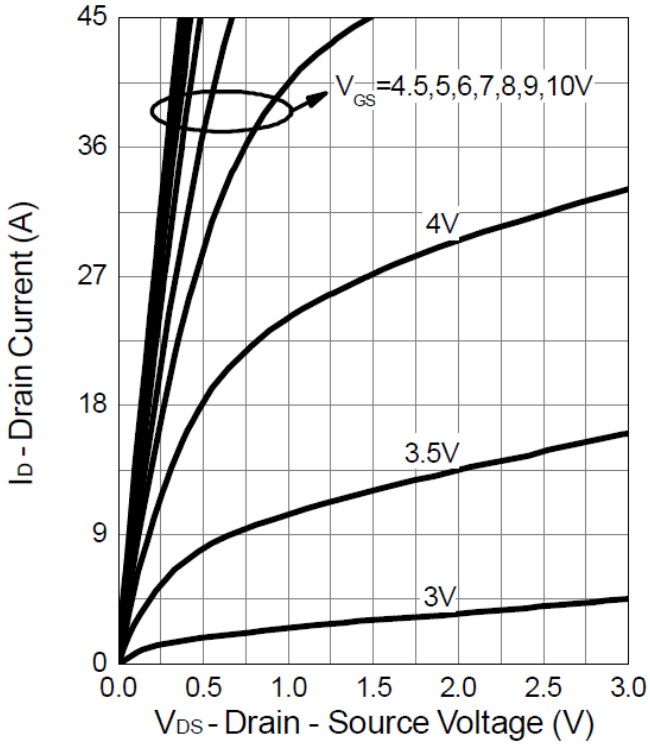
Safe Operation Area



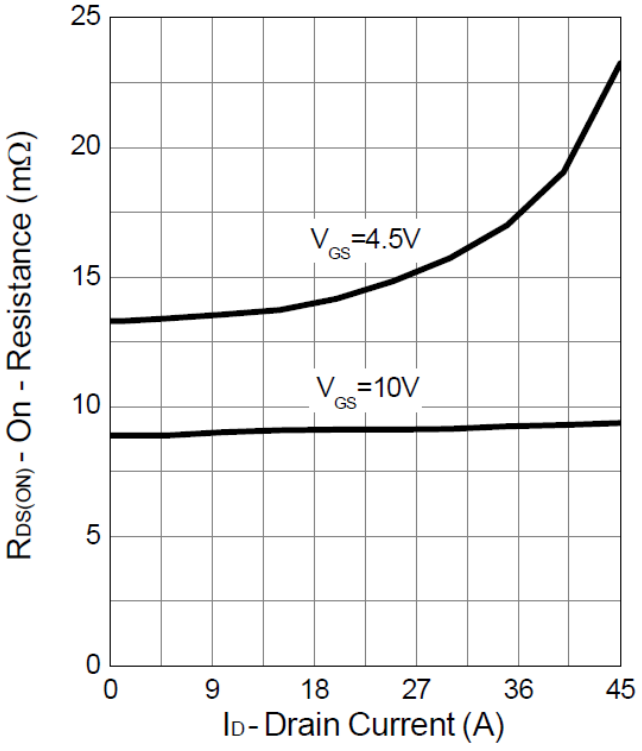
Thermal Transient Impedance



Output Characteristics

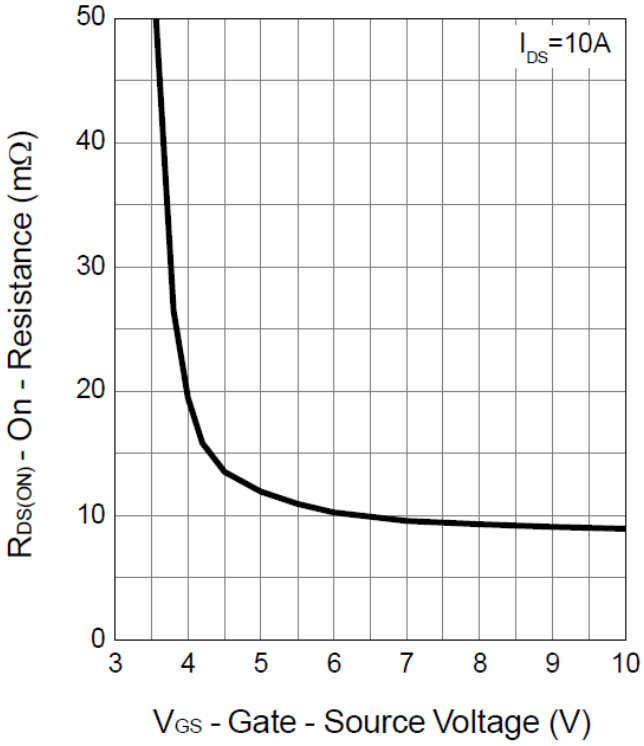


Drain-Source On Resistance

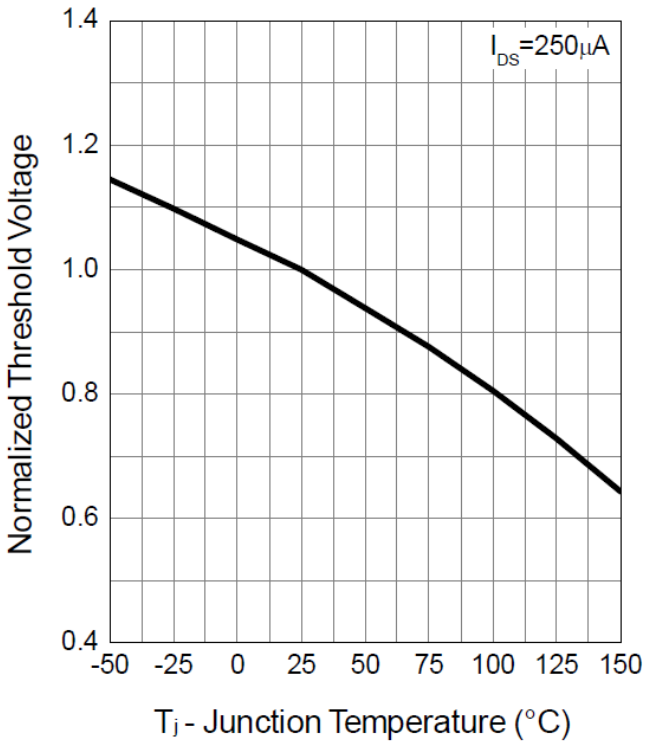


Typical Operating Characteristics(Cont.)

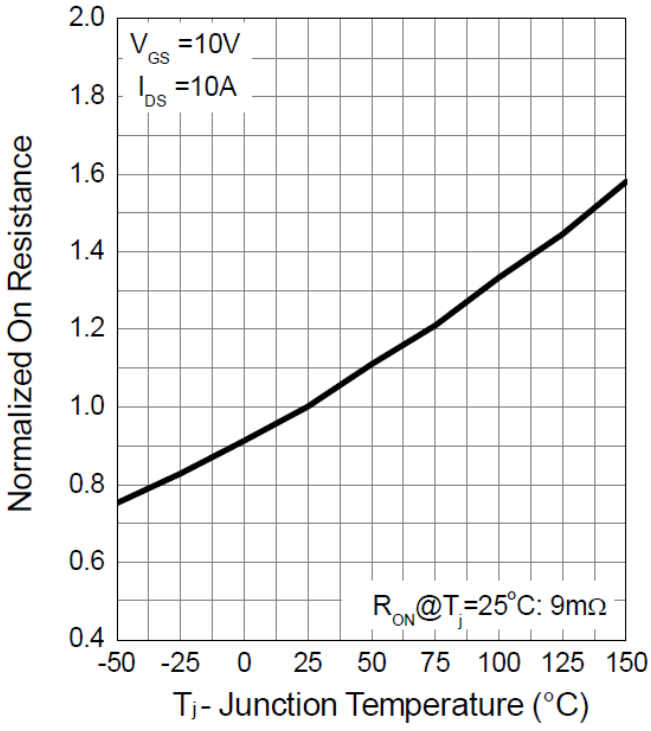
Gate-Source On Resistance



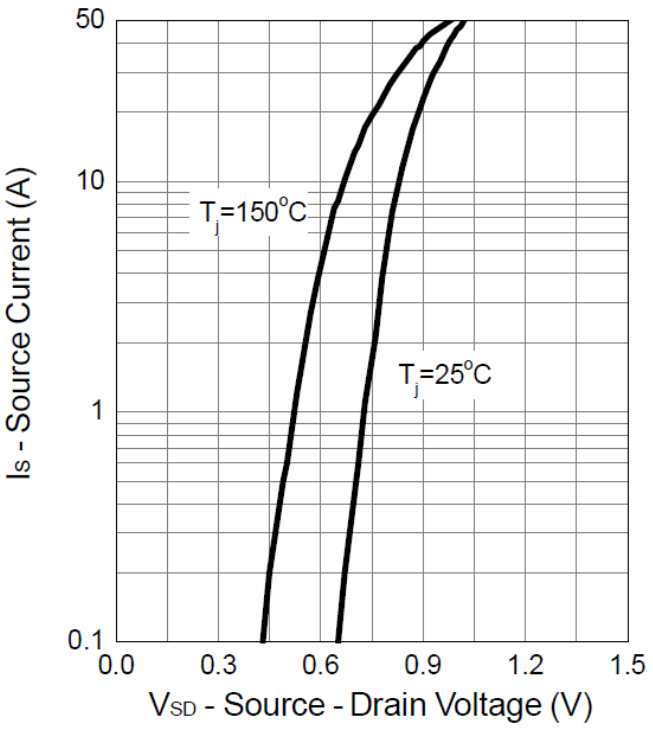
Gate Threshold Voltage



Drain-Source On Resistance

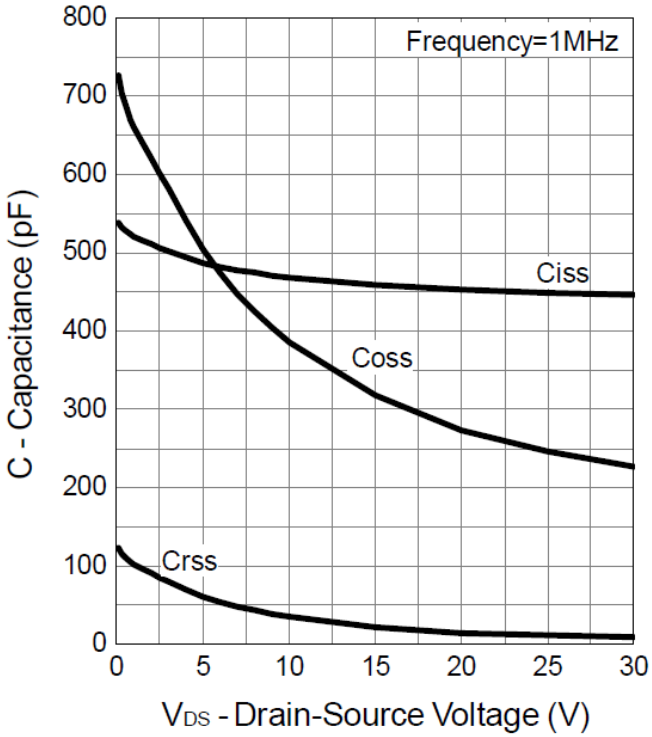


Source-Drain Diode Forward

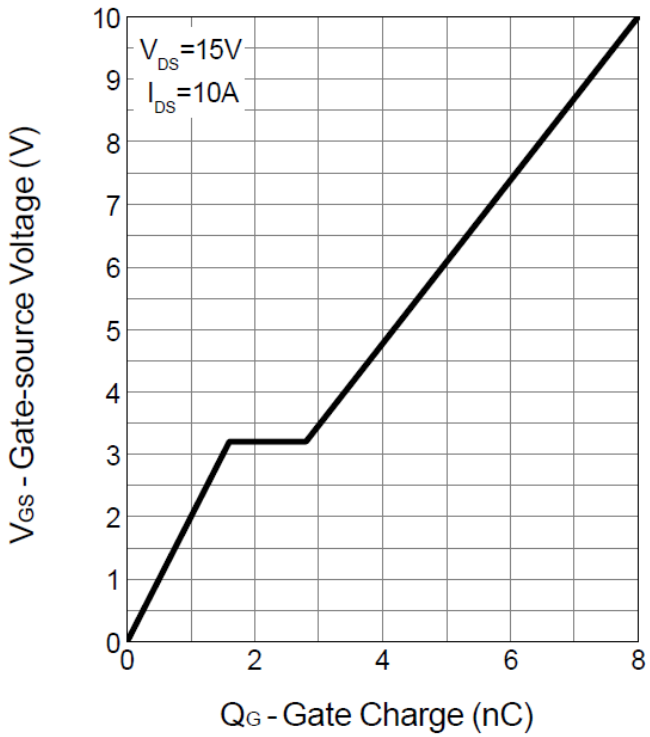


Typical Operating Characteristics(Cont.)

Capacitance

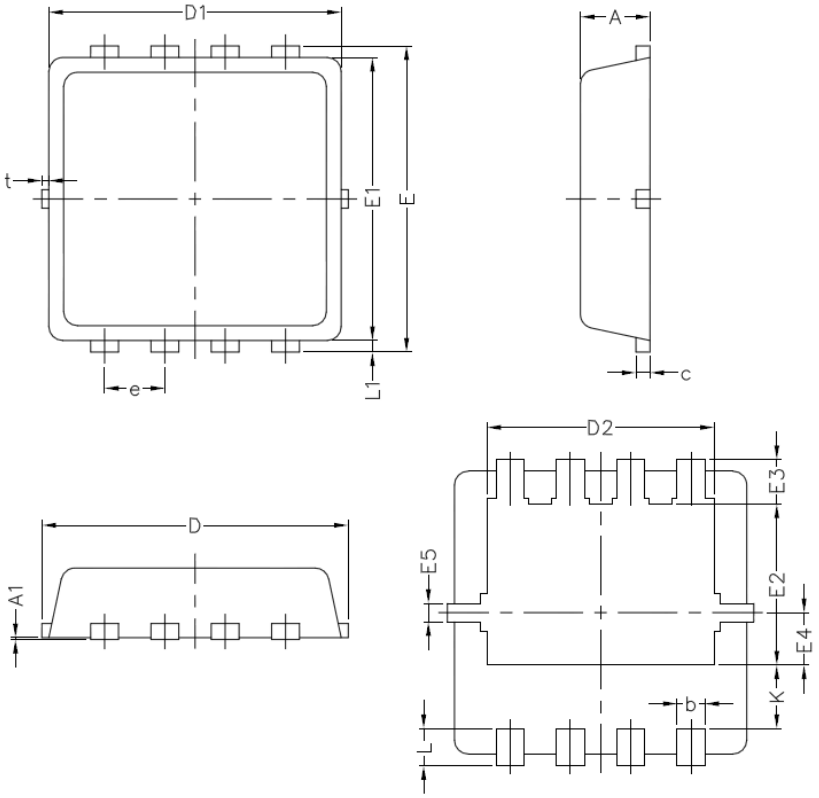


Gate Charge



Package Information

PPAK-3*3-8 Package



Symbol	PPAK-3*3-8(mm)		
	Min	Nom	Max
A	0.70	0.75	0.85
A1	/	/	0.05
b	0.20	0.30	0.40
c	0.10	0.152	0.25
D	3.15	3.3	3.45
D1	3.00	3.15	3.30
D2	2.25	2.45	2.65
E	3.15	3.30	3.45
E1	2.90	3.05	3.20
E2	1.54	1.74	1.94
E3	0.28	0.48	0.68
E4	0.37	0.57	0.77
E5	0.10	0.20	0.30
e	0.60	0.65	0.70
K	0.49	0.69	0.89
L	0.30	0.40	0.50
L1	0.06	0.125	0.20
t	/	/	0.13

Design Notes