

P-Channel Enhancement Mode MOSFET

TDM3307

DESCRIPTION

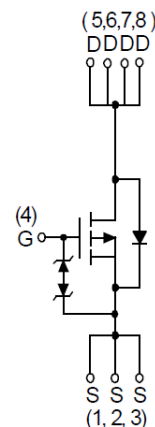
The TDM3307 uses advanced trench technology to provide excellent RDS(ON) and low gate charge. This device is suitable for use as a load switch or in PWM applications.

GENERAL FEATURES

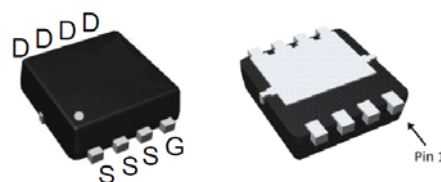
- -30V/-50A
- RDS(ON) < 16mΩ @ VGS=-4.5V
RDS(ON) < 9.5mΩ @ VGS=-10V
- Reliable and Rugged
- HBM ESD capability level of 8KV typical
- Lead free product is available
- DFN3*3-8 Package

Application

- PWM applications
- Load switch
- Power management



P-Channel MOSFET



PPAK-3*3-8

ABSOLUTE MAXIMUM RATINGS(TA=25°C unless otherwise noted)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V _{DS}	-30	V
Gate-Source Voltage	V _{GS}	±25	V
Diode Continuous Forward Current	I _S (T _C =25°C)	-20	A
Continuous Drain Current	I _D (T _C =25°C)	-50	A
	I _D (T _C =100°C)	-31	A
Pulsed Drain Current	I _{DM} T _C =25°C)	-200	A
Maximum Power Dissipation (note1)	P _D (T _C =25°C)	35.7	W
	P _D (T _C =100°C)	14.3	W
Continuous Drain Current	I _D (T _A =25°C)	-17.1	A
	I _D (T _A =70°C)	-13.7	A
Maximum Power Dissipation (note1)	P _D (T _A =25°C)	4.2	W
	P _D (T _A =70°C)	2.7	W
Maximum Junction Temperature	T _J	150	°C
Storage Temperature Range	T _{STG}	-55 to 150	°C
Thermal Resistance-Junction to Ambient (note1)	RθJA(t≤10s)	30	°C/W
	RθJA(Steady State)	75	°C/W
Thermal Resistance-Junction to Case (note2)	RθJC(Steady State)	3.5	°C/W

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

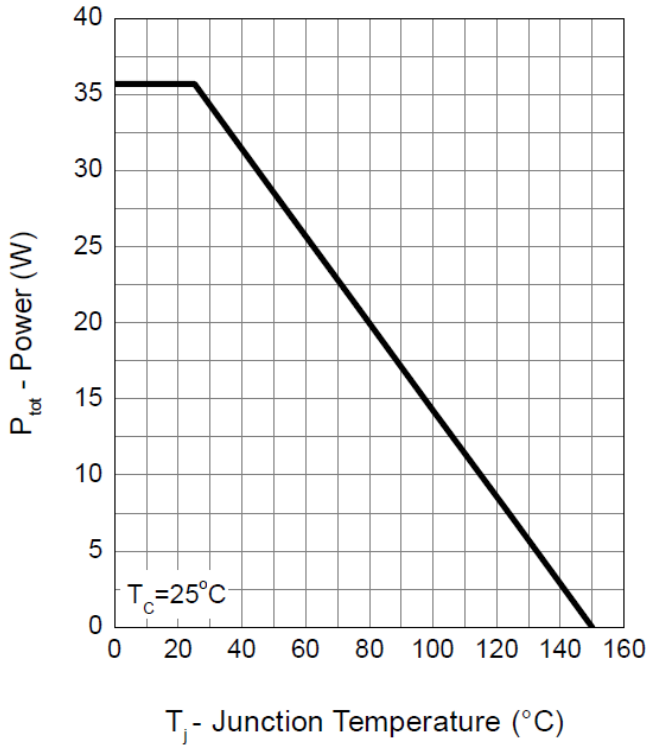
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
STATIC CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=-250\mu A$	-30	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=-24, V_{GS}=0V$	-	-	-1	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 10	μA
ON CHARACTERISTICS (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-1.3	-1.8	-2.3	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=-4.5V, I_{DS}=-10A$	-	12	16	m Ω
		$V_{GS}=-10V, I_{DS}=-17.6A$	-	7.5	9.5	m Ω
DYNAMIC CHARACTERISTICS (Note 4)						
Gate Resistance	R_g	$V_{GS}=0V, V_{DS}=0V, F=1MHz$	-	8	-	Ω
Input Capacitance	C_{iss}	$V_{DS}=-15V, V_{GS}=0V, F=1.0MHz$	-	2110	-	PF
Output Capacitance	C_{oss}		-	450	-	PF
Reverse Transfer Capacitance	C_{rss}		-	330	-	PF
SWITCHING CHARACTERISTICS (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=-15V, R_L=15\Omega, V_{GEN}=-10V, R_G=6\Omega, I_{DS}=-1A$	-	12	-	nS
Turn-on Rise Time	t_r		-	14	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	98	-	nS
Turn-Off Fall Time	t_f		-	60	-	nS
Total Gate Charge	Q_g	$V_{DS}=-15V, I_{DS}=-17.1A, V_{GS}=-10V$	-	45	-	nC
Gate-Source Charge	Q_{gs}		-	5	-	nC
Gate-Drain Charge	Q_{gd}		-	12.7	-	nC
Body Diode Reverse Recovery Time	T_{rr}	$I_{DS}=-17.6A, di/dt=100A/\mu s$	-	24	-	nS
Body Diode Reverse Recovery Charge	Q_{rr}		-	16	-	nC
DRAIN-SOURCE DIODE CHARACTERISTICS						
Diode Forward Voltage (Note 3)	V_{SD}	$V_{GS}=0V, I_{SD}=-1A$	-	-0.7	-1	V

NOTES:

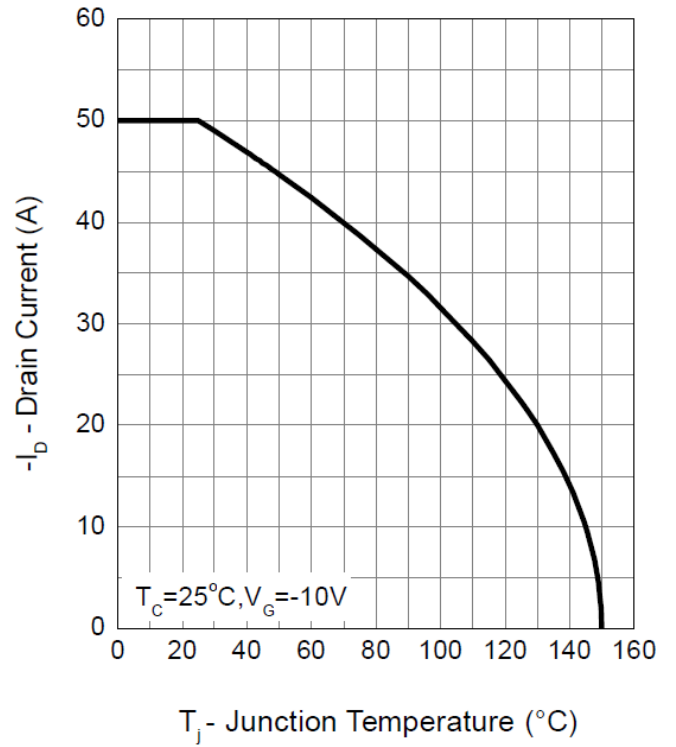
- Surface Mounted on 1in^2 pad area, $t_s \leq 10\text{sec}$. $R_{\theta JA}$ steady state $t = 999s$.
- The power dissipation P_D is based on $T_{J(MAX)} = 150^{\circ}\text{C}$, and it is useful for reducing junction-to-case thermal resistance ($R_{\theta JC}$) when additional heat sink is used.
- Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
- Guaranteed by design, not subject to production testing

Typical Operating Characteristics

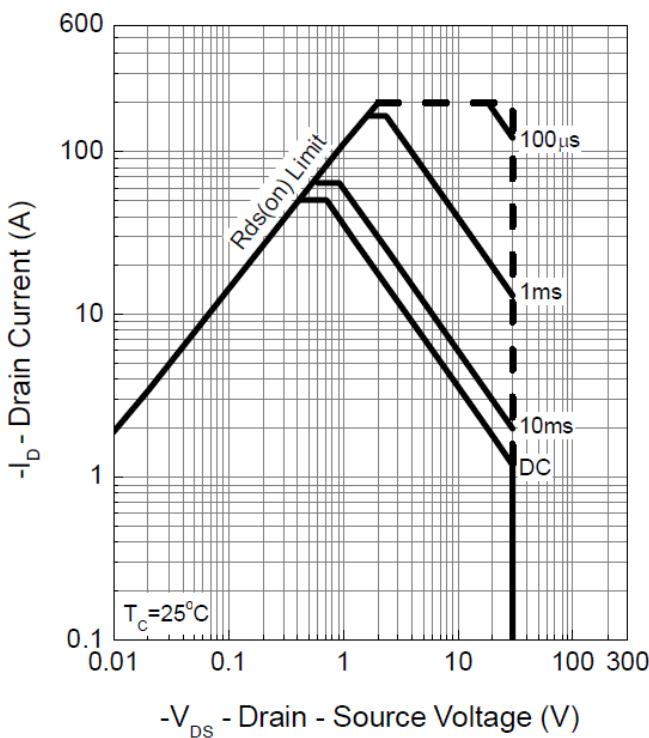
Power Dissipation



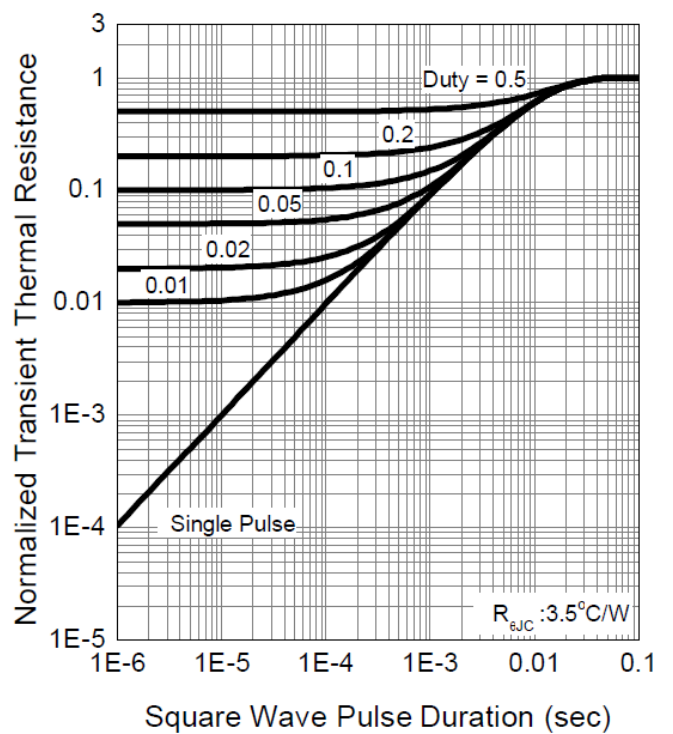
Drain Current



Safe Operation Area



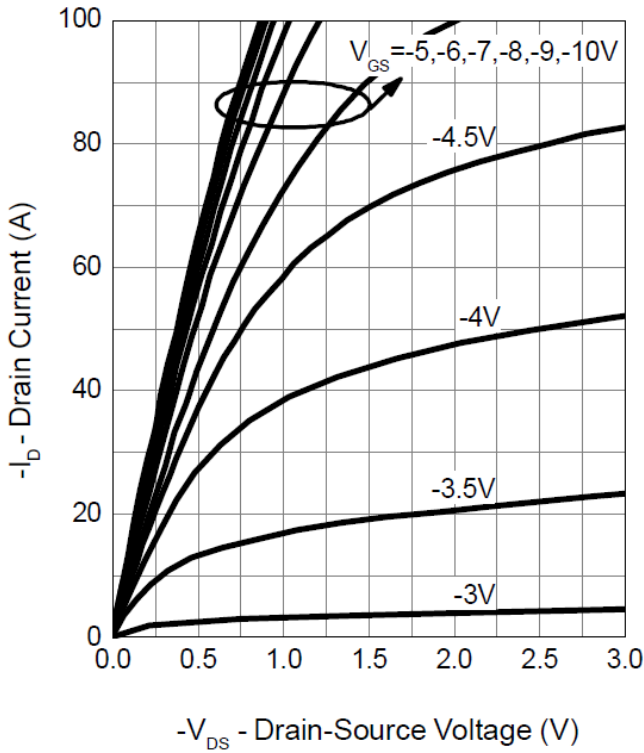
Thermal Transient Impedance



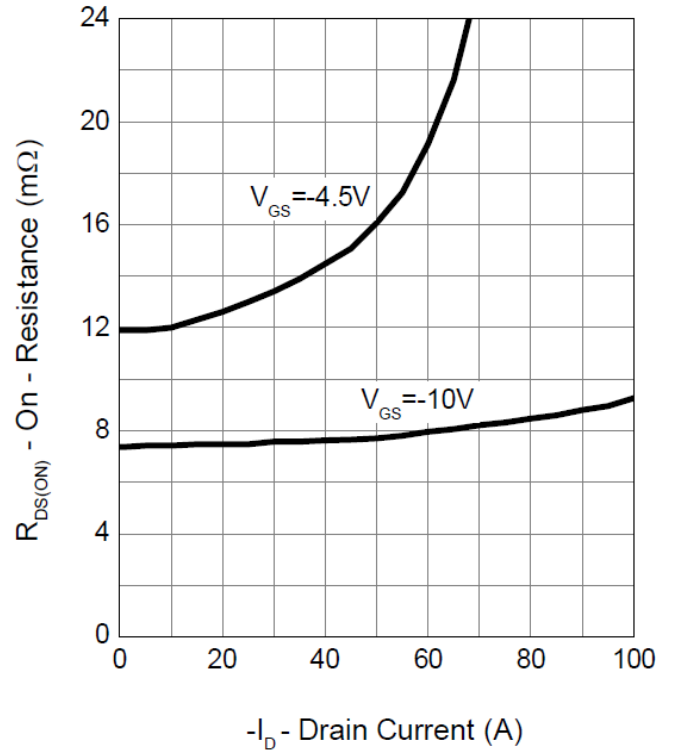
P-Channel Enhancement Mode MOSFET TDM3307

Typical Operating Characteristics(Cont.)

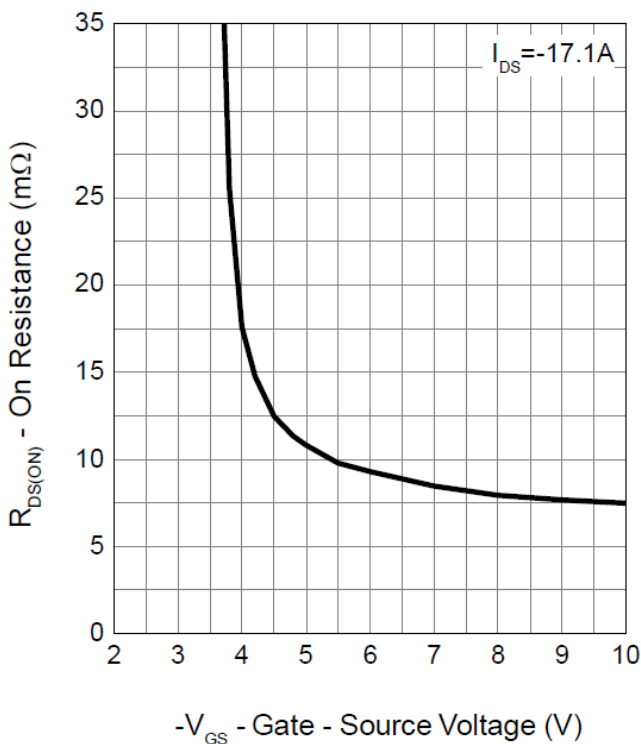
Output Characteristics



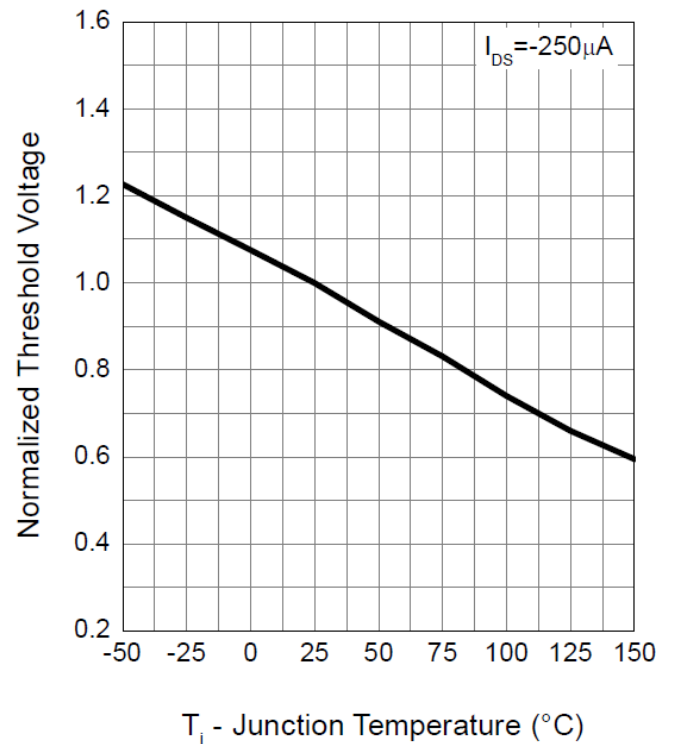
Drain-Source On Resistance



Gate-Source On Resistance

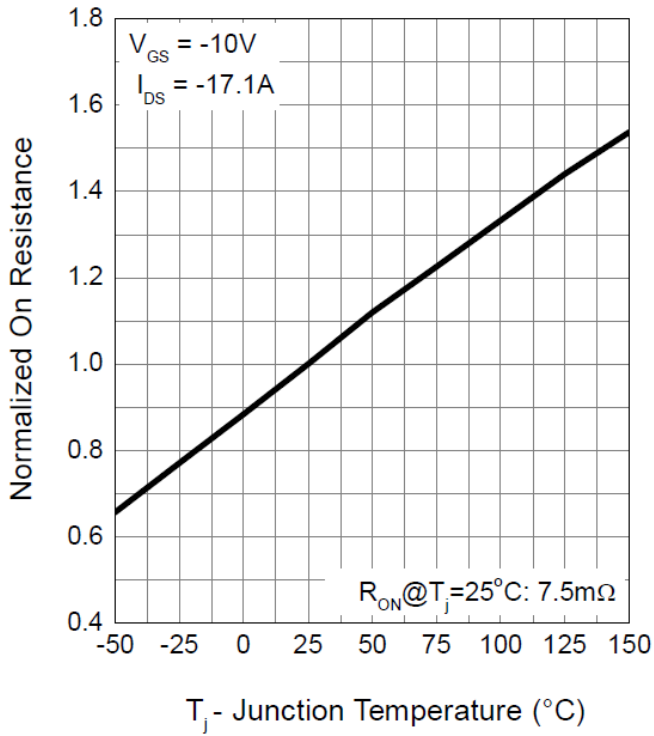


Gate Threshold Voltage

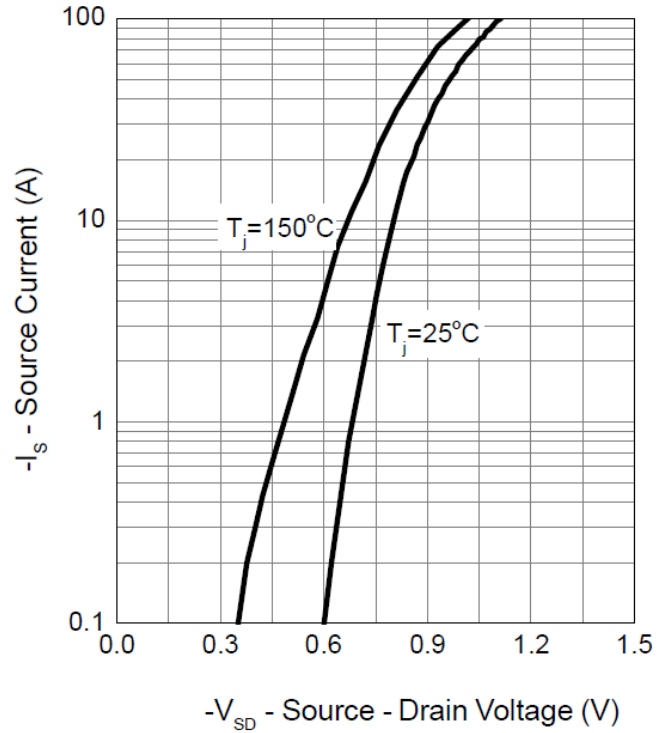


Typical Operating Characteristics (Cont.)

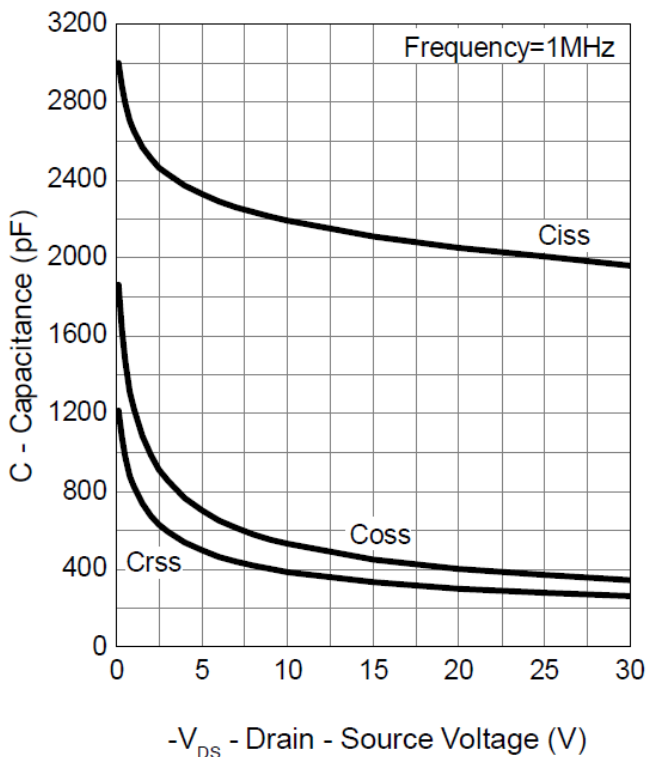
Drain-Source On Resistance



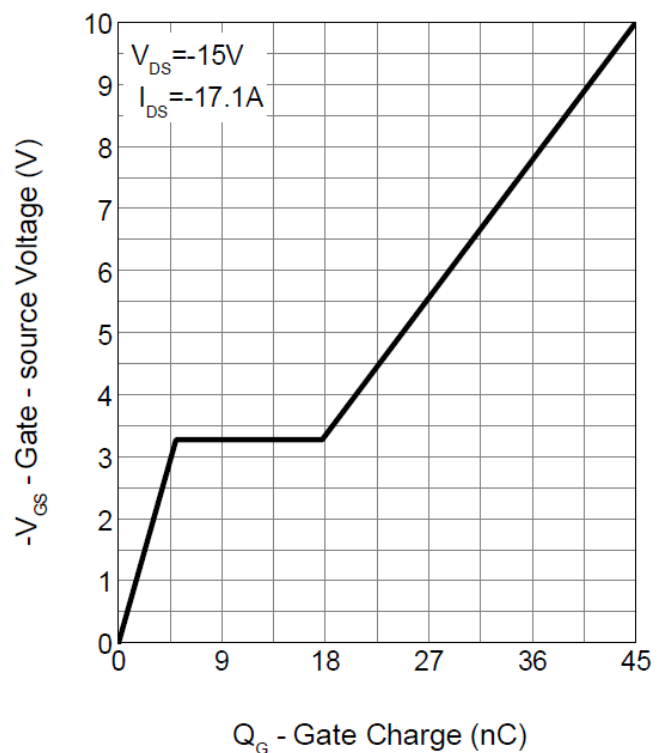
Source-Drain Diode Forward



Capacitance

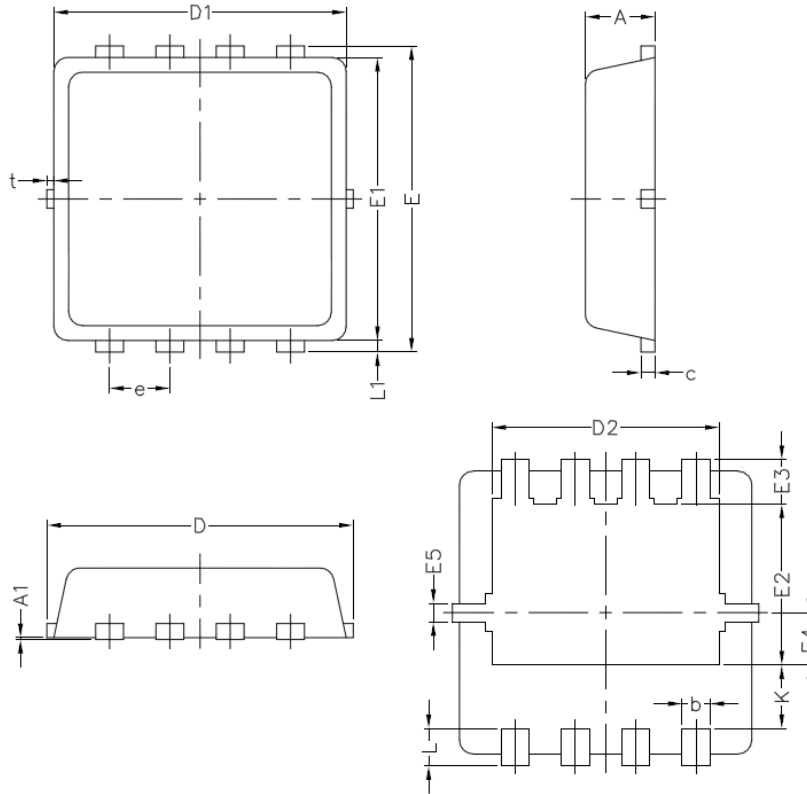


Gate Charge



Package Information

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