

P-Channel Enhancement Mode MOSFET

TDM3419

DESCRIPTION

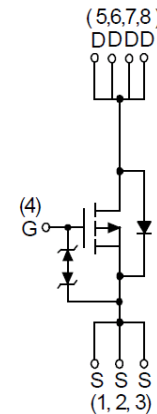
The TDM3419 uses advanced trench technology to provide excellent RDS(ON) and low gate charge. This device is suitable for use as a load switch or in PWM applications.

GENERAL FEATURES

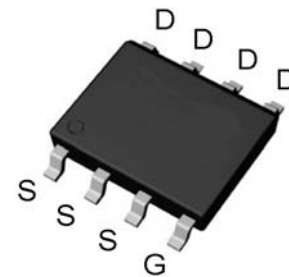
- RDS(ON) < 13mΩ @ VGS=-4.5V
RDS(ON) < 7.5mΩ @ VGS=-10V
- Reliable and Rugged
- HBM ESD capability level of 8KV typical
- Lead free product is available
- SOP-8 Package

Application

- PWM applications
- Load switch
- Power management



P-Channel MOSFET



Top View of SOP-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)	-31	A
Continuous Drain Current	I _D (T _A =25°C)	-19	A
	I _D (T _A =70°C)	-16	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)	35	°C/W
	RθJA(Steady State)	70	°C/W

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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	$R_{DS(ON)}$	$V_{GS}=-4.5V, I_{DS}=-10A$	-	9	13	$m\Omega$
		$V_{GS}=-10V, I_{DS}=-20A$	-	6	7.5	$m\Omega$
DYNAMIC CHARACTERISTICS (Note 4)						
Gate Resistance	R_g	$V_{GS}=0V, V_{DS}=0V, F=1MHz$	-	3	6	Ω
Input Capacitance	C_{iss}	$V_{DS}=-15V, V_{GS}=0V, F=1.0MHz$	-	2895	3760	PF
Output Capacitance	C_{oss}		-	630	-	PF
Reverse Transfer Capacitance	C_{rss}		-	515	-	PF
SWITCHING CHARACTERISTICS (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=-15V, R_L=15\Omega, V_{GEN}=-10V, R_G=6\Omega, I_{DS}=-1A$	-	16	27	nS
Turn-on Rise Time	t_r		-	13	24	nS
Turn-Off Delay Time	$t_{d(off)}$		-	58	105	nS
Turn-Off Fall Time	t_f		-	23	42	nS
Total Gate Charge	Q_g	$V_{DS}=-15V, I_{DS}=-17.1A, V_{GS}=-10V$	-	62	-	nC
Gate-Source Charge	Q_{gs}		-	7.2	-	nC
Gate-Drain Charge	Q_{gd}		-	19	-	nC
Body Diode Reverse Recovery Time	T_{rr}	$I_{DS}=-20A, di/dt=100A/\mu s$	-	32	-	nS
Body Diode Reverse Recovery Charge	Q_{rr}		-	17	-	nC
DRAIN-SOURCE DIODE CHARACTERISTICS						
Diode Forward Voltage (Note 3)	V_{SD}	$V_{GS}=0V, I_{SD}=-1A$	-	-0.7	-1	V

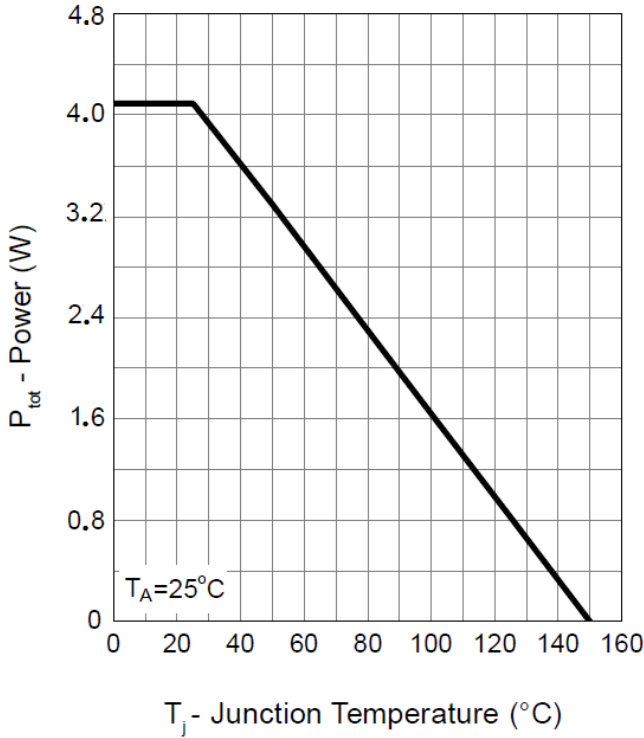
NOTES:

- Surface Mounted on $1in^2$ pad area, $t_s \leq 10sec$. $R_{\theta JA}$ steady state $t = 999s$.
- The power dissipation P_D is based on $T_{J(MAX)} = 150^{\circ}C$, 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

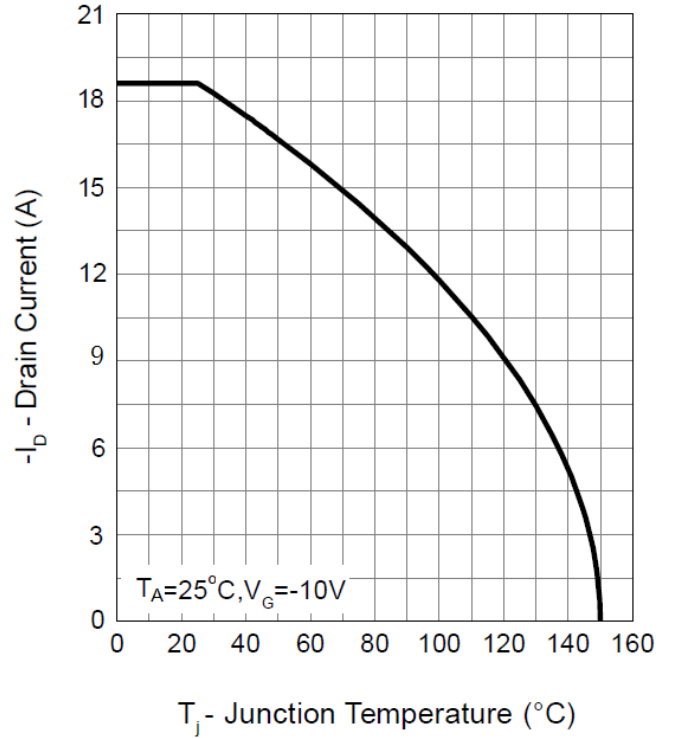
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Typical Operating Characteristics

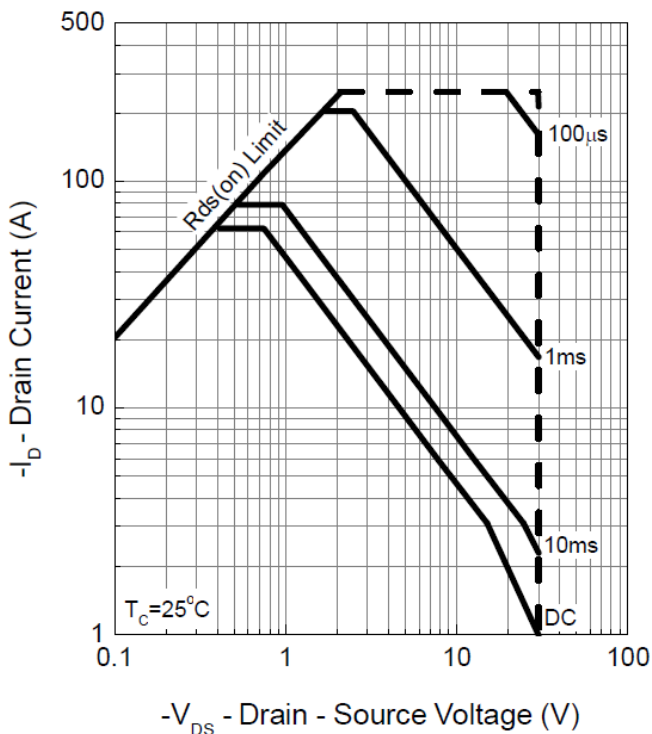
Power Dissipation



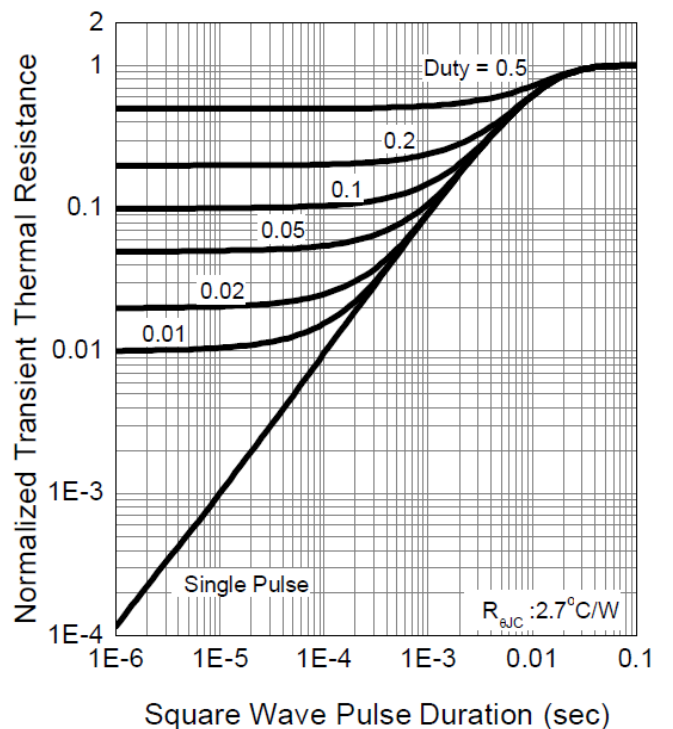
Drain Current



Safe Operation Area



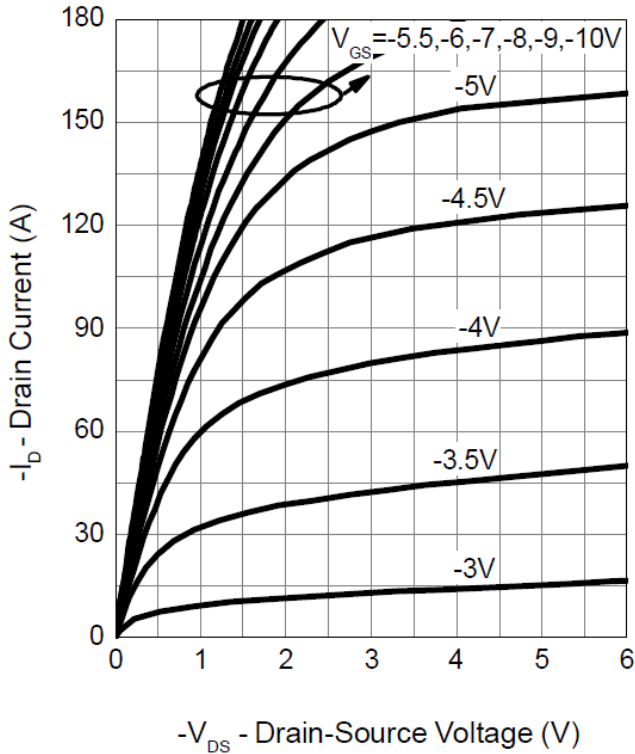
Thermal Transient Impedance



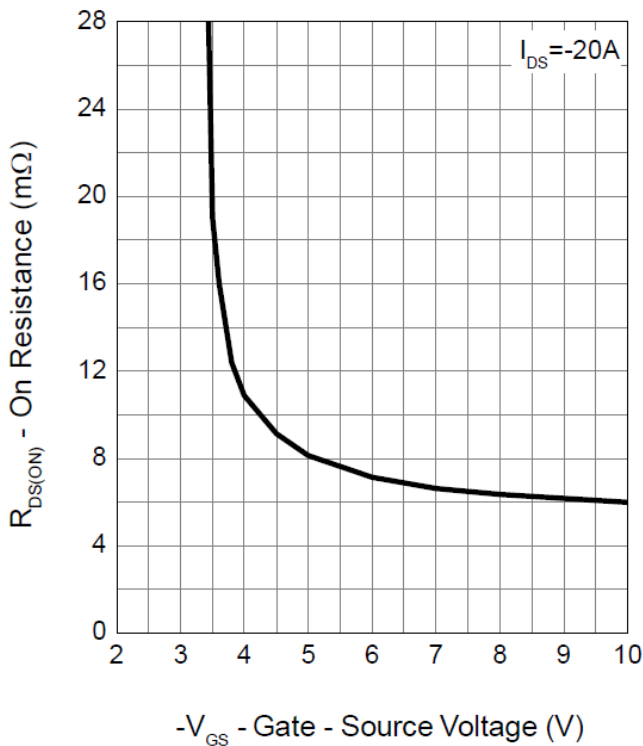
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Typical Operating Characteristics(Cont.)

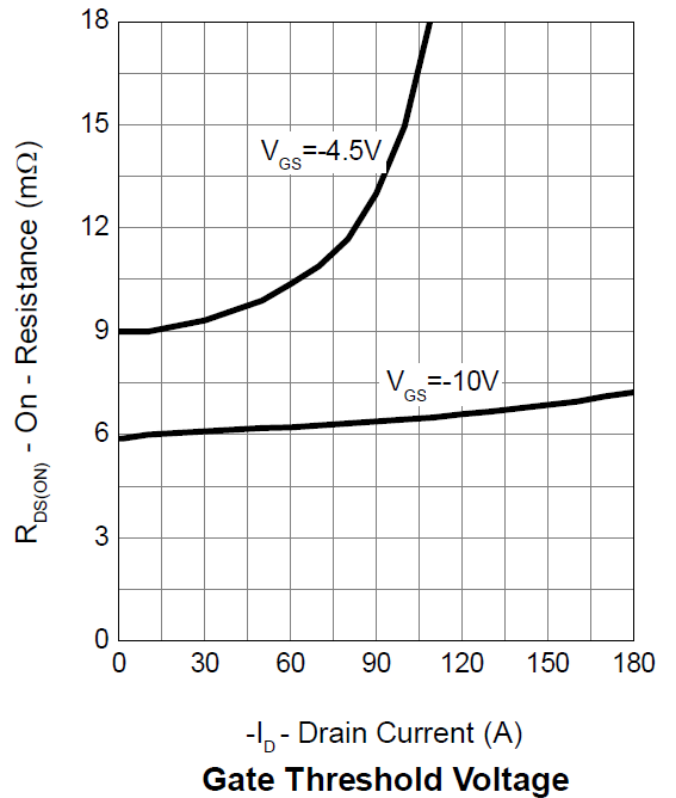
Output Characteristics



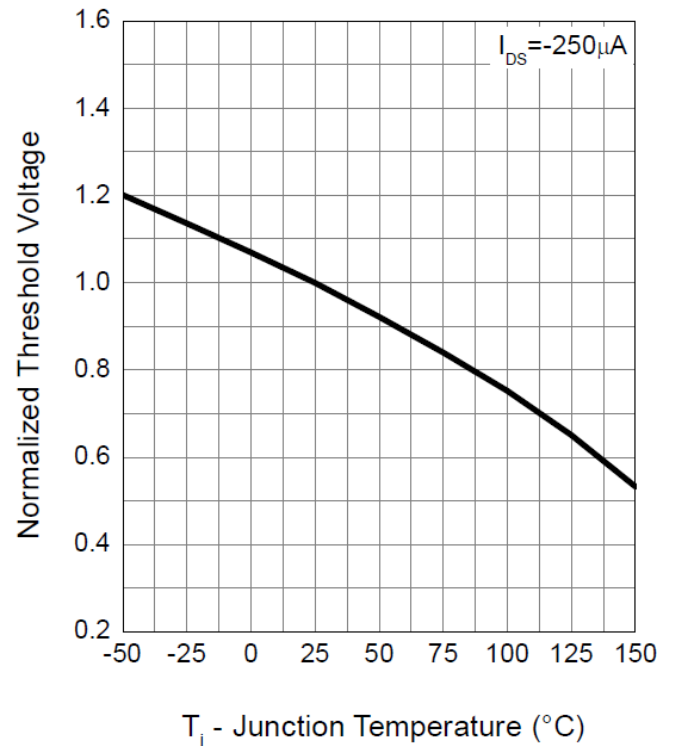
Gate-Source On Resistance



Drain-Source On Resistance



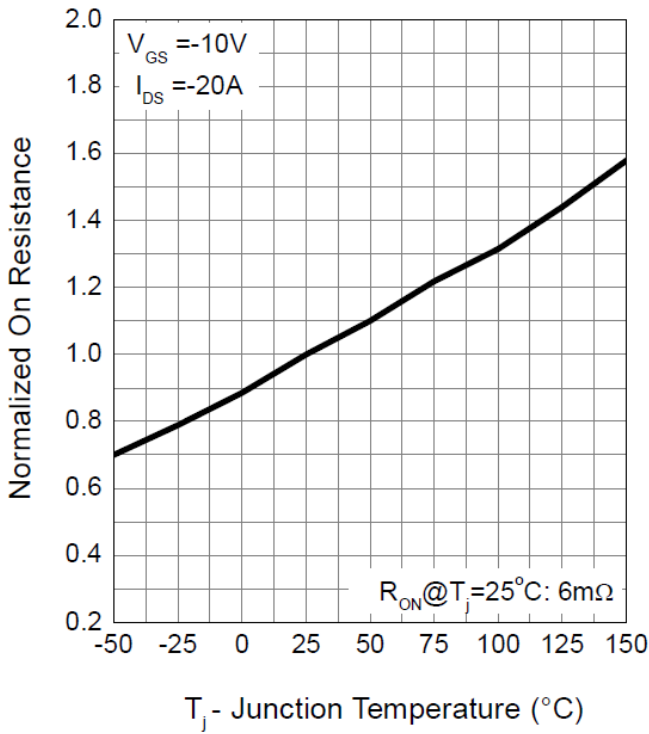
Gate Threshold Voltage



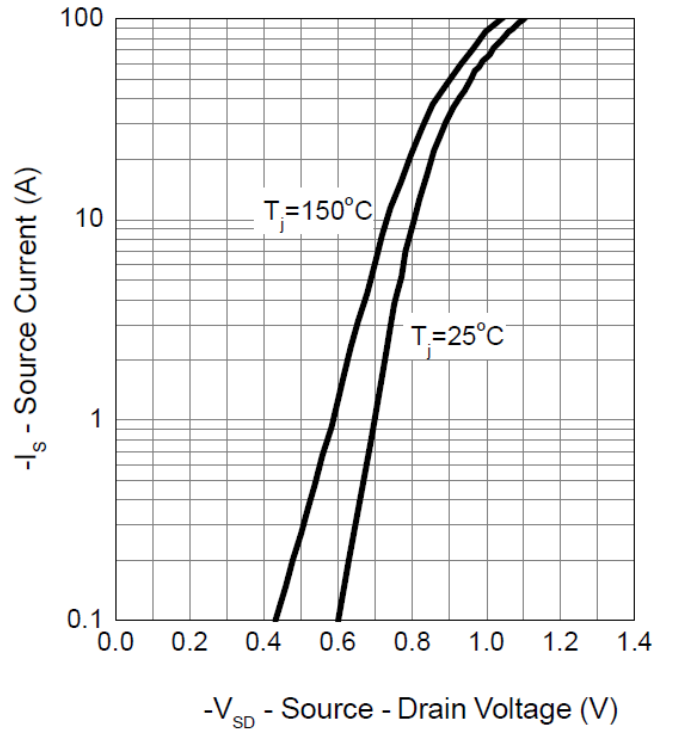
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Typical Operating Characteristics (Cont.)

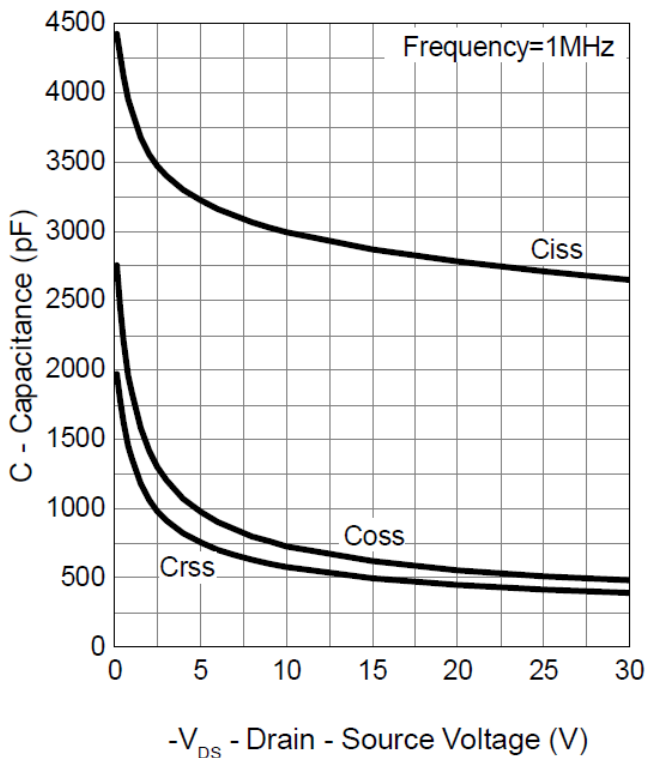
Drain-Source On Resistance



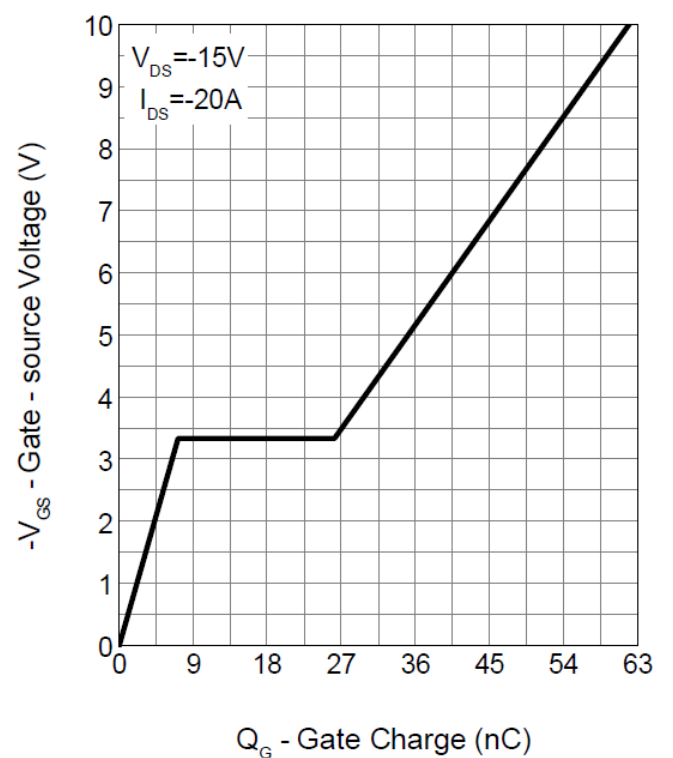
Source-Drain Diode Forward



Capacitance

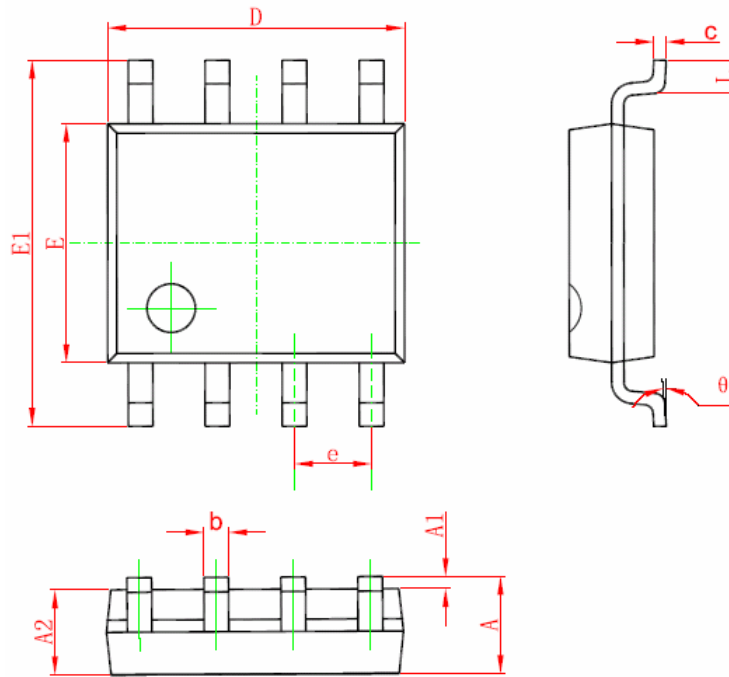


Gate Charge



Package Information

SOP-8 Package



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270 (BSC)		0.050 (BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°

Design Notes