

N-Channel Enhancement Mode MOSFET

TDM31530

**DESCRIPTION**

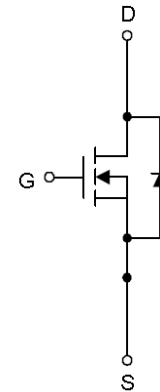
The TDM31530 uses advanced trench technology to provide excellent RDS(ON) and low gate charge. This device is suitable for use as a load switch or in PWM applications.

**GENERAL FEATURES**

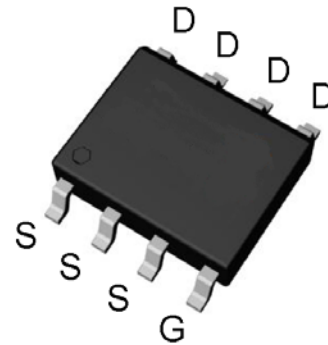
- RDS(ON) < 70mΩ @ VGS=10V
- High Power and current handling capability
- Lead free product is available
- SOP-8 Package

**Application**

- PWM applications
- Load switch
- Power management
- Hard Switched and High Frequency Circuits



N-Channel MOSFET



ABSOLUTE MAXIMUM RATINGS(T<sub>A</sub>=25°C unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V <sub>DS</sub>	150	V
Gate-Source Voltage	V <sub>GS</sub>	±25	V
Drain Current @ Continuous	I <sub>D</sub> (T <sub>A</sub> =25°C)	3.8	A
	I <sub>D</sub> (T <sub>A</sub> =70°C)	3.0	A
Drain Current @ Current-Pulsed (Note 1)	I <sub>DM</sub> (T <sub>C</sub> =25°C)	60	A
Maximum Power Dissipation (T <sub>A</sub> =25°C)	P <sub>D</sub>	2	W
Maximum Operating Junction Temperature	T <sub>J</sub>	150	°C
Storage Temperature Range	T <sub>STG</sub>	-55 To 150	°C
Avalanche Energy, Single pulse(L=0.5mH)	E <sub>AS</sub>	9	mJ

THERMAL CHARACTERISTICS

Thermal Resistance,Junction-to-Ambient (Note 1)	R <sub>θJA</sub>	70	°C/W
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**ELECTRICAL CHARACTERISTICS** ( $T_A=25^{\circ}\text{C}$  unless otherwise noted)

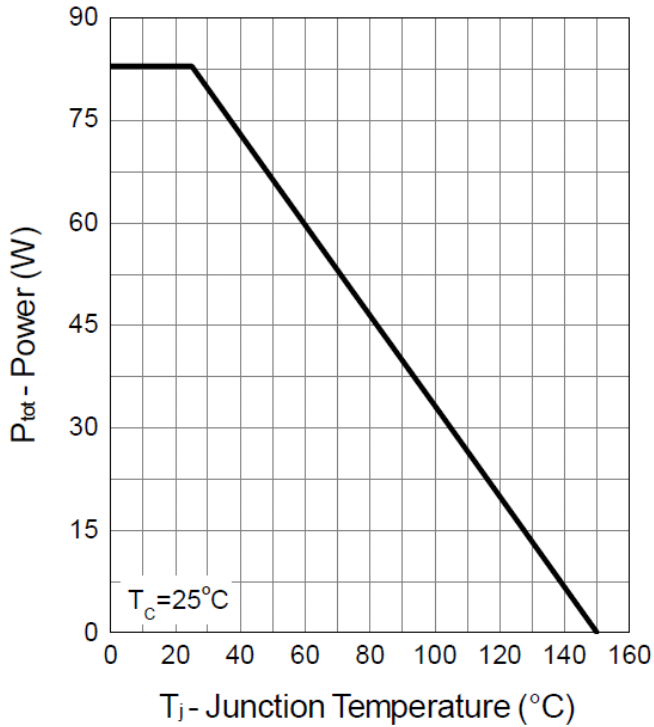
Parameter	Symbol	Condition	Min	Typ	Max	Unit
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A$	150			V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=120V, V_{GS}=0V$			1	$\mu A$
Gate-Body Leakage Current	$I_{GSS}$	$V_{GS}=\pm 25V, V_{DS}=0V$			$\pm 100$	nA
<b>ON CHARACTERISTICS</b> (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	$R_{DS(ON)}$	$V_{GS}=10V, I_D=10A$		58	70	m $\Omega$
<b>DYNAMIC CHARACTERISTICS</b> (Note3)						
Input Capacitance	$C_{iss}$	$V_{DS}=30V, V_{GS}=0V, F=1.0\text{MHz}$		1320	1720	PF
Output Capacitance	$C_{oss}$			100		PF
Reverse Transfer Capacitance	$C_{rss}$			26		PF
<b>SWITCHING CHARACTERISTICS</b> (Note 3)						
Turn-on Delay Time	$t_{d(on)}$	$V_{DS}=30V, R_L=30\Omega, V_{GEN}=10V, R_G=6\Omega, I_D=1A$		17	31	nS
Turn-on Rise Time	$t_r$			6	11	nS
Turn-Off Delay Time	$t_{d(off)}$			27	49	nS
Turn-Off Fall Time	$t_f$			10	18	nS
Total Gate Charge	$Q_g$	$V_{DS}=75V, I_D=10A, V_{GS}=10V$		22	31	nC
Gate-Source Charge	$Q_{gs}$			8		nC
Gate-Drain Charge	$Q_{gd}$			4.5		nC
Body Diode Reverse Recovery Time	$T_{rr}$	$I_F=10A, di/dt=100A/\mu s$		55		nS
Body Diode Reverse Recovery Charge	$Q_{rr}$			150		nC
<b>DRAIN-SOURCE DIODE CHARACTERISTICS</b>						
Diode Forward Voltage (Note 2)	$V_{SD}$	$V_{GS}=0V, I_S=5A$		0.8	1.3	V

**NOTES:**

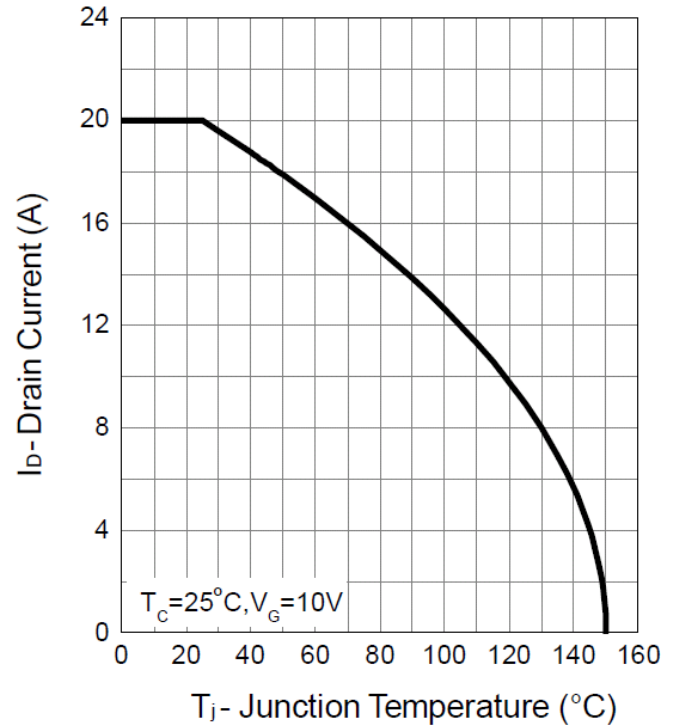
1. Pulse width limited by max. junction temperature.
2. Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$ .
3. Guaranteed by design, not subject to production testing

Typical Operating Characteristics

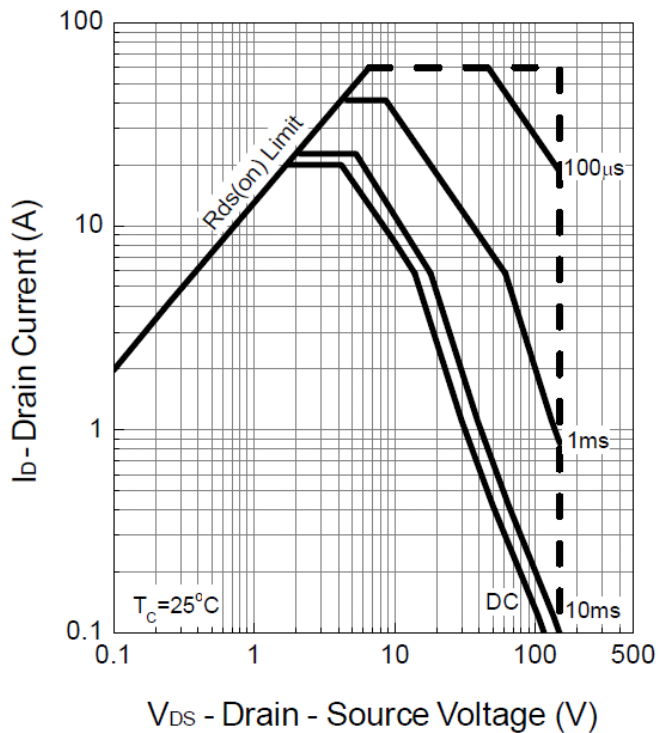
Power Dissipation



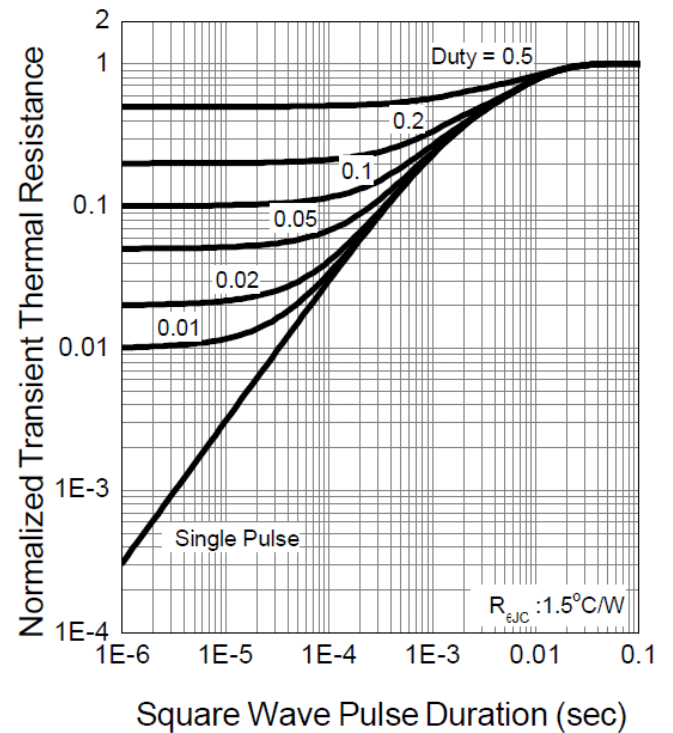
Drain Current



Safe Operation Area

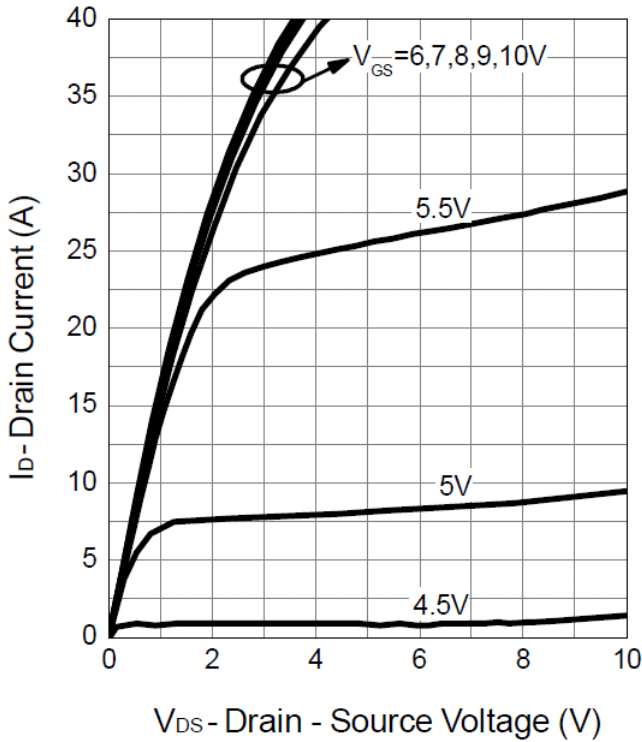


Thermal Transient Impedance

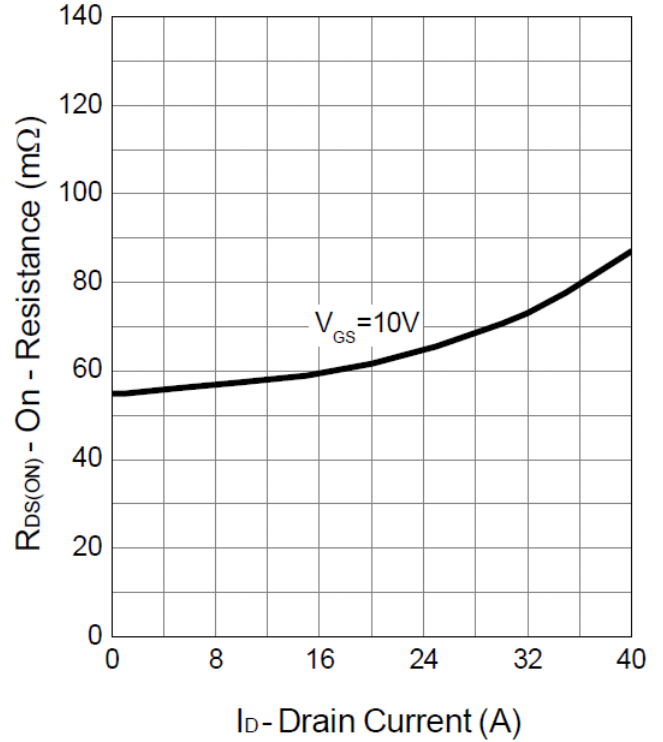


Typical Operating Characteristics (Cont.)

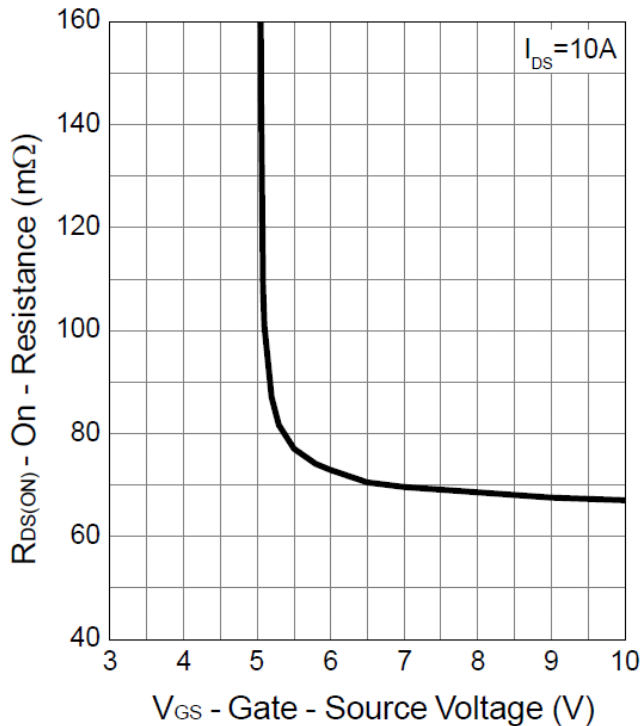
Output Characteristics



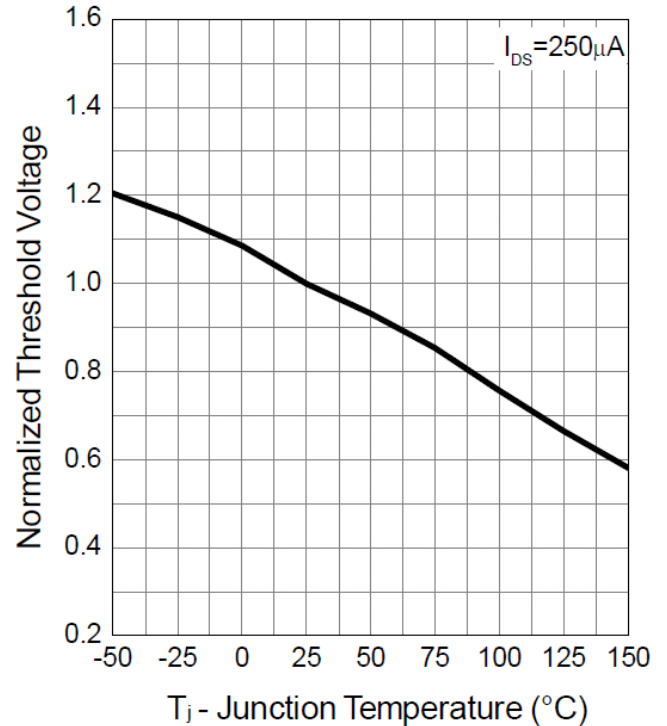
Drain-Source On Resistance



Gate-Source On Resistance

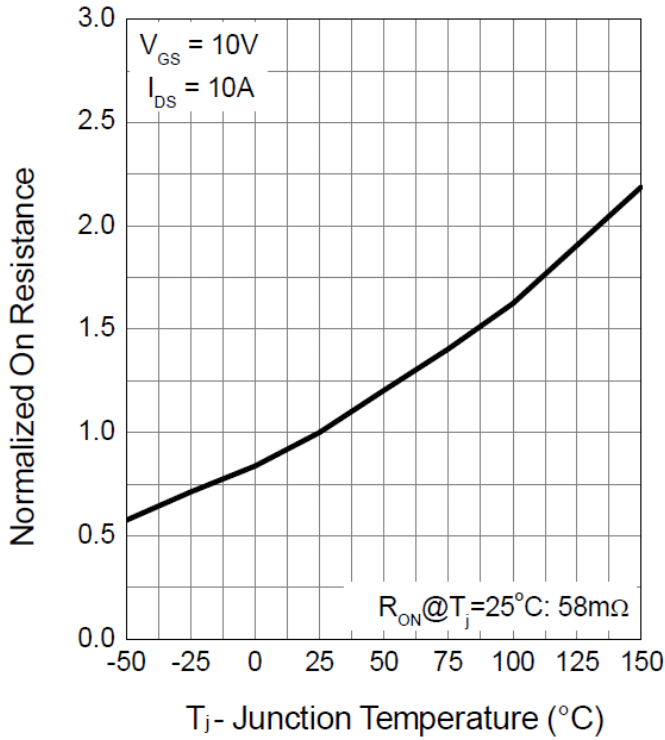


Gate Threshold Voltage

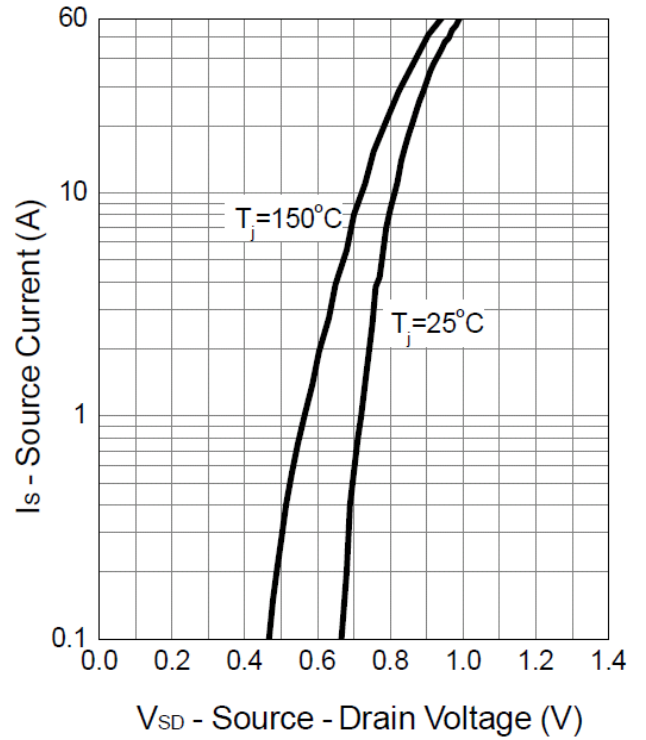


Typical Operating Characteristics (Cont.)

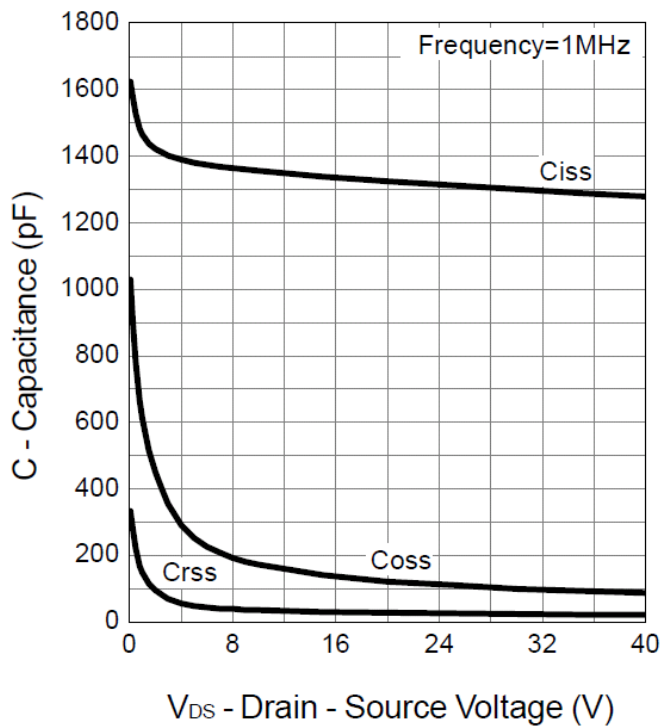
Drain-Source On Resistance



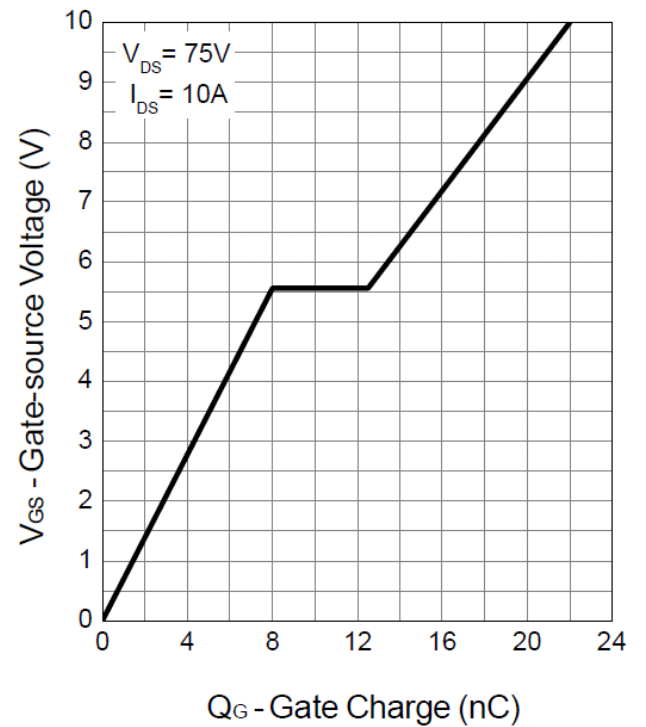
Source-Drain Diode Forward



Capacitance

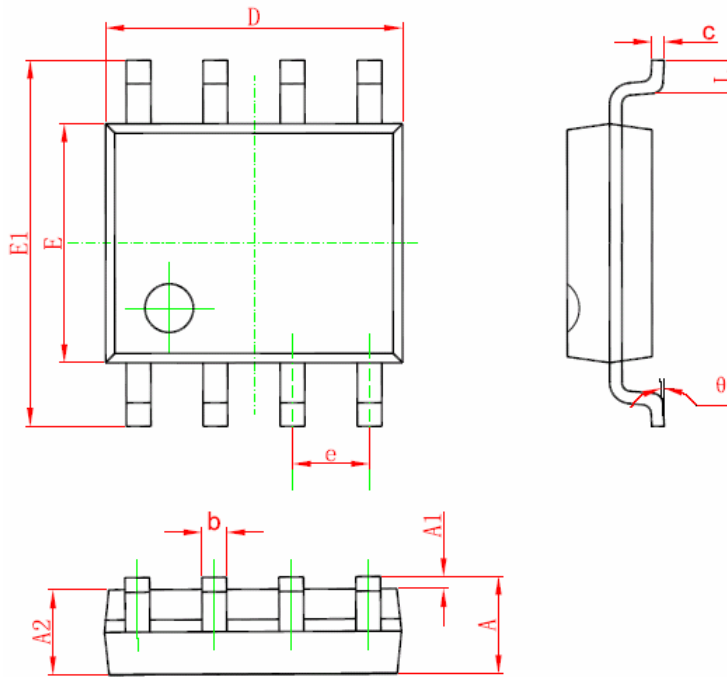


Gate Charge



Package Information

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