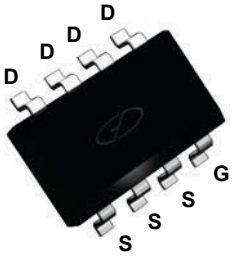
GOOD-ARK SEMICONDUCTOR

GSFQ0313

30V P-Channel MOSFET

Main Product Characteristics

$V_{(BR)DSS}$	-30V
$R_{DS(ON)}$	15mΩ
I_D	-12A



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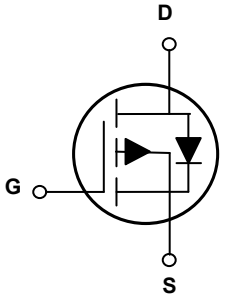


Schematic Diagram

Features and Benefits

- Advanced MOSFET process technology
- Ideal for high efficiency switched mode power supplies
- Low on-resistance with low gate charge
- Fast switching and reverse body recovery

Description

The GSFQ0313 utilizes the latest techniques to achieve high cell density and low on-resistance. These features make this device extremely efficient and reliable for use in high efficiency switch mode power supply and a wide variety of other applications.

Absolute Maximum Ratings (T_C=25°C unless otherwise specified)

Parameter	Symbol	Max.	Unit
Drain-Source Voltage	V_{DS}	-30	V
Gate-to-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current, V_{GS} @ 10V	I_D @ T_C = 25°C	-12	A
Continuous Drain Current, V_{GS} @ 10V	I_D @ T_C = 100°C	-8.4	A
Pulsed Drain Current	I_{DM}	-48	A
Power Dissipation [3]	P_D @T_C = 25°C	3	W
	P_D @T_C = 100°C	1.3	W
Single Pulse Avalanche Energy[5]	E_{AS}	231	mJ
Junction-to-Ambient (t ≤ 10s) [4]	$R_{\theta JA}$	41.67	°C/W
Operating Junction and Storage Temperature Range	T_J T_{STG}	-55 to + 150	°C

Electrical Characteristics (T_A=25°C unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D = 250μA	-30	-33	—	V
Drain-to-Source Leakage Current	I_{DSS}	V_{DS} = -30V, V_{GS} = 0V	-	-	-1	μA
		T_J = 125°C	-	-	-50	
Gate-to-Source Forward Leakage	I_{GSS}	V_{GS} =20V	-	-	100	nA
		V_{GS} = -20V	-	-	-100	
Static Drain-to-Source On- Resistance	$R_{DS\ (on)}$	V_{GS}=-10V, I_D = -10A	-	11.5	15	mΩ
		V_{GS}=-4.5V, I_D = -7A	-	18	25	
Gate Threshold Voltage	$V_{GS\ (th)}$	V_{DS} = V_{GS}, I_D = 250μA	-1.0	-1.5	-2.2	V
Forward Transconductance	g_{FS}	V_{DS} = -10V, I_D = -10A	20	-	-	S
Input Capacitance	C_{iss}	V_{GS} = 0V V_{DS} =-15V f = 1MHz	-	1750	-	pF
Output Capacitance	C_{oss}		-	215	-	
Reverse transfer capacitance	C_{rss}		-	180	-	
Total Gate Charge	Q_g	I_D =-15A,V_{DS}=-15V, V_{GS} = -10V	-	24	-	nC
Gate-to-Source Charge	Q_{gs}		-	3.5	-	
Gate-to-Drain("Miller") Charge	Q_{gd}		-	6	-	
Turn-on Delay Time[4]	$t_{d(on)}$	V_{GS}=-10V, V_{DS}=-15V, R_L=1.5Ω, R_{GEN}=1Ω I_D=-10A	-	9	-	nS
Rise Time[4]	t_r		-	8	-	
Turn-Off Delay Time[4]	$t_{d(off)}$		-	28	-	
Fall Time[4]	t_f		-	10	-	
Source-Drain Ratings and Characteristics						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Continuous Source Current (Body Diode) [2]	I_S	MOSFET symbol showing the integral reverse p-n junction diode.	-	-	-12	A
Pulsed Source Current (Body Diode)	I_{SM}		-	-	-48	A
Diode Forward Voltage[3]	V_{SD}	I_S=-10A, V_{GS}=0V	-	-0.8	-1.2	V

Notes

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production.
5. EAS condition: Tj=25℃,VDD=-15V,VG=10V,L=0.5mH,Rg=25Ω, IAS=-34A.

Typical Electrical and Thermal Characteristic Curves

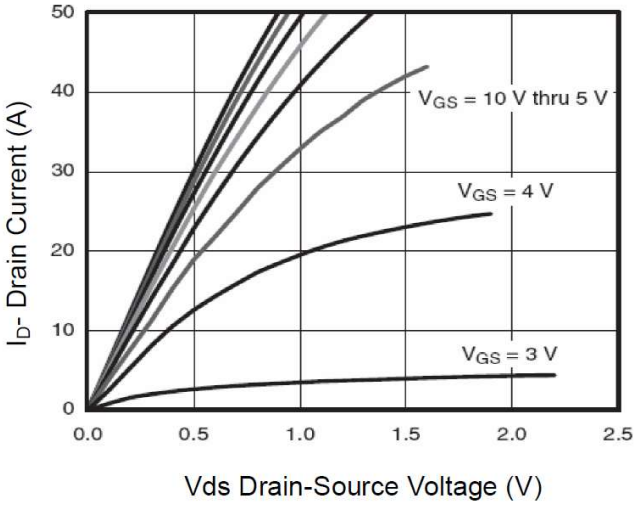


Figure 1. Typical Output Characteristics

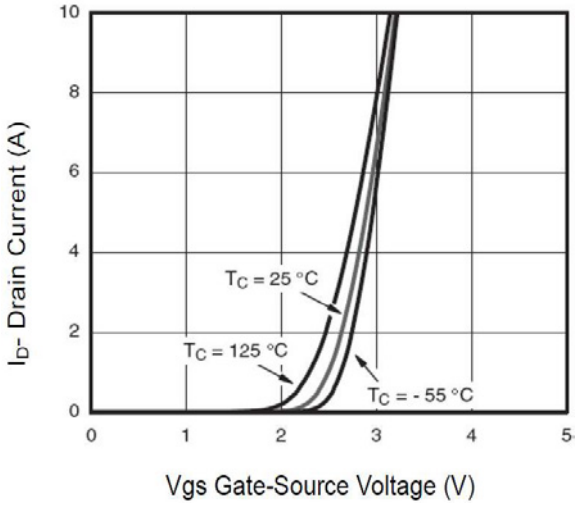


Figure 2. Gate to Source Cut-off Voltage

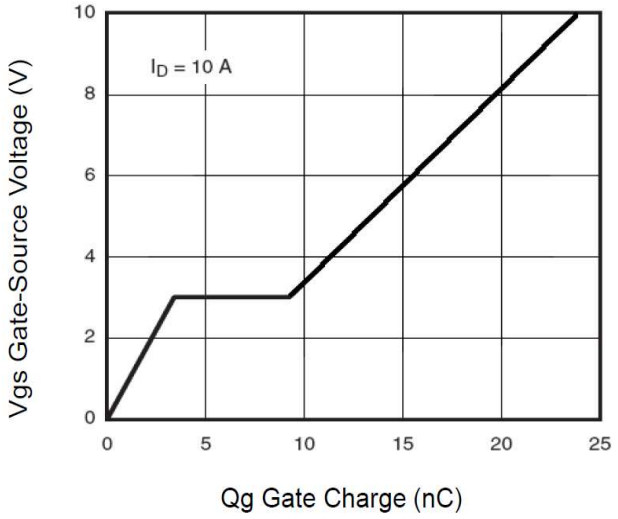


Figure 3. Gate Charge

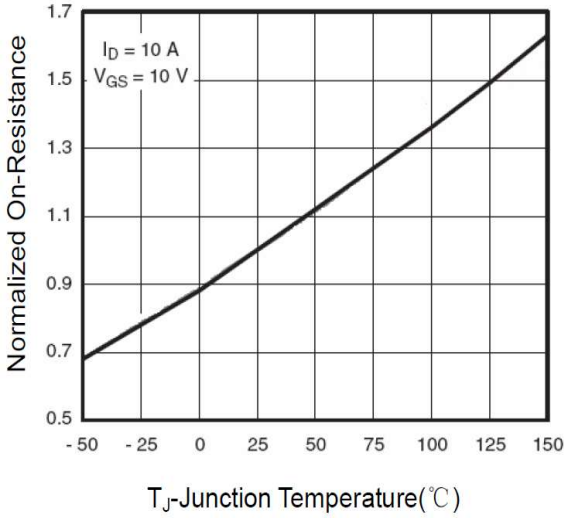


Figure 4. Normalized On-Resistance Vs. Case Temperature

Typical Electrical and Thermal Characteristic Curves

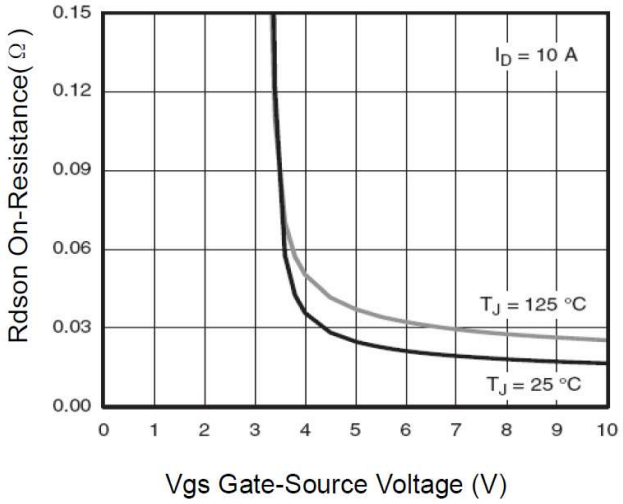


Figure 5. On-Resistance Vs. Gate-Source Voltage

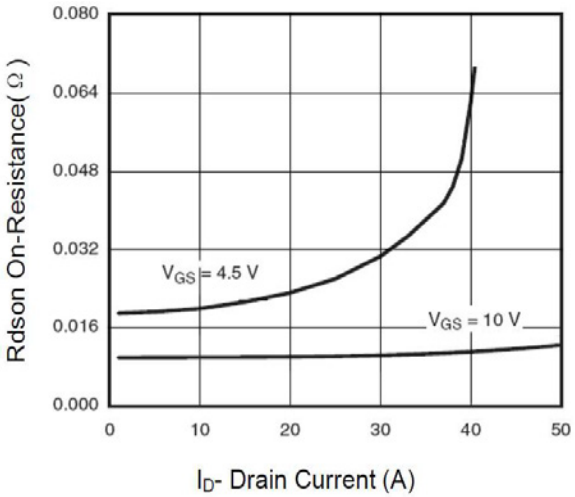


Figure 6. On-Resistance Vs. Drain Current

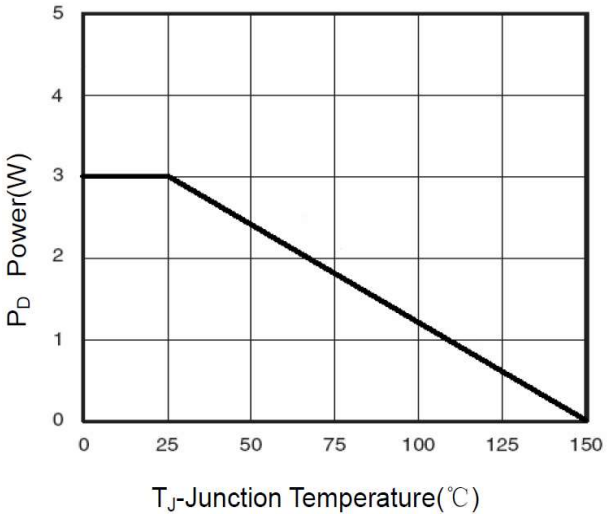


Figure 7. Power De-rating

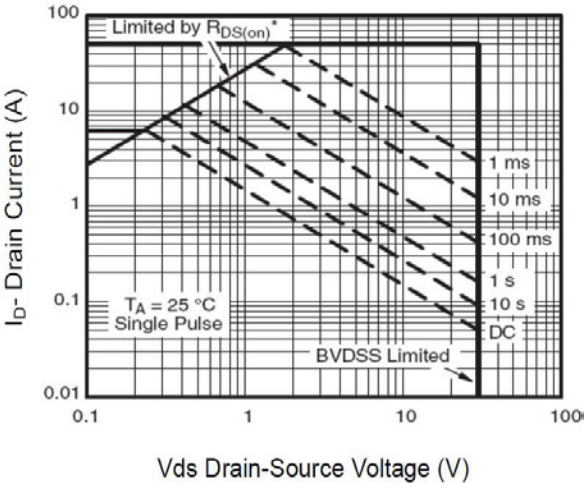


Figure 8. Safe Operation Area

Typical Electrical and Thermal Characteristic Curves

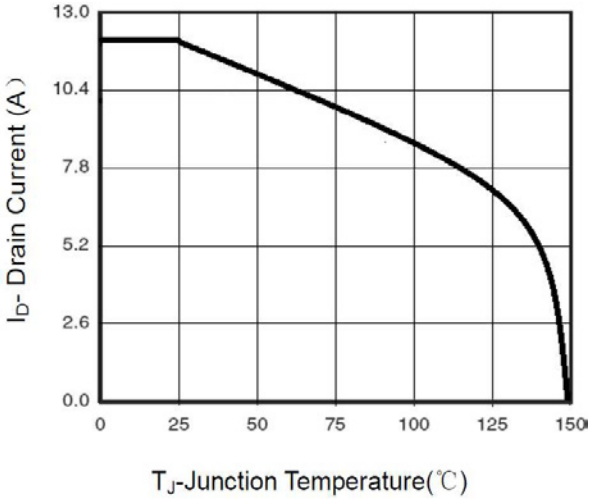


Figure 9. Maximum Drain Current Vs. Case Temperature

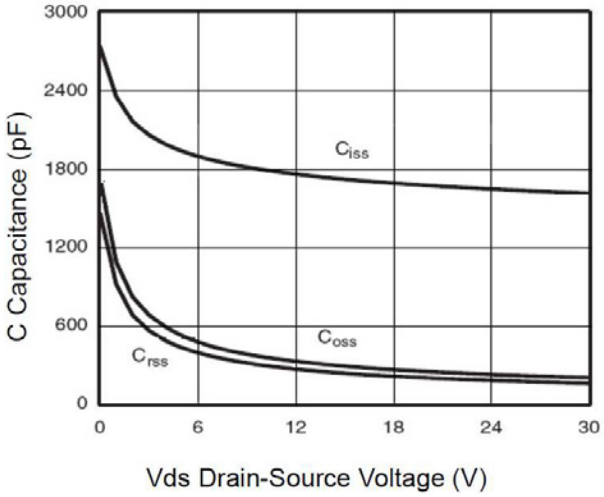


Figure 10. Typical Capacitance Vs. Drain-to-Source Voltage

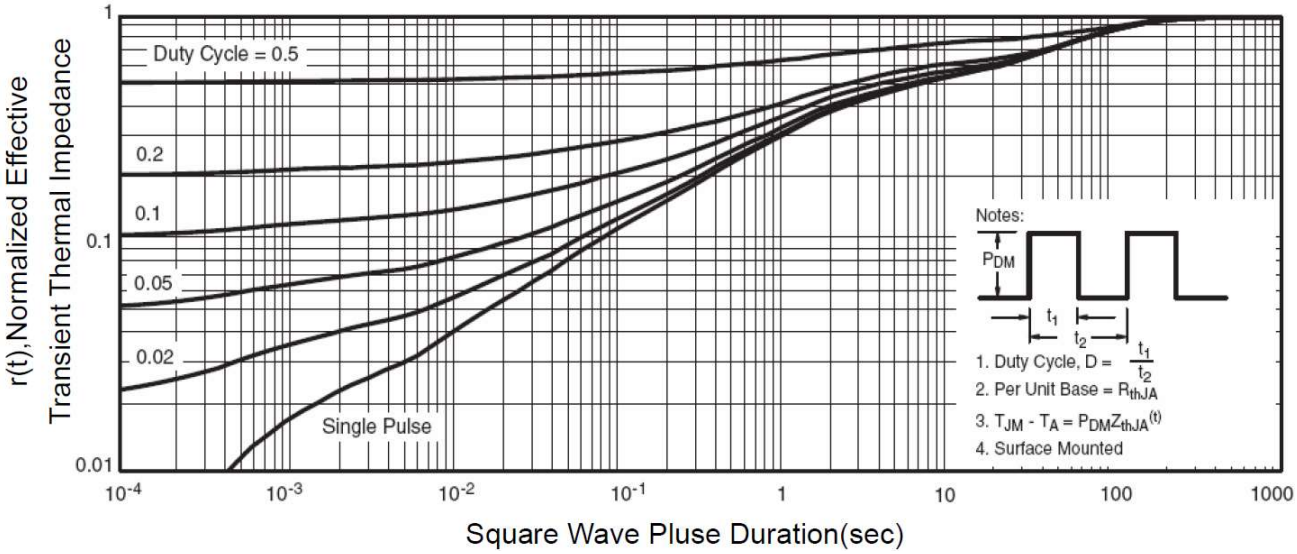


Figure 11. Maximum Effective Transient Thermal Impedance, Junction-to-Case

Test Circuit & Waveform

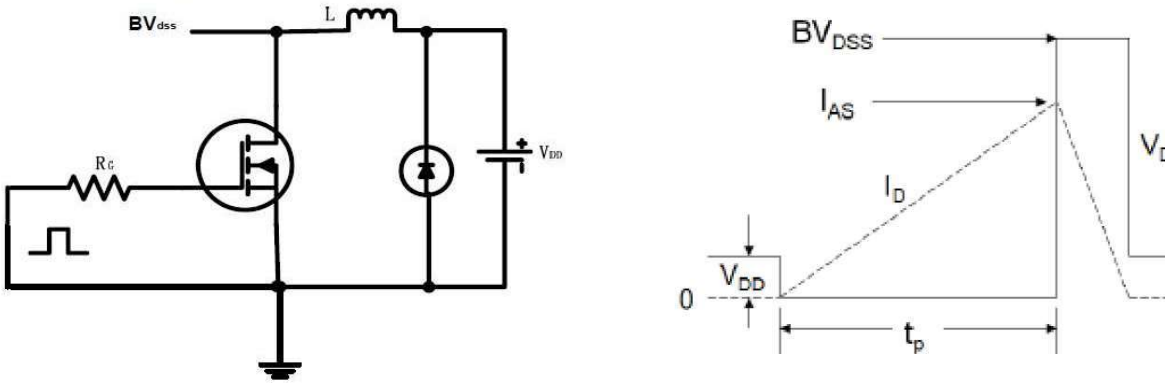


Figure 8. Unclamped Inductive Switching Test Circuit & Waveforms

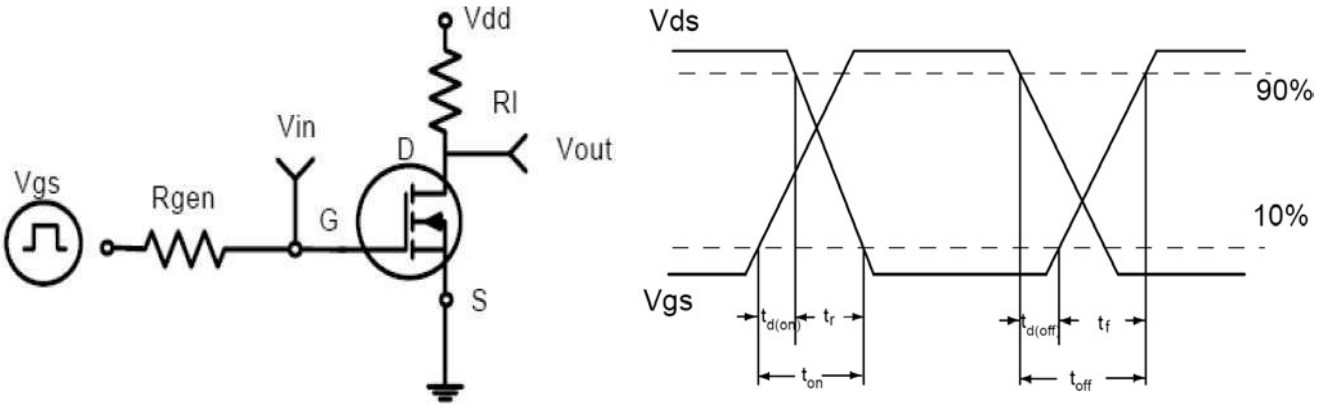


Figure 9. Resistive Switching Test Circuit & Waveforms

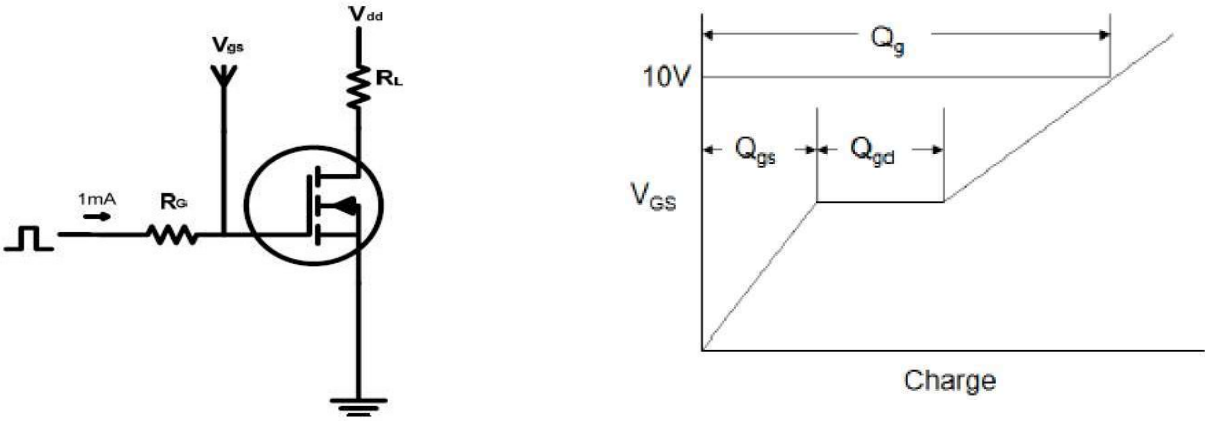
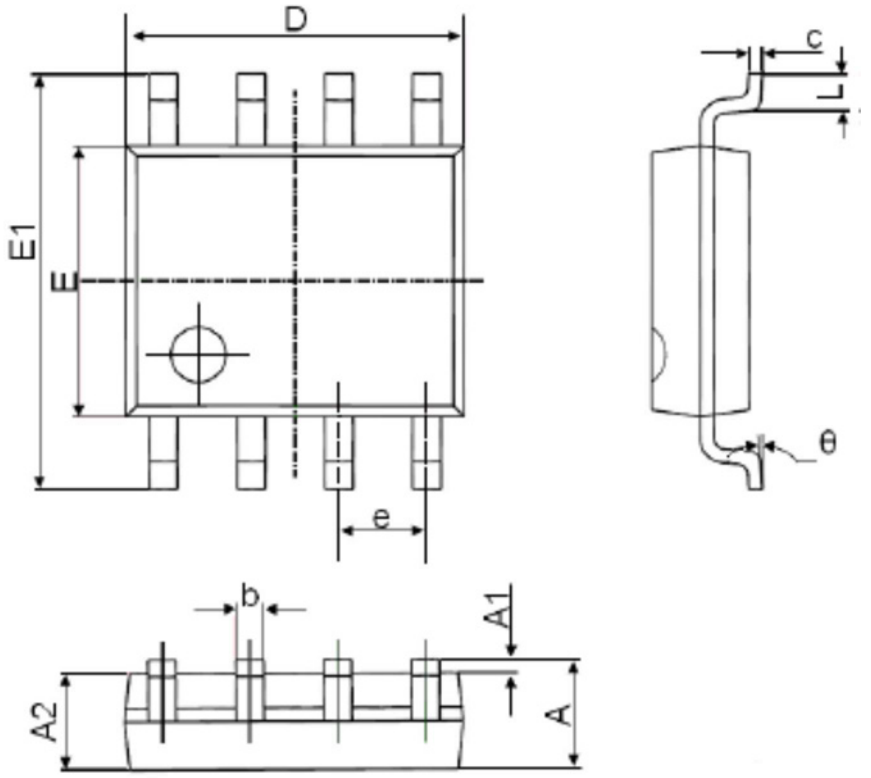


Figure 10. Gate Charge Test Circuit & Waveform

Package Outline Dimensions SOP-8



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°