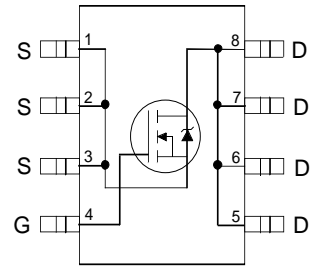


**Features**

- $V_{DS} (V) = 30V$
- $R_{DS(ON)} < 13.8m\Omega$  ( $V_{GS} = 10V$ )
- $R_{DS(ON)} < 18.2m\Omega$  ( $V_{GS} = 4.5V$ )

**Applications**

- Control FET for Notebook Processor Power
- Synchronous Rectifier MOSFET for Graphics Cards and POL Converters in Networking and Telecommunication Systems



Top View

**Absolute Maximum Ratings**

	Parameter	Max.	Units
$V_{DS}$	Drain-to-Source Voltage	30	V
$V_{GS}$	Gate-to-Source Voltage	$\pm 20$	
$I_D @ T_A = 25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$	11	A
$I_D @ T_A = 70^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$	8.7	
$I_{DM}$	Pulsed Drain Current ①	88	
$P_D @ T_A = 25^\circ C$	Power Dissipation ④	2.5	W
$P_D @ T_A = 70^\circ C$	Power Dissipation ④	1.6	
	Linear Derating Factor	0.02	W/°C
$T_J$	Operating Junction and	-55 to + 150	°C
$T_{STG}$	Storage Temperature Range		

**Thermal Resistance**

	Parameter	Typ.	Max.	Units
$R_{\theta JL}$	Junction-to-Drain Lead	—	20	°C/W
$R_{\theta JA}$	Junction-to-Ambient ④	—	50	

**Notes:**

- ① Repetitive rating; pulse width limited by max. junction temperature.
- ② Starting  $T_J = 25^\circ C$ ,  $L = 1.6mH$   
 $R_G = 25\Omega$ ,  $I_{AS} = 8.8A$ .
- ③ Pulse width  $\leq 400\mu s$ ; duty cycle  $\leq 2\%$ .
- ④ When mounted on 1 inch square copper board

**Static @ T<sub>J</sub> = 25°C (unless otherwise specified)**

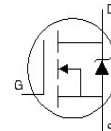
	Parameter	Min.	Typ.	Max.	Units	Conditions
BV <sub>DSS</sub>	Drain-to-Source Breakdown Voltage	30	—	—	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA
ΔBV <sub>DSS</sub> /ΔT <sub>J</sub>	Breakdown Voltage Temp. Coefficient	—	0.023	—	V/°C	Reference to 25°C, I <sub>D</sub> = 1mA
R <sub>DS(on)</sub>	Static Drain-to-Source On-Resistance	—	11	13.8	mΩ	V <sub>GS</sub> = 10V, I <sub>D</sub> = 11A ②
		—	14.5	18.2		V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 8.8A ②
V <sub>GS(th)</sub>	Gate Threshold Voltage	1.35	1.8	2.25	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA
ΔV <sub>GS(th)</sub>	Gate Threshold Voltage Coefficient	—	- 4.7	—	mV/°C	
I <sub>DSS</sub>	Drain-to-Source Leakage Current	—	—	1.0	μA	V <sub>DS</sub> = 24V, V <sub>GS</sub> = 0V
		—	—	150		V <sub>DS</sub> = 24V, V <sub>GS</sub> = 0V, T <sub>J</sub> = 125°C
I <sub>GSS</sub>	Gate-to-Source Forward Leakage	—	—	100	nA	V <sub>GS</sub> = 20V
	Gate-to-Source Reverse Leakage	—	—	-100		V <sub>GS</sub> = -20V
g <sub>fs</sub>	Forward Transconductance	22	—	—	S	V <sub>DS</sub> = 15V, I <sub>D</sub> = 8.8A
Q <sub>g</sub>	Total Gate Charge	—	7.2	11	nC	V <sub>DS</sub> = 15V V <sub>GS</sub> = 4.5V I <sub>D</sub> = 8.8A See Fig. 16
Q <sub>gs1</sub>	Pre-V <sub>th</sub> Gate-to-Source Charge	—	2.1	—		
Q <sub>gs2</sub>	Post-V <sub>th</sub> Gate-to-Source Charge	—	0.7	—		
Q <sub>gd</sub>	Gate-to-Drain Charge	—	2.7	—		
Q <sub>godr</sub>	Gate Charge Overdrive	—	1.7	—		
Q <sub>sw</sub>	Switch Charge (Q <sub>gs2</sub> + Q <sub>gd</sub> )	—	3.4	—		
Q <sub>oss</sub>	Output Charge	—	2.8	—	nC	V <sub>DS</sub> = 15V, V <sub>GS</sub> = 0V
R <sub>G</sub>	Gate Resistance	—	2.5	4.8	Ω	
t <sub>d(on)</sub>	Turn-On Delay Time	—	6.9	—	ns	V <sub>DD</sub> = 15V, V <sub>GS</sub> = 4.5V ③ I <sub>D</sub> = 8.8A Clamped Inductive Load
t <sub>r</sub>	Rise Time	—	6.2	—		
t <sub>d(off)</sub>	Turn-Off Delay Time	—	10	—		
t <sub>f</sub>	Fall Time	—	3.1	—		
C <sub>iss</sub>	Input Capacitance	—	770	—	pF	V <sub>GS</sub> = 0V V <sub>DS</sub> = 15V f = 1.0MHz
C <sub>oss</sub>	Output Capacitance	—	190	—		
C <sub>rss</sub>	Reverse Transfer Capacitance	—	100	—		

**Avalanche Characteristics**

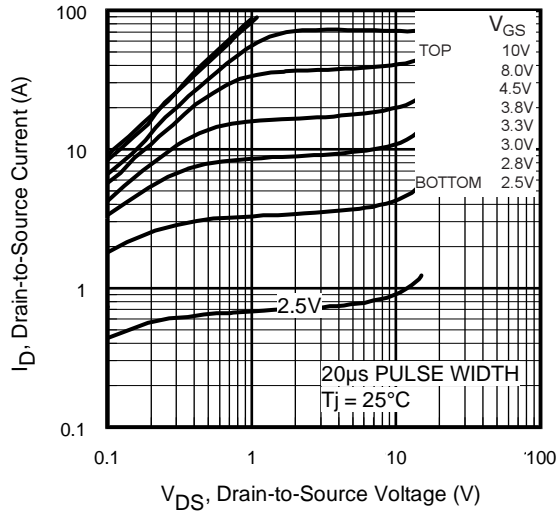
	Parameter	Typ.	Max.	Units
E <sub>AS</sub>	Single Pulse Avalanche Energy ②	—	63	mJ
I <sub>AR</sub>	Avalanche Current ①	—	8.8	A

**Diode Characteristics**

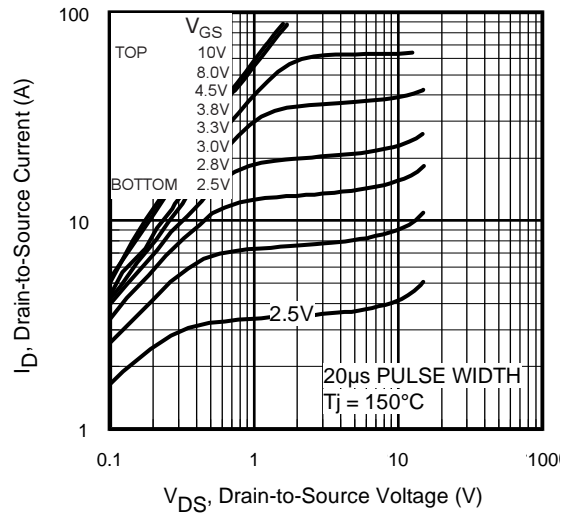
	Parameter	Min.	Typ.	Max.	Units	Conditions
I <sub>S</sub>	Continuous Source Current (Body Diode)	—	—	3.1	A	MOSFET symbol showing the integral reverse p-n junction diode.
I <sub>SM</sub>	Pulsed Source Current (Body Diode) ①	—	—	88		
V <sub>SD</sub>	Diode Forward Voltage	—	—	1.0	V	T <sub>J</sub> = 25°C, I <sub>S</sub> = 8.8A, V <sub>GS</sub> = 0V ③
t <sub>rr</sub>	Reverse Recovery Time	—	31	46	ns	T <sub>J</sub> = 25°C, I <sub>F</sub> = 8.8A, V <sub>DD</sub> = 15V
Q <sub>rr</sub>	Reverse Recovery Charge	—	17	26	nC	di/dt = 100A/μs ③



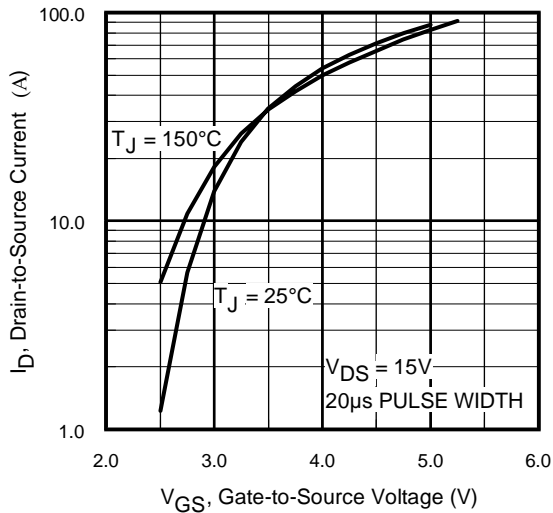
**TYPICAL CHARACTERISTICS** (25 °C, unless otherwise noted)



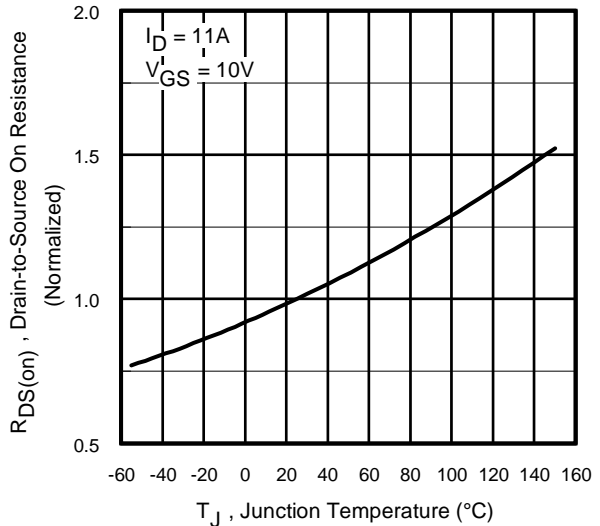
**Fig 1.** Typical Output Characteristics



**Fig 2.** Typical Output Characteristics

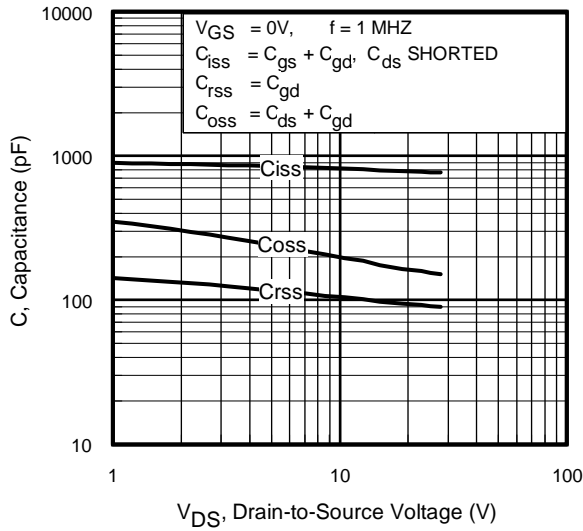


**Fig 3.** Typical Transfer Characteristics

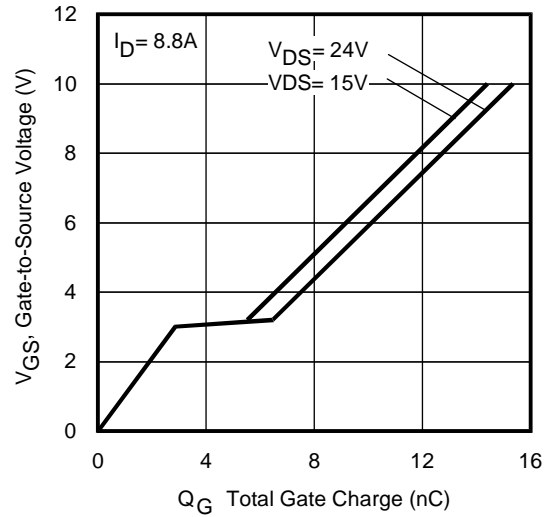


**Fig 4.** Normalized On-Resistance Vs. Temperature

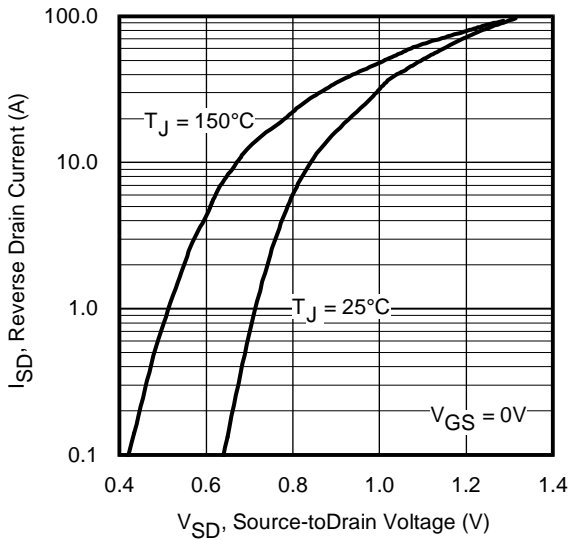
**TYPICAL CHARACTERISTICS** (25 °C, unless otherwise noted)



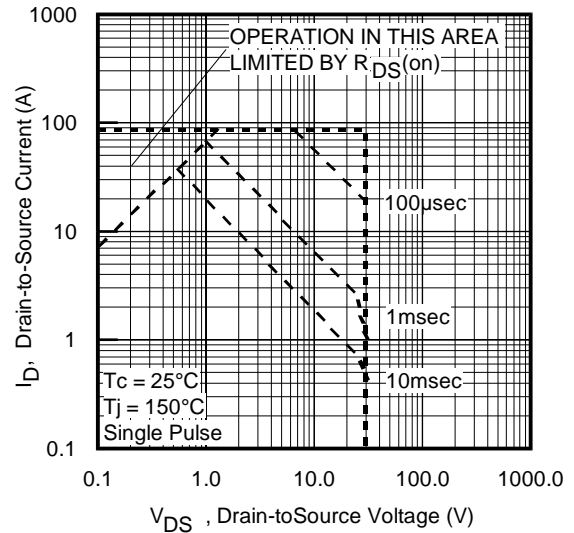
**Fig 5.** Typical Capacitance Vs. Drain-to-Source Voltage



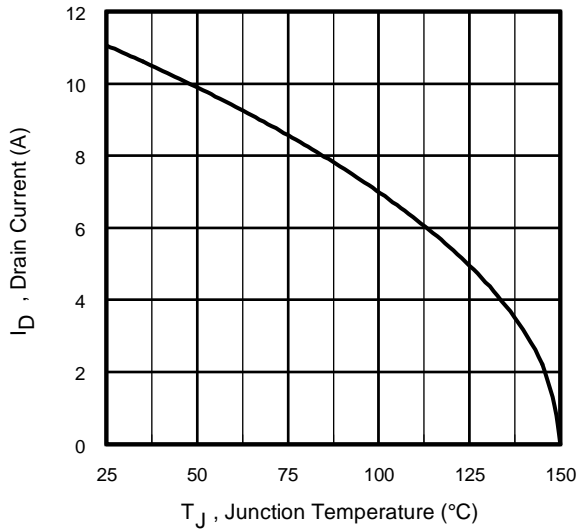
**Fig 6.** Typical Gate Charge Vs. Gate-to-Source Voltage



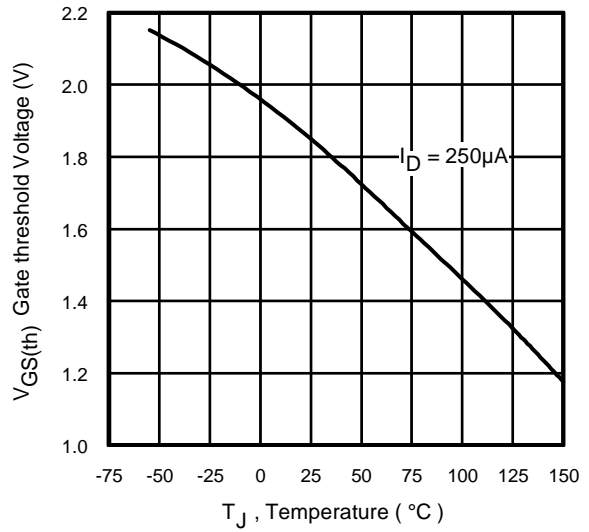
**Fig 7.** Typical Source-Drain Diode Forward Voltage



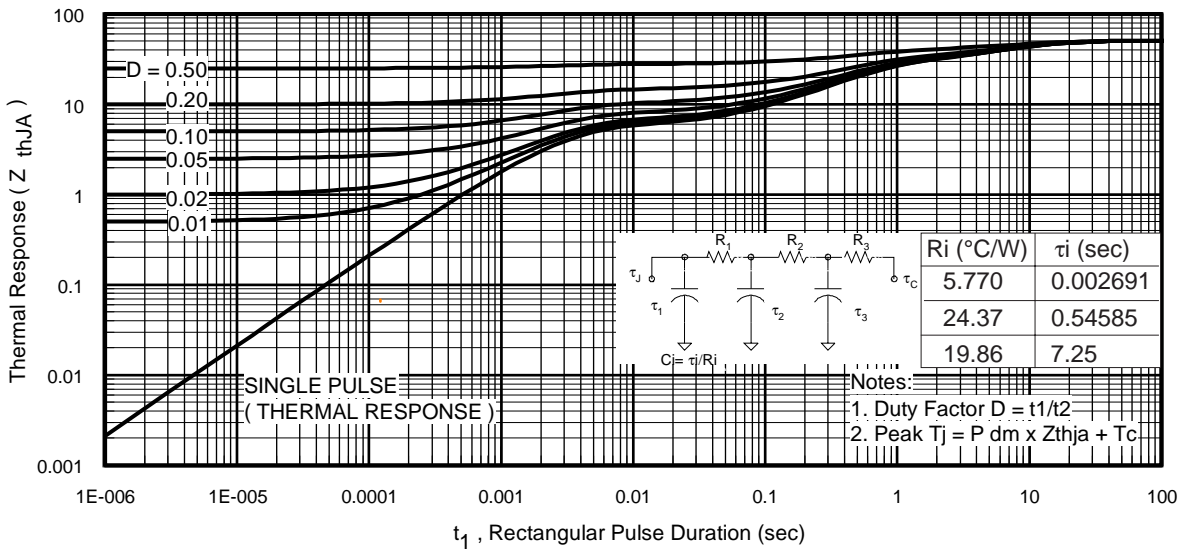
**Fig 8.** Maximum Safe Operating Area



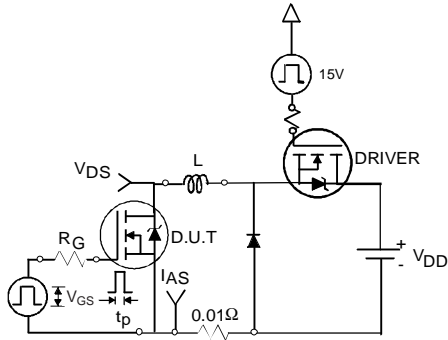
**Fig 9.** Maximum Drain Current Vs. Case Temperature



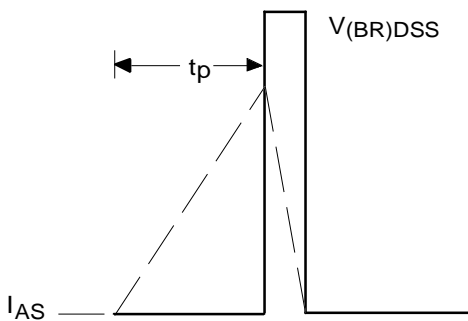
**Fig 10.** Threshold Voltage Vs. Temperature



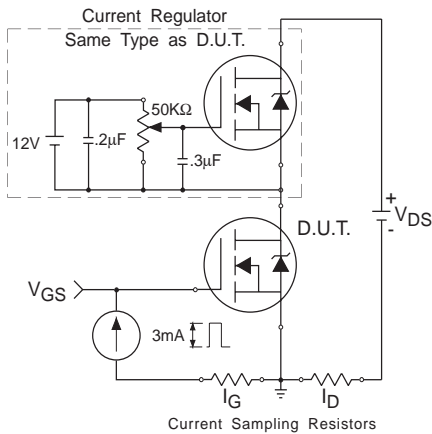
**Fig 11.** Maximum Effective Transient Thermal Impedance, Junction-to-Ambient



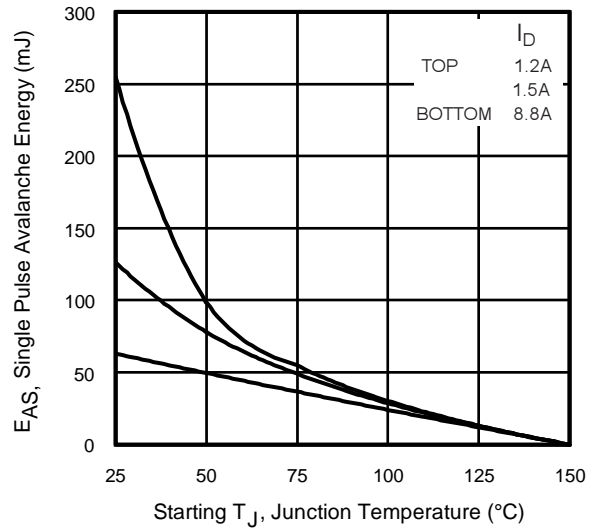
**Fig 12a.** Unclamped Inductive Test Circuit



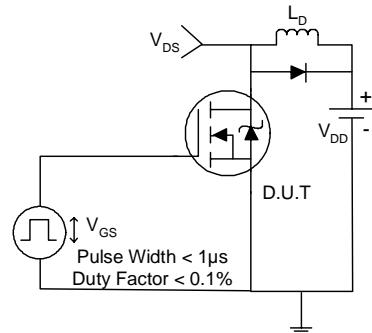
**Fig 12b.** Unclamped Inductive Waveforms



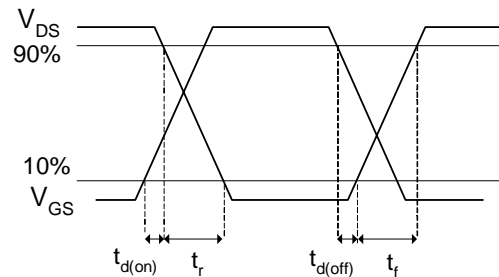
**Fig 13.** Gate Charge Test Circuit



**Fig 12c.** Maximum Avalanche Energy Vs. Drain Current

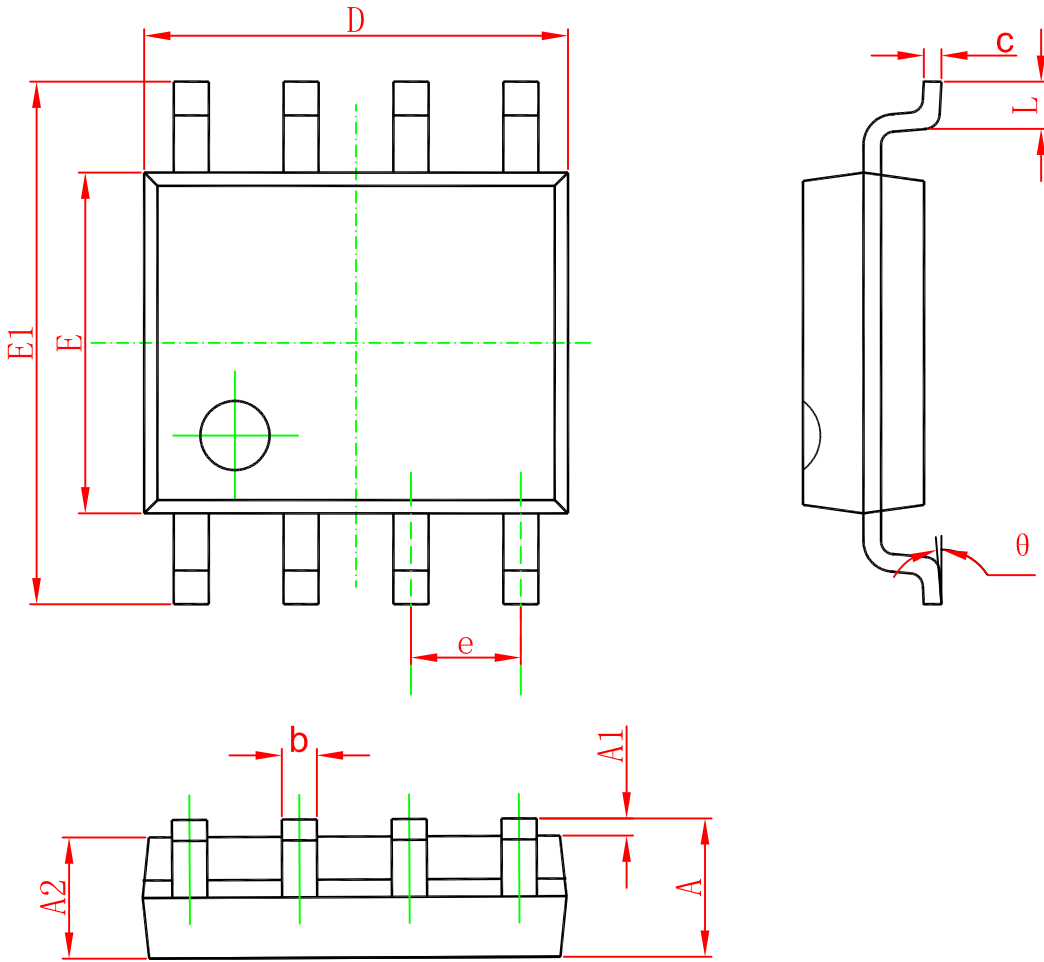


**Fig 14a.** Switching Time Test Circuit



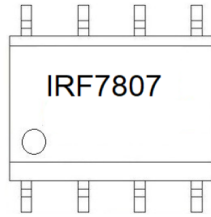
**Fig 14b.** Switching Time Waveforms

**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°

## Marking



## Ordering information

Order code	Package	Baseqty	Deliverymode
IRF7807TR	SOP-8	3000	Tape and reel