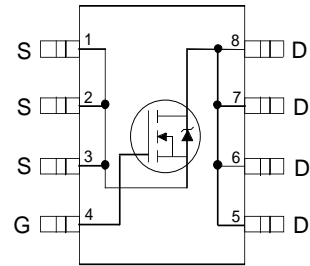


Features

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

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	± 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_J = 25°C (unless otherwise specified)

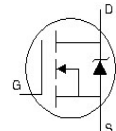
	Parameter	Min.	Typ.	Max.	Units	Conditions
BV _{DSS}	Drain-to-Source Breakdown Voltage	30	—	—	V	V _{GS} = 0V, I _D = 250μA
ΔBV _{DSS} /ΔT _J	Breakdown Voltage Temp. Coefficient	—	0.023	—	V/°C	Reference to 25°C, I _D = 1mA
R _{DS(on)}	Static Drain-to-Source On-Resistance	—	11	13.8	mΩ	V _{GS} = 10V, I _D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

Avalanche Characteristics

	Parameter	Typ.	Max.	Units
E _{AS}	Single Pulse Avalanche Energy ②	—	63	mJ
I _{AR}	Avalanche Current ①	—	8.8	A

Diode Characteristics

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



TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

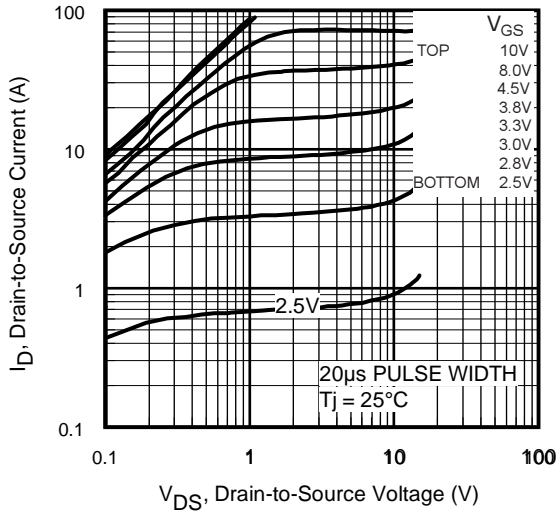


Fig 1. Typical Output Characteristics

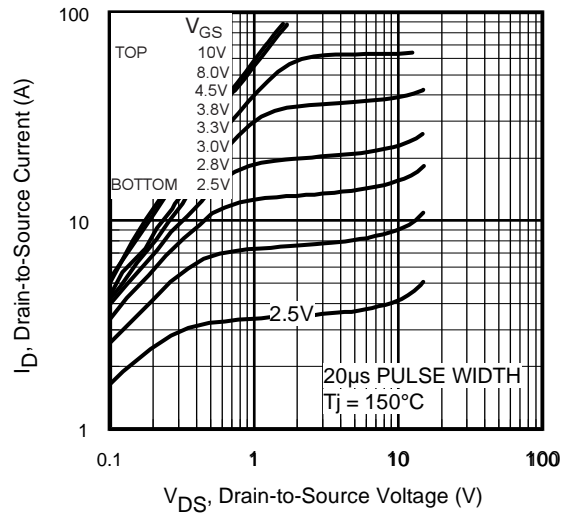


Fig 2. Typical Output Characteristics

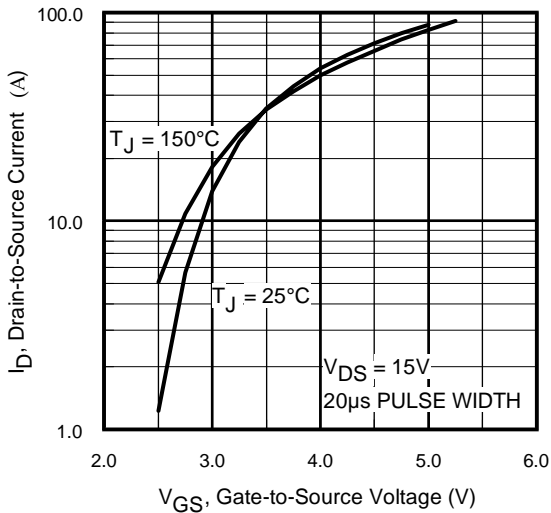


Fig 3. Typical Transfer Characteristics

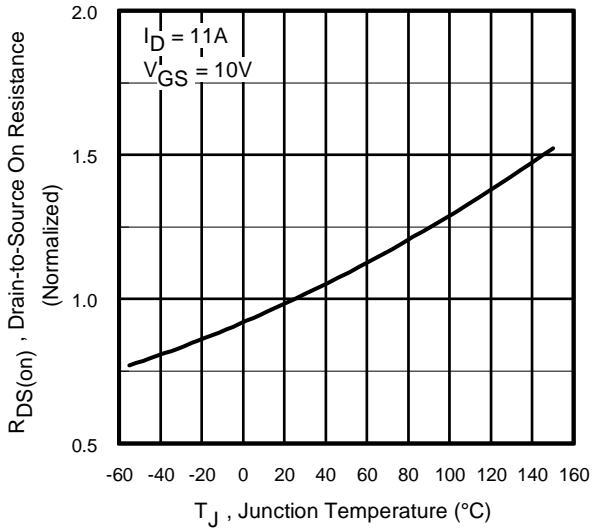


Fig 4. Normalized On-Resistance Vs. Temperature

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

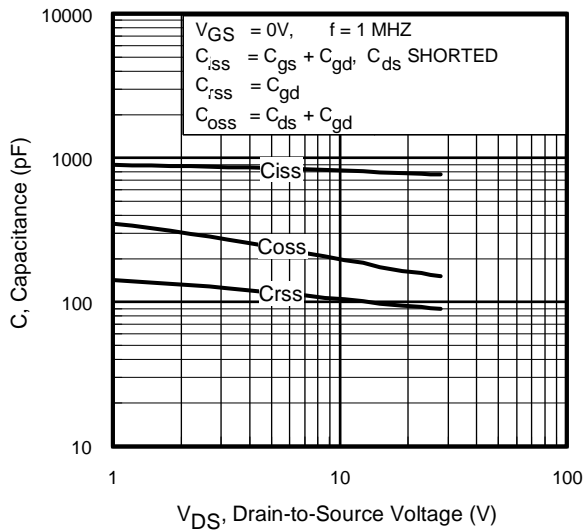


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

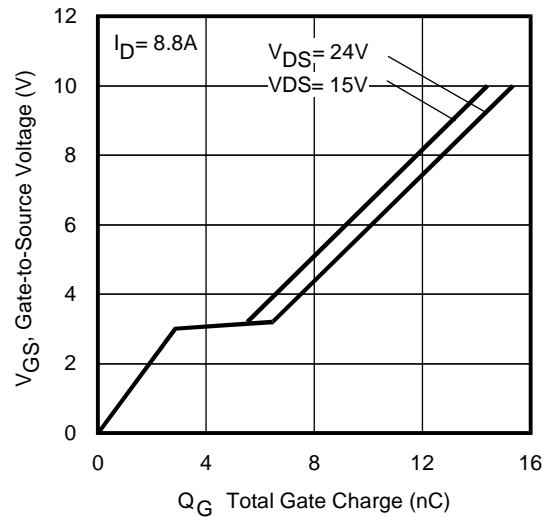


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

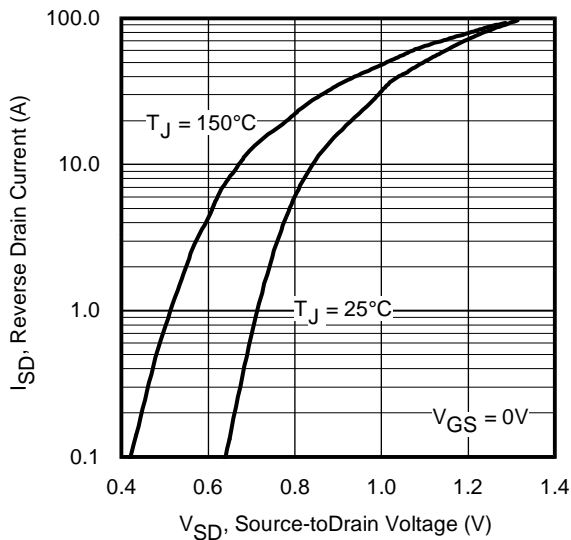


Fig 7. Typical Source-Drain Diode Forward Voltage

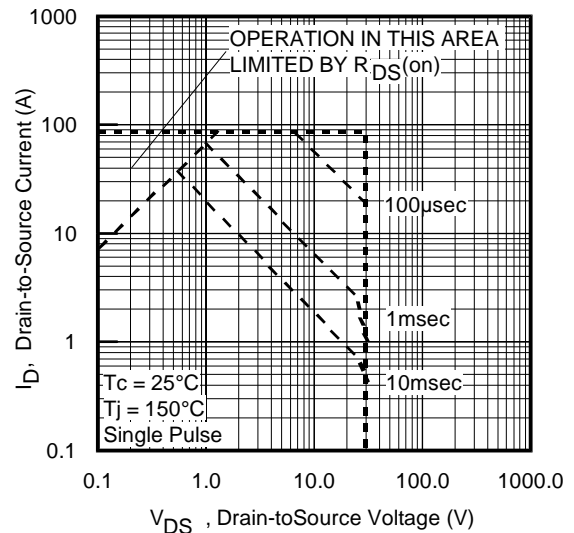


Fig 8. Maximum Safe Operating Area

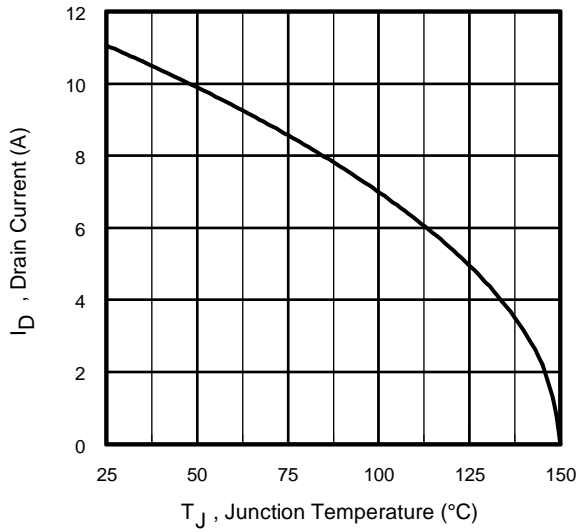


Fig 9. Maximum Drain Current Vs. Case Temperature

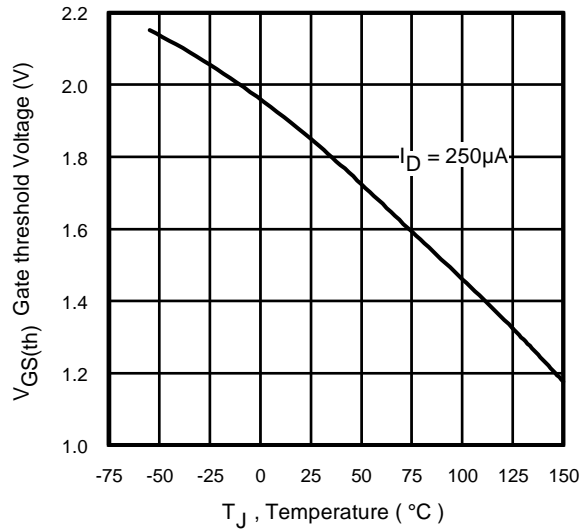


Fig 10. Threshold Voltage Vs. Temperature

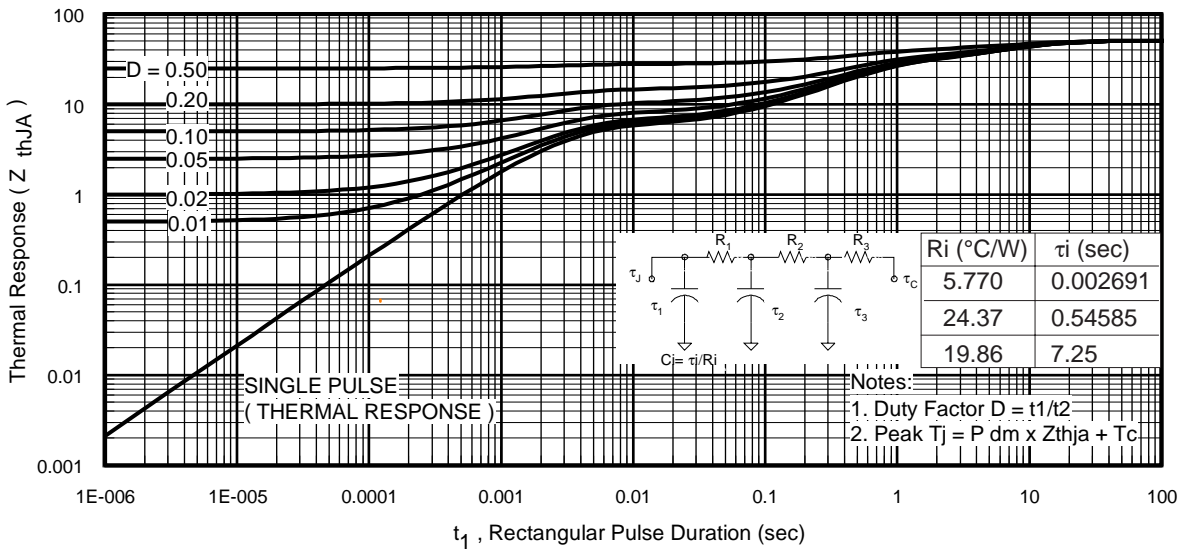


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

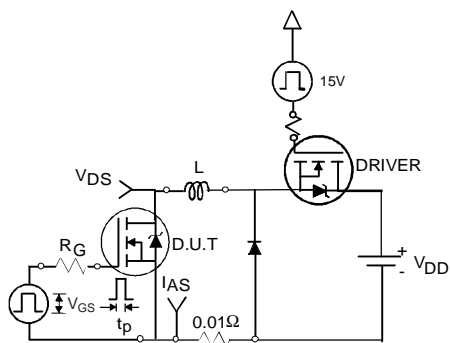


Fig 12a. Unclamped Inductive Test Circuit

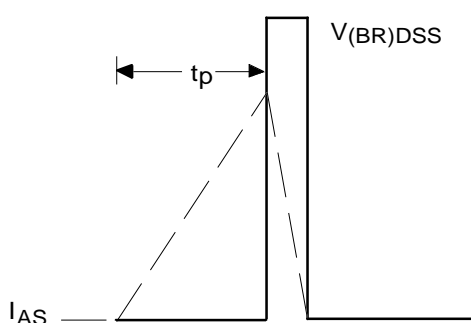


Fig 12b. Unclamped Inductive Waveforms

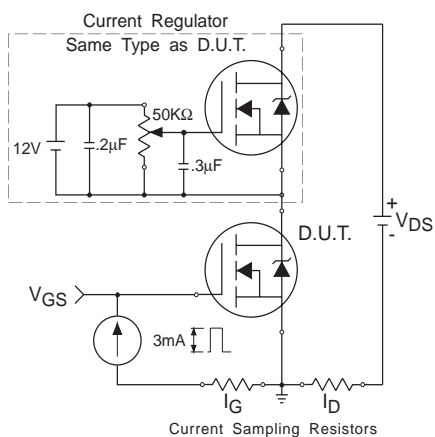


Fig 13. Gate Charge Test Circuit

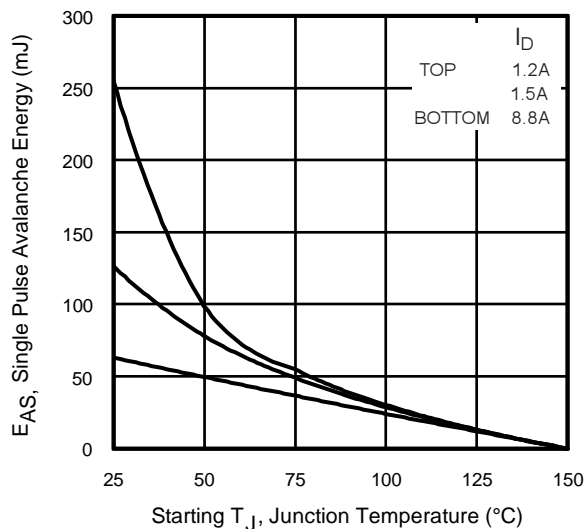


Fig 12c. Maximum Avalanche Energy Vs. Drain Current

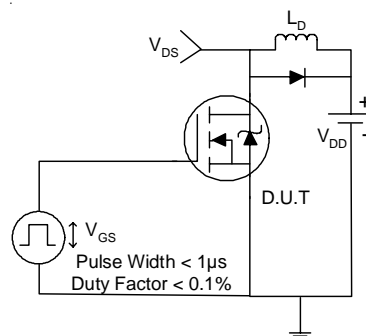


Fig 14a. Switching Time Test Circuit

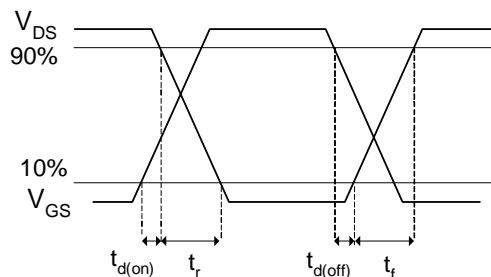
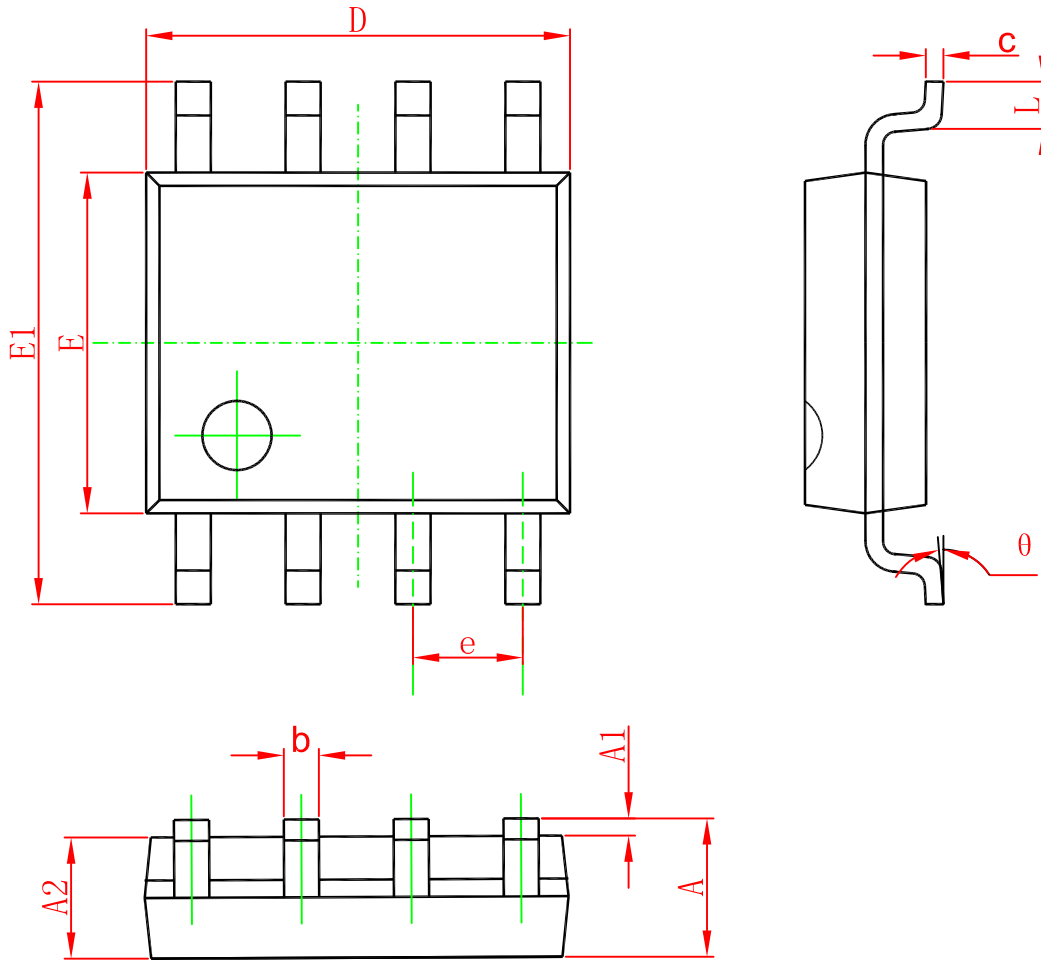


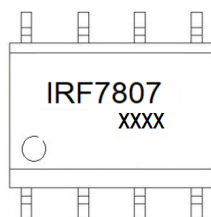
Fig 14b. Switching Time Waveforms

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