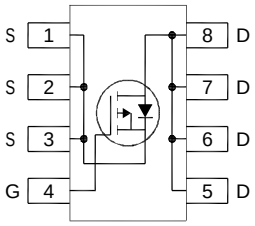
-30V P-Channel MOSFET

Applications

- Charge and Discharge Switch for Notebook PC

Battery Application



SOP-8

Features

- $V_{DS\,(V)}$ =-30V
- I_D= -16A (V_{GS} = -10V)
- $R_{DS(ON)}$ < 6.6mΩ (V_{GS}=-10V)
- $R_{DS(ON)}$ < 10.2 mΩ (V_{GS}=-4.5V)

Features

Industry-Standard SO8 Package
RoHS Compliant Containing no Lead, no Bromide and no Halogen

Resulting Benefits

Multi-Vendor Compatibility
Environmentally Friendlier

Absolute Maximum Ratings

	Parameter	Max.	Units
V_{DS}	Drain-to-Source Voltage	-30	V
V	Gate-to-Source Voltage	± 20	
I @ T_A = 25°C	Continuous Drain Current, V_{GS} @ 10V	-16	A
I @ T_A = 70°C	Continuous Drain Current, V_{GS} @ 10V	-13	
I	Pulsed Drain Current ①	-130	
P @T_A = 25°C	Power Dissipation ④	2.5	W
P @T_A = 70°C	Power Dissipation ④	1.6	
	Linear Derating Factor	0.02	W/°C
T T	Operating Junction and Storage Temperature Range	-55 to + 150	°C

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
$\Delta BV_{DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient		0.022		V/°C	Reference to 25°C, I_D = -1mA
$R_{DS(on)}$	Static Drain-to-Source On-Resistance		5.4	6.6	mΩ	V_{GS} = -10V, I_D = -16A ③
			8.3	10.2		V_{GS} = -4.5V, I_D = -13A ③
$V_{GS(th)}$	Gate Threshold Voltage	-1.3	-1.8	-2.4	V	V_{DS} = V_{GS}, I_D = -50μA
$\Delta V_{GS(th)}$	Gate Threshold Voltage Coefficient		-5.7		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
gfs	Forward Transconductance	36			S	V_{DS} = -10V, I_D = -13A
Q_g	Total Gate Charge ⑥		31		nC	V_{DS} = -15V, V_{GS} = -4.5V, I_D = - 13A
Q_g	Total Gate Charge ⑥		61	92	nC	V_{GS} = -10V
Q_{gs}	Gate-to-Source Charge ⑥		9			V_{DS} = -15V
Q_{gd}	Gate-to-Drain Charge ⑥		14			I_D = -13A
R_G	Gate Resistance ⑥		14		Ω	
$t_{d(on)}$	Turn-On Delay Time		19		ns	V_{DD} = -15V, V_{GS} = -4.5V ③
t_r	Rise Time		64			I_D = -1.0A
$t_{d(off)}$	Turn-Off Delay Time		160			R_G = 6.8Ω
t_f	Fall Time		120			See Figs. 20a &20b
C_{iss}	Input Capacitance		2820		pF	V_{GS} = 0V
C_{oss}	Output Capacitance		640			V_{DS} = -15V
C_{rss}	Reverse Transfer Capacitance		370			f = 1.0MHz

Avalanche Characteristics

	Parameter	Typ.	Max.	Units
E_{AS}	Single Pulse Avalanche Energy ②		330	mJ
I_{AR}	Avalanche Current ①		-13	A

Diode Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)			-2.5	A	MOSFET symbol showing the integral reverse p-n junction diode.
I_{SM}	Pulsed Source Current (Body Diode) ①			-130		
V_{SD}	Diode Forward Voltage			-1.2	V	T_J = 25°C, I_S = -2.5A, V_{GS} = 0V ③
t_{rr}	Reverse Recovery Time		33	50	ns	T_J = 25°C, I_F = -2.5A, V_{DD} = -24V
Q_{rr}	Reverse Recovery Charge		30	45	nC	di/dt = 100A/μs ③

Thermal Resistance

	Parameter	Typ.	Max.	Units
$R_{\theta JL}$	Junction-to-Drain Lead ⑤		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°C, L = 4.3mH, R_G = 25Ω, I_{AS} = -13A.

③ Pulse width ≤ 400μs; duty cycle ≤ 2%.

④ When mounted on 1 inch square copper board.

⑤ R_θ is measured at T_J of approximately 90°C.

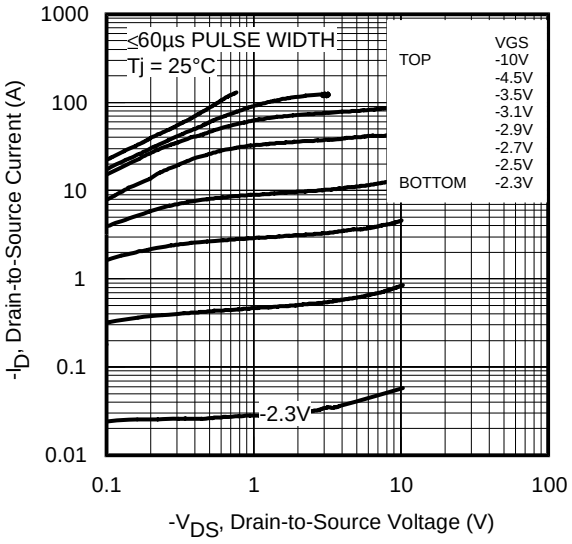


Fig 1. Typical Output Characteristics

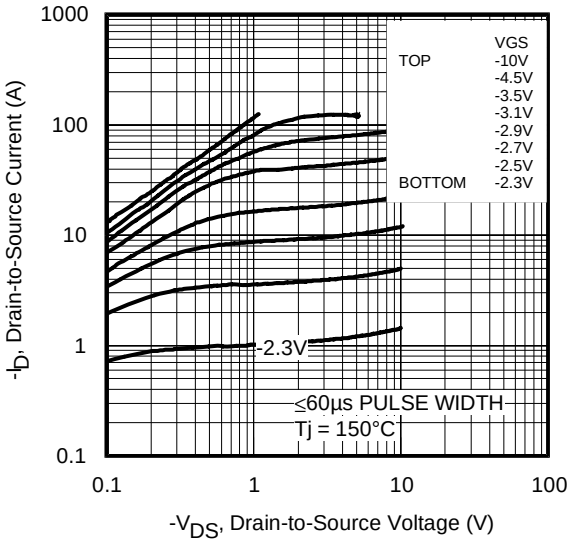


Fig 2. Typical Output Characteristics

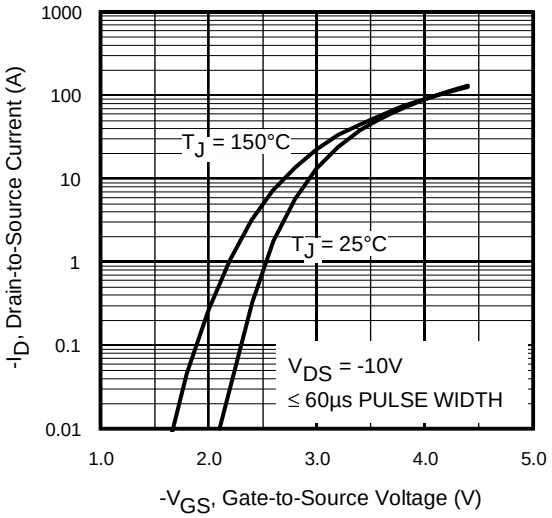


Fig 3. Typical Transfer Characteristics

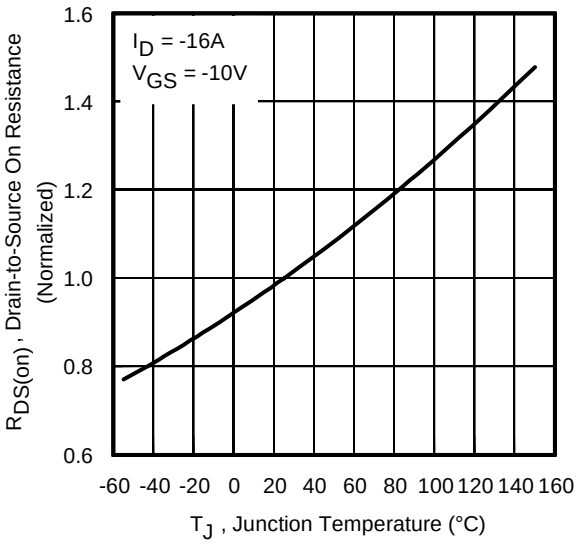


Fig 4. Normalized On-Resistance vs. Temperature

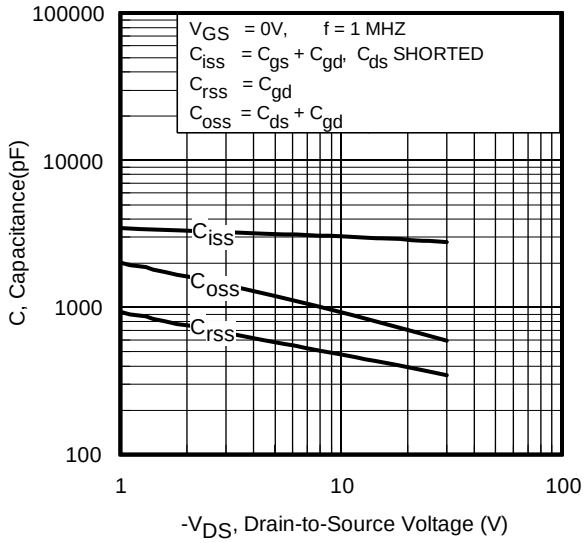


Fig 5. Typical Capacitance vs.Drain-to-Source Voltage

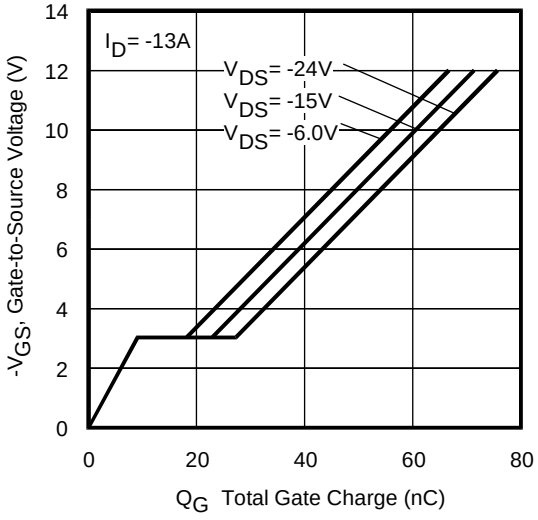


Fig 6. Typical Gate Charge vs.Gate-to-Source Voltage

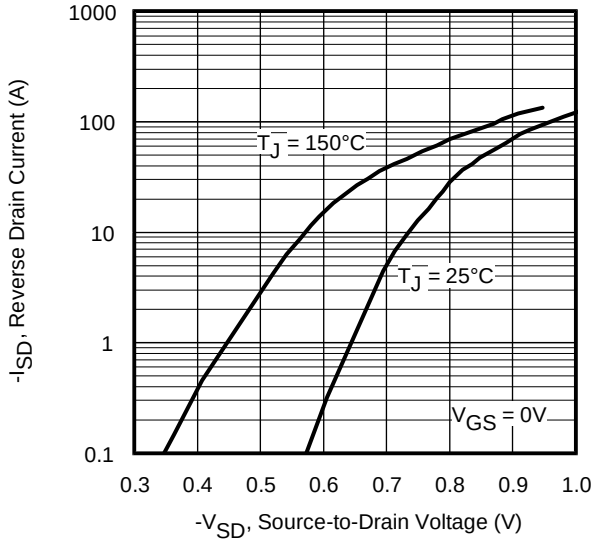


Fig 7. Typical Source-Drain Diode Forward Voltage

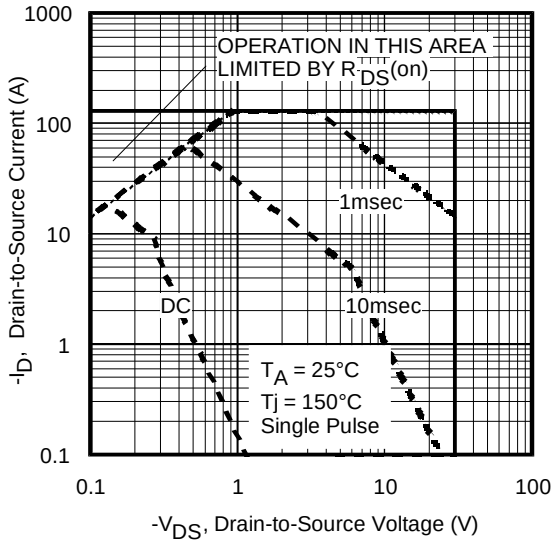


Fig 8. Maximum Safe Operating Area

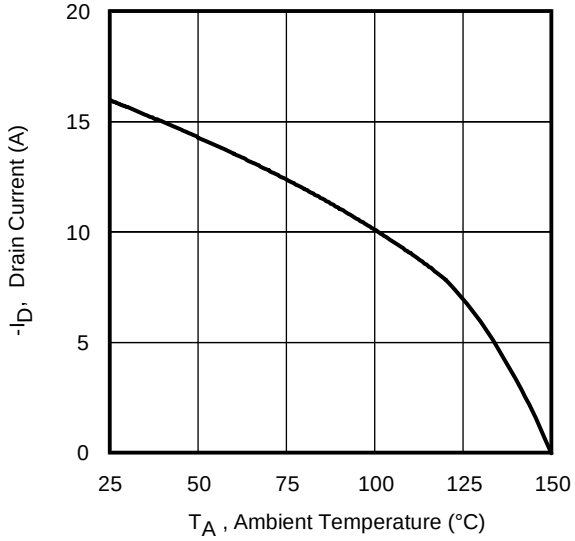


Fig 9. Maximum Drain Current vs. Ambient Temperature

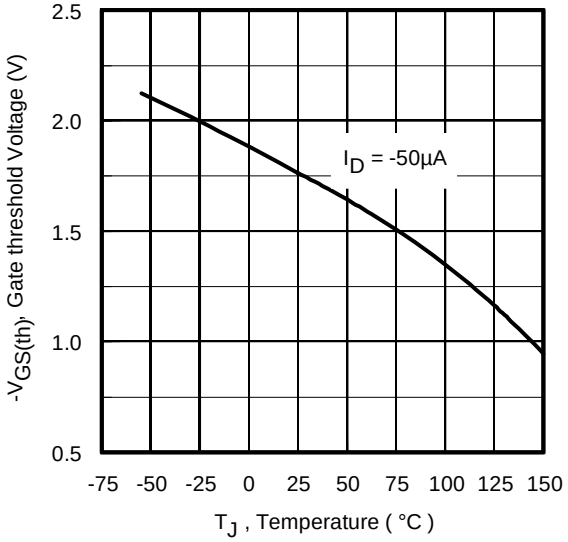


Fig 10. Threshold Voltage vs. Temperature

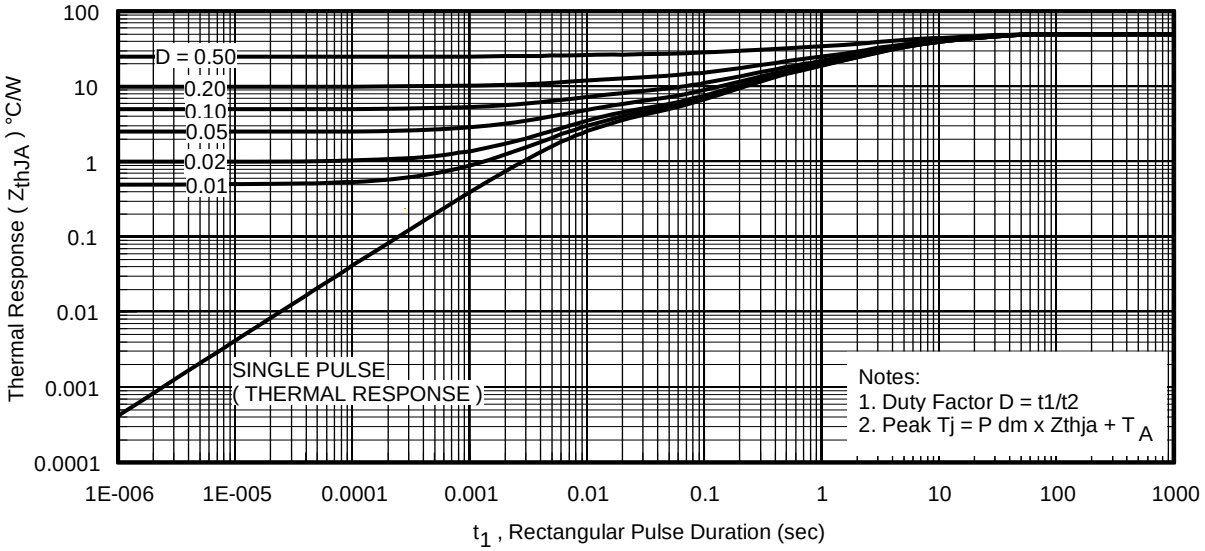


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

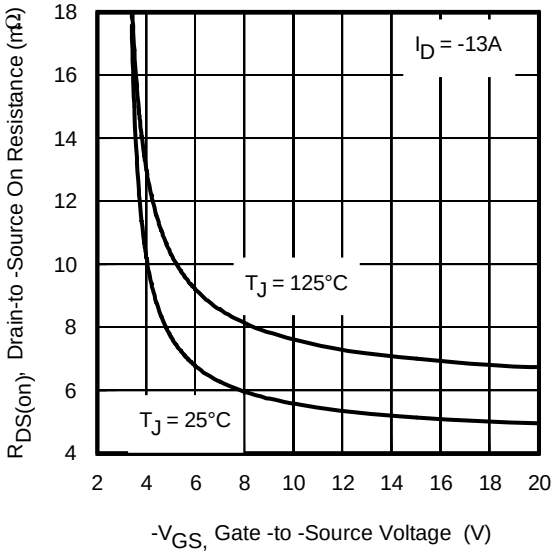


Fig 12. On-Resistance vs. Gate Voltage

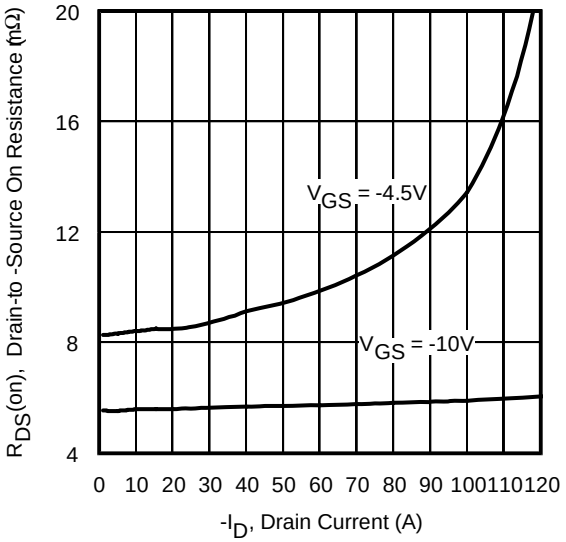


Fig 13. Typical On-Resistance vs. Drain Current

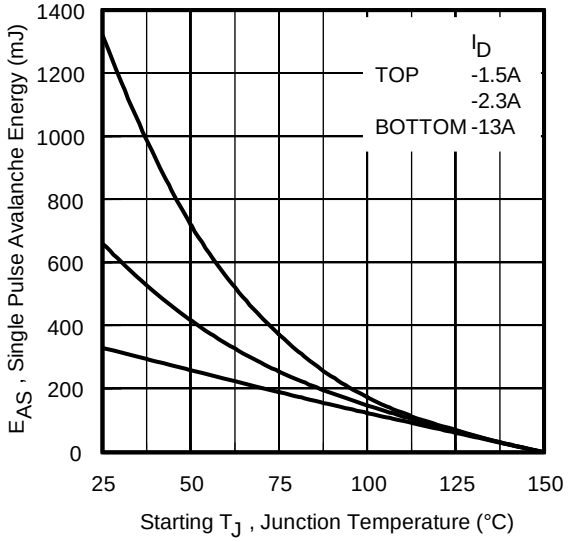


Fig 14. Maximum Avalanche Energy vs. Drain Current

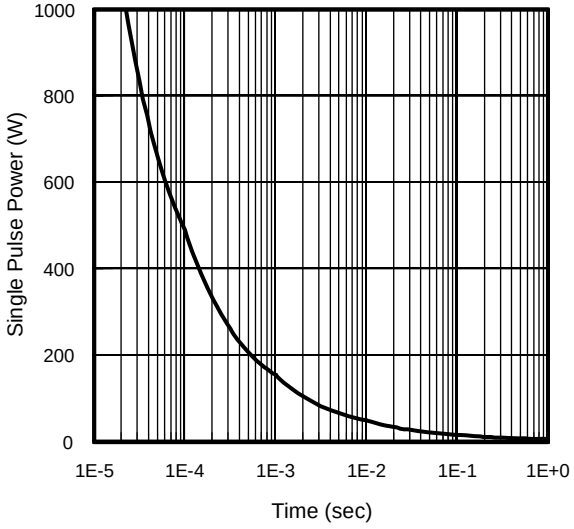


Fig 16. Typical Power vs. Time

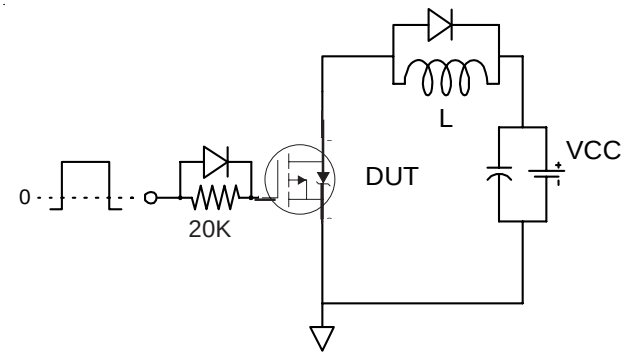


Fig 17a. Gate Charge Test Circuit

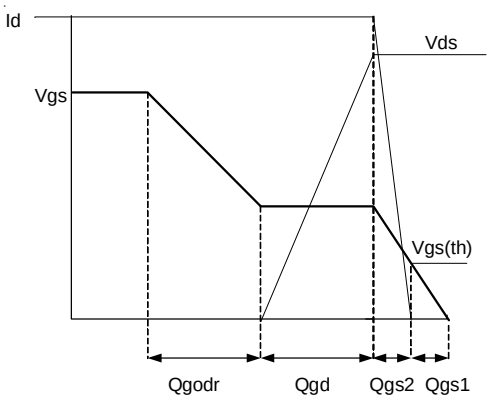


Fig 17b. Gate Charge Waveform

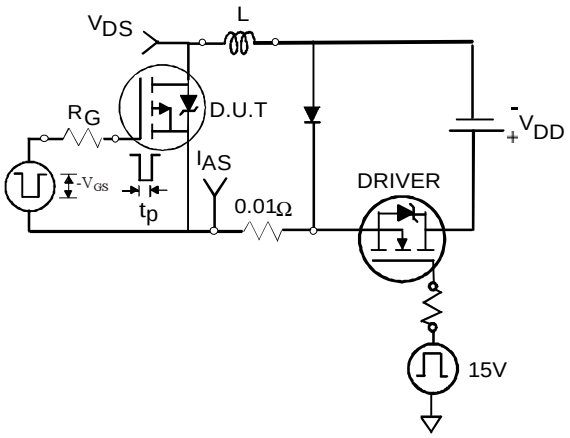


Fig 18a. Unclamped Inductive Test Circuit

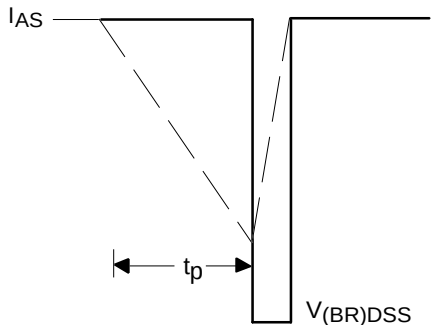


Fig 18b. Unclamped Inductive Waveforms

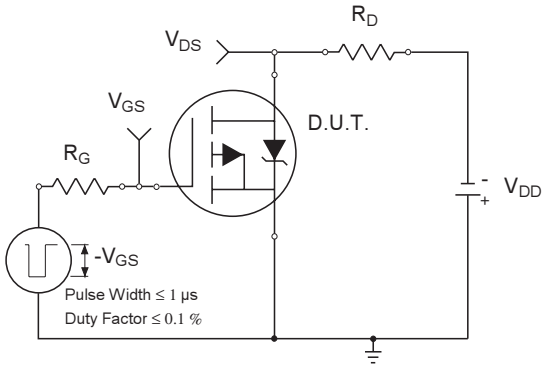


Fig 19a. Switching Time Test Circuit

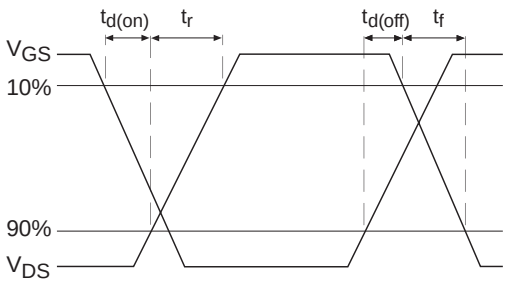
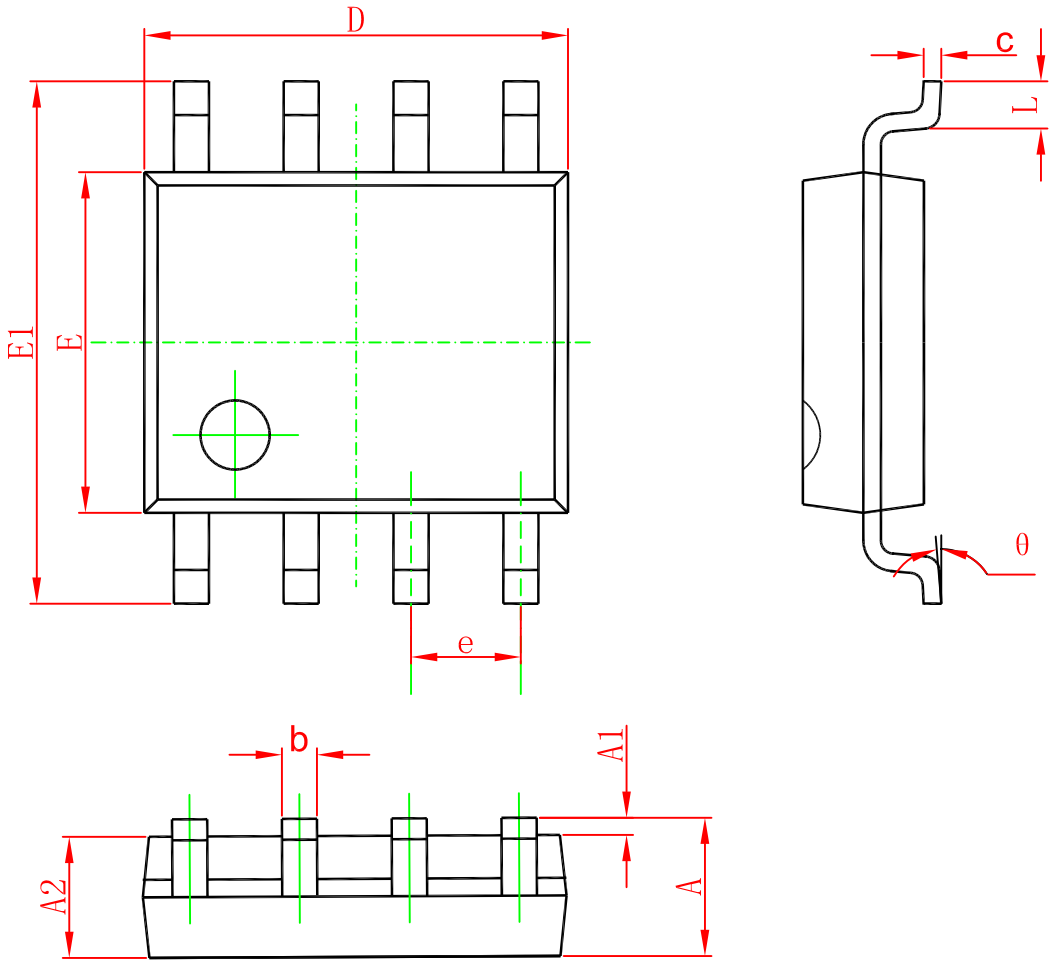


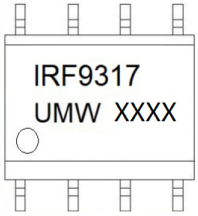
Fig 19b. Switching Time Waveforms

Package Mechanical Data 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
UMW IRF9317TR	SOP-8	3000	Tape and reel

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