

Features

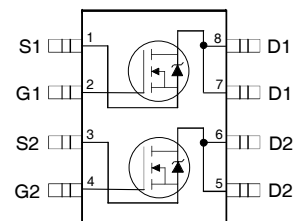
- $V_{DS} (V) = 60V$
- $I_D = 8A$ ($V_{GS}=10V$)
- $R_{DS(ON)} < 23 m\Omega$ ($V_{GS} = 10V$)

Applications

- Synchronous Rectifier MOSFET for Isolated DC-DC Converters
- Low Power Motor Drive Systems

Benefits

- Ultra-Low Gate Impedance
- Fully Characterized Avalanche Voltage and Current
- 20V V_{GS} Max. Gate Rating



SOP-8

Absolute Maximum Ratings

	Parameter	Max.	Units
V_{DS}	Drain-to-Source Voltage	60	V
V_{GS}	Gate-to-Source Voltage	± 20	
$I_D @ T_A = 25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$	8.0	A
$I_D @ T_A = 70^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$	6.4	
I_{DM}	Pulsed Drain Current ①	64	
$P_D @ T_A = 25^\circ C$	Power Dissipation ④	2.0	W
$P_D @ T_A = 70^\circ C$	Power Dissipation ④	1.28	
	Linear Derating Factor	0.016	W/ $^\circ C$
T_J	Operating Junction and	-55 to + 150	$^\circ C$
T_{STG}	Storage Temperature Range		

Thermal Resistance

	Parameter	Typ.	Max.	Units
$R_{\theta JL}$	Junction-to-Drain Lead ⑤		20	$^\circ C/W$
$R_{\theta JA}$	Junction-to-Ambient ④⑤		62.5	

Static @ $T_J = 25^\circ\text{C}$ (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Conditions
BV_{DSS}	Drain-to-Source Breakdown Voltage	60			V	$V_{GS} = 0V, I_D = 250\mu A$
$\Delta BV_{DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient		0.068		V/ $^\circ\text{C}$	Reference to 25°C , $I_D = 1mA$
$R_{DS(on)}$	Static Drain-to-Source On-Resistance		13.7	23	m Ω	$V_{GS} = 10V, I_D = 8.0A$ ③
$V_{GS(th)}$	Gate Threshold Voltage			2	V	$V_{DS} = V_{GS}, I_D = 50\mu A$
$\Delta V_{GS(th)}$	Gate Threshold Voltage Coefficient		-8.2		mV/ $^\circ\text{C}$	
I_{DSS}	Drain-to-Source Leakage Current			20	μA	$V_{DS} = 60V, V_{GS} = 0V$
				250		$V_{DS} = 60V, V_{GS} = 0V, T_J = 125^\circ\text{C}$
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	18			S	$V_{DS} = 25V, I_D = 6.4A$
Q_g	Total Gate Charge		24	36	nC	$V_{DS} = 30V$ $V_{GS} = 10V$ $I_D = 6.4A$ See Fig. 17
Q_{gs1}	Pre-Vth Gate-to-Source Charge		3.8			
Q_{gs2}	Post-Vth Gate-to-Source Charge		1.2			
Q_{gd}	Gate-to-Drain Charge		7.2			
Q_{godr}	Gate Charge Overdrive		11.8			
Q_{sw}	Switch Charge ($Q_{gs2} + Q_{gd}$)		8.4			
Q_{oss}	Output Charge		7.5		nC	$V_{DS} = 16V, V_{GS} = 0V$
$t_{d(on)}$	Turn-On Delay Time		5.1		ns	$V_{DD} = 30V, V_{GS} = 10V$ ③ $I_D = 6.4A$ $R_G = 1.8\Omega$
t_r	Rise Time		5.9			
$t_{d(off)}$	Turn-Off Delay Time		17			
t_f	Fall Time		6.7			
C_{iss}	Input Capacitance		1330		pF	$V_{GS} = 0V$
C_{oss}	Output Capacitance		190			$V_{DS} = 30V$
C_{rss}	Reverse Transfer Capacitance		92			$f = 1.0MHz$

Avalanche Characteristics

	Parameter	Typ.	Max.	Units
E_{AS}	Single Pulse Avalanche Energy ②		325	mJ
I_{AR}	Avalanche Current ①		6.4	A

Diode Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)			1.8	A	MOSFET symbol showing the integral reverse p-n junction diode.
I_{SM}	Pulsed Source Current (Body Diode) ①			64		
V_{SD}	Diode Forward Voltage			1.3	V	$T_J = 25^\circ\text{C}, I_S = 6.4A, V_{GS} = 0V$ ③
t_{rr}	Reverse Recovery Time		20	30	ns	$T_J = 25^\circ\text{C}, I_F = 6.4A, V_{DD} = 30V$ $di/dt = 300A/\mu s$ ③
Q_{rr}	Reverse Recovery Charge		61	92	nC	

Notes:

- ① Repetitive rating; pulse width limited by max. junction temperature.
- ② Starting $T_J = 25^\circ\text{C}$, $L = 16mH$
 $R_G = 25\Omega$, $I_{AS} = 6.4A$.
- ③ Pulse width $\leq 400\mu s$; duty cycle $\leq 2\%$.
- ④ When mounted on 1 inch square copper board.
- ⑤ R_θ is measured at T_J approximately 90°C .

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

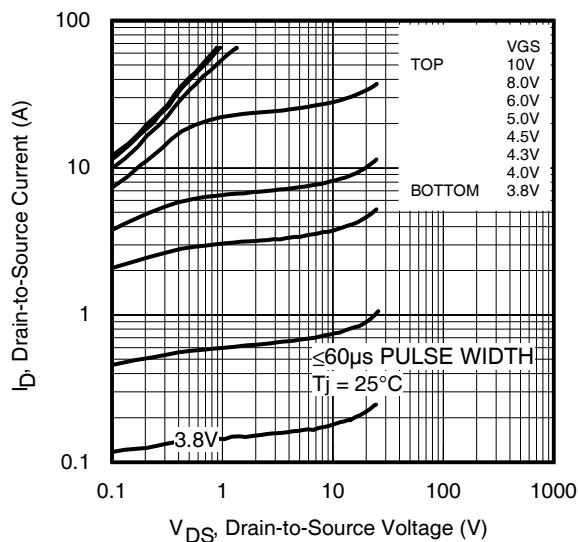


Fig 1. Typical Output Characteristics

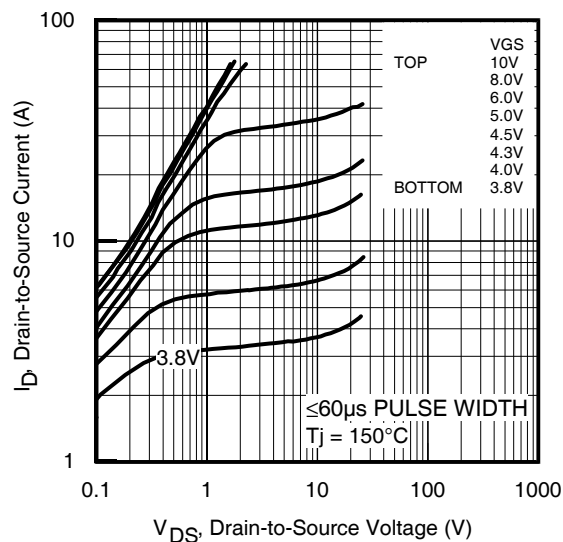


Fig 2. Typical Output Characteristics

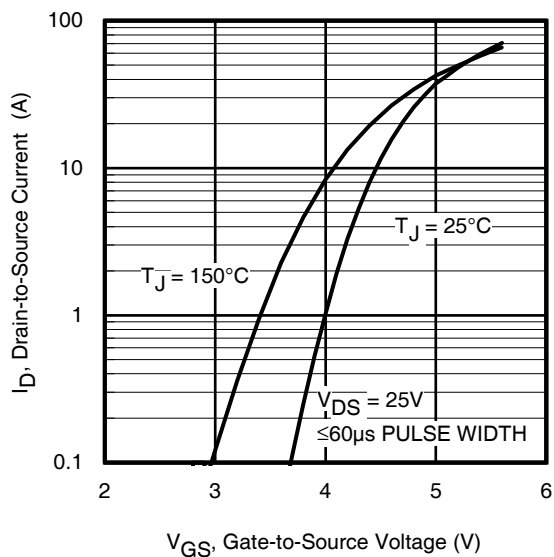


Fig 3. Typical Transfer Characteristics

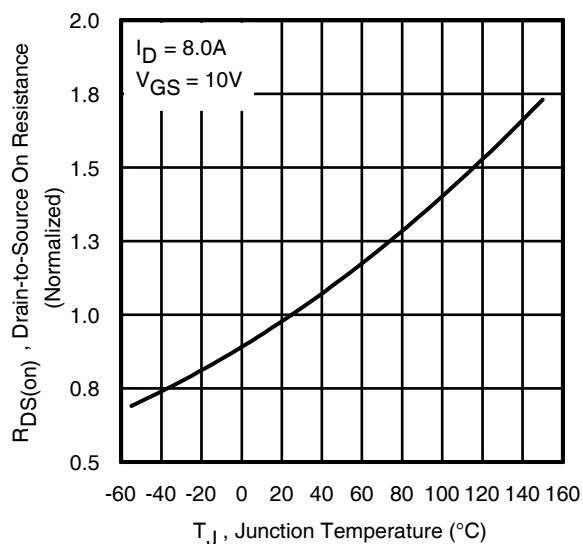


Fig 4. Normalized On-Resistance vs. Temperature

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

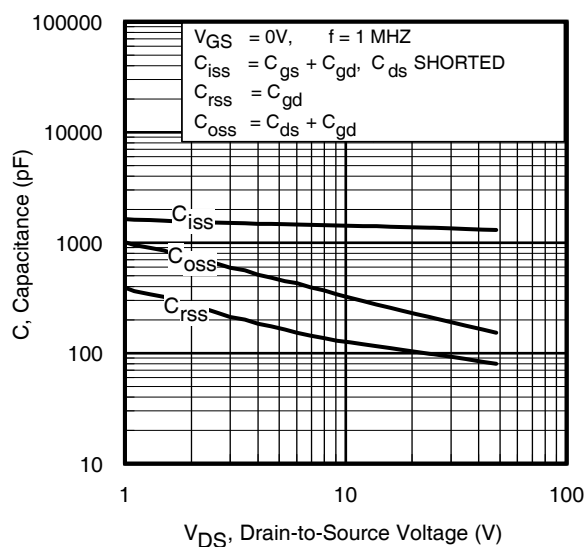


Fig 5. Typical Capacitance vs. Drain-to-Source Voltage

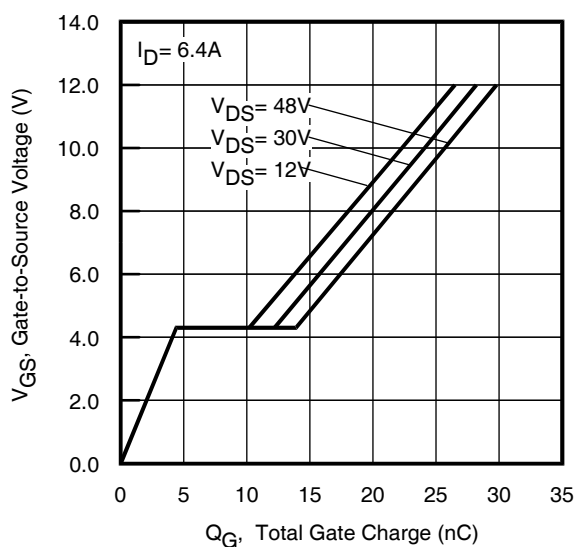


Fig 6. Typical Gate Charge vs. Gate-to-Source Voltage

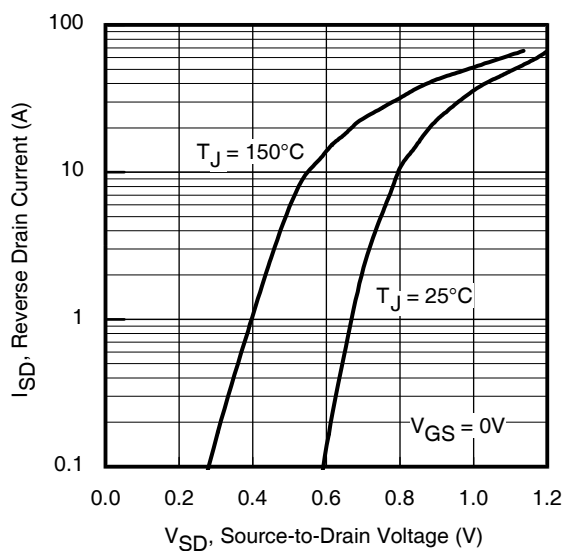


Fig 7. Typical Source-Drain Diode Forward Voltage

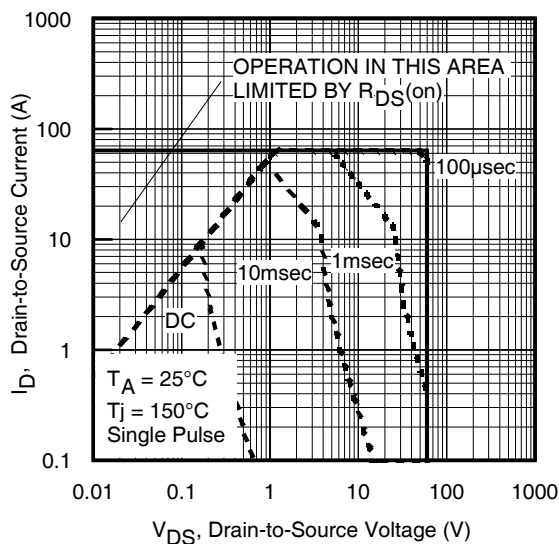


Fig 8. Maximum Safe Operating Area

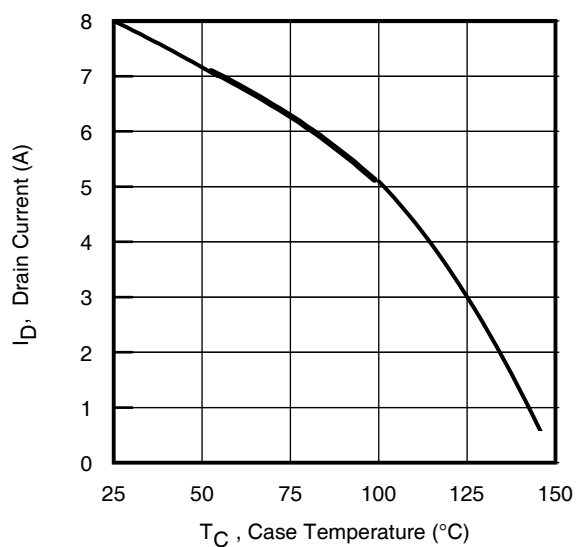


Fig 9. Maximum Drain Current vs. Case Temperature

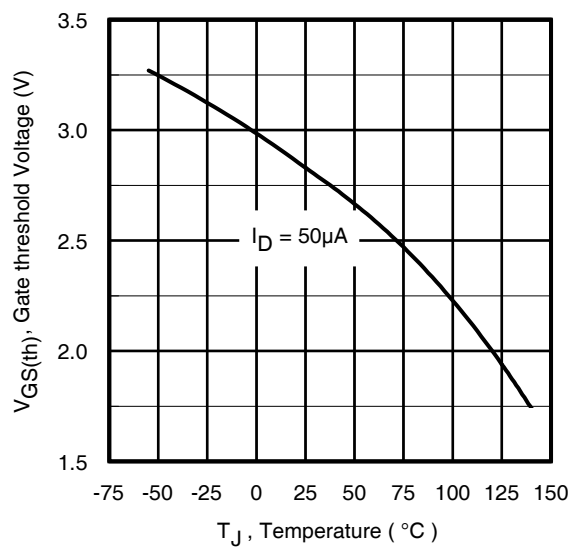


Fig 10. Threshold Voltage vs. Temperature

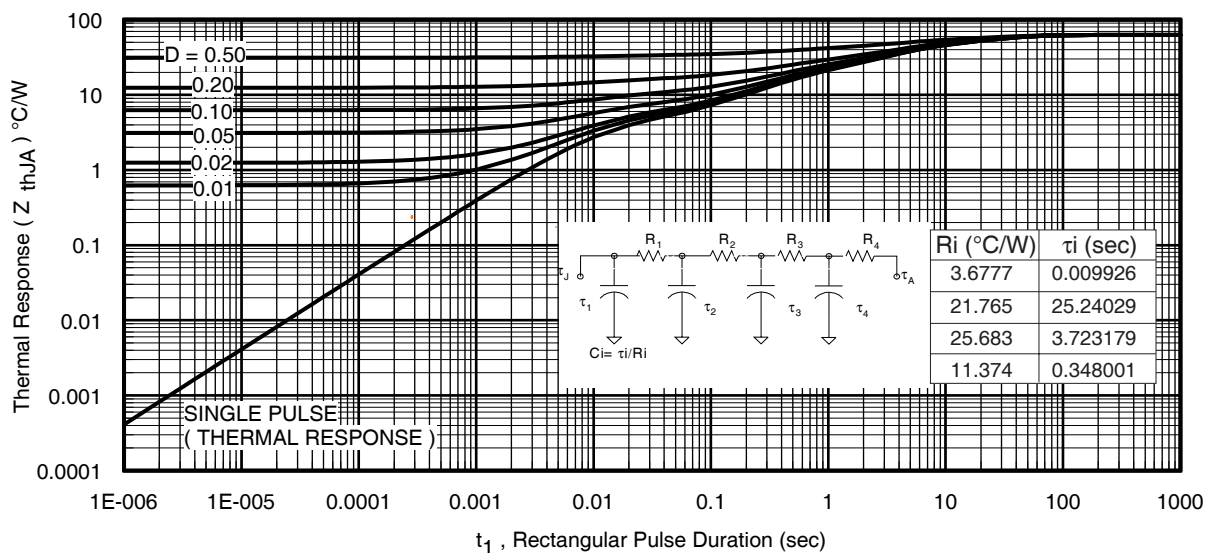


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

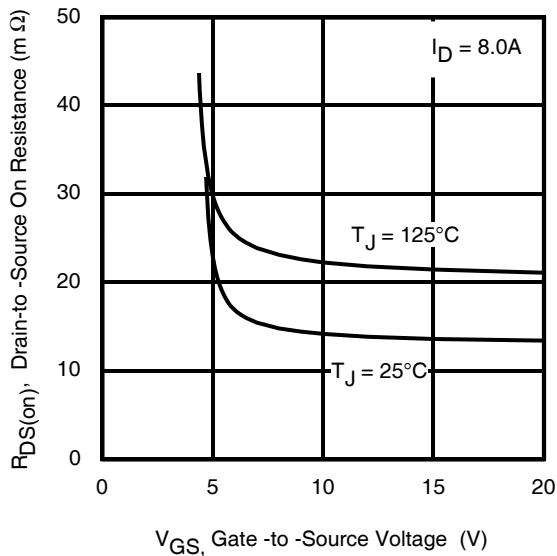


Fig 12. On-Resistance vs. Gate Voltage

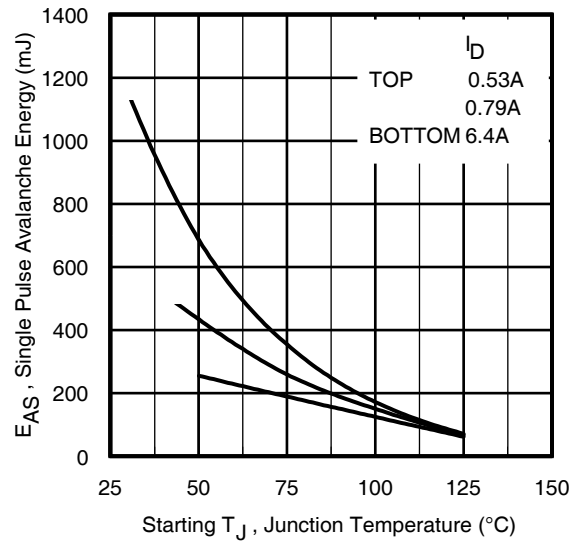


Fig 13. Maximum Avalanche Energy vs. Drain Current

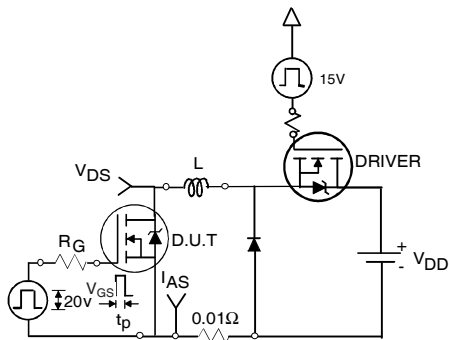


Fig 14a. Unclamped Inductive Test Circuit

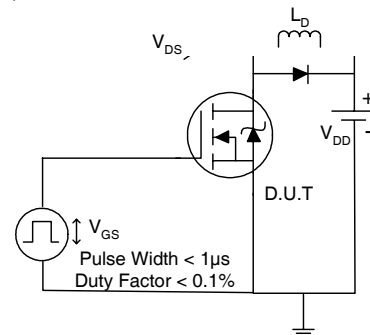


Fig 15a. Switching Time Test Circuit

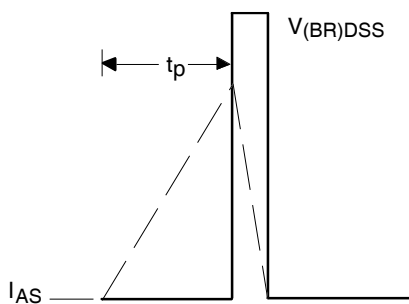


Fig 14b. Unclamped Inductive Waveforms

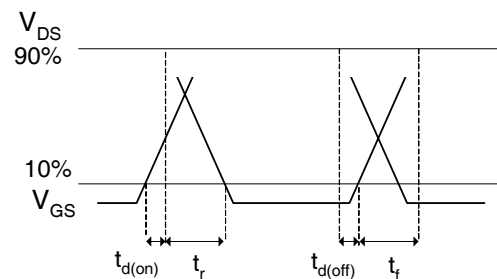


Fig 15b. Switching Time Waveforms

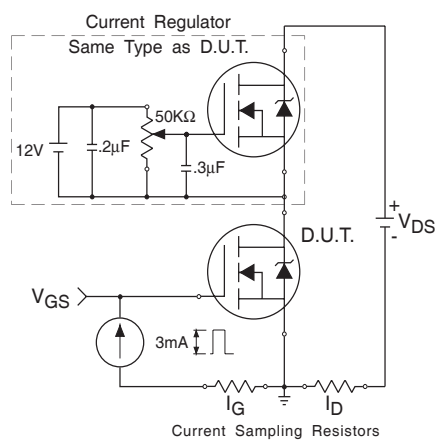


Fig 17a. Gate Charge Test Circuit

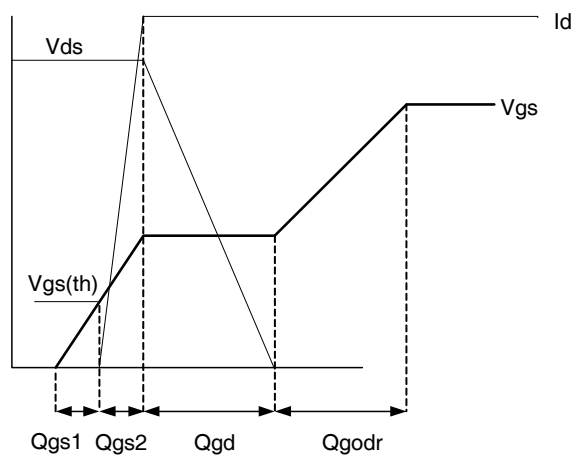
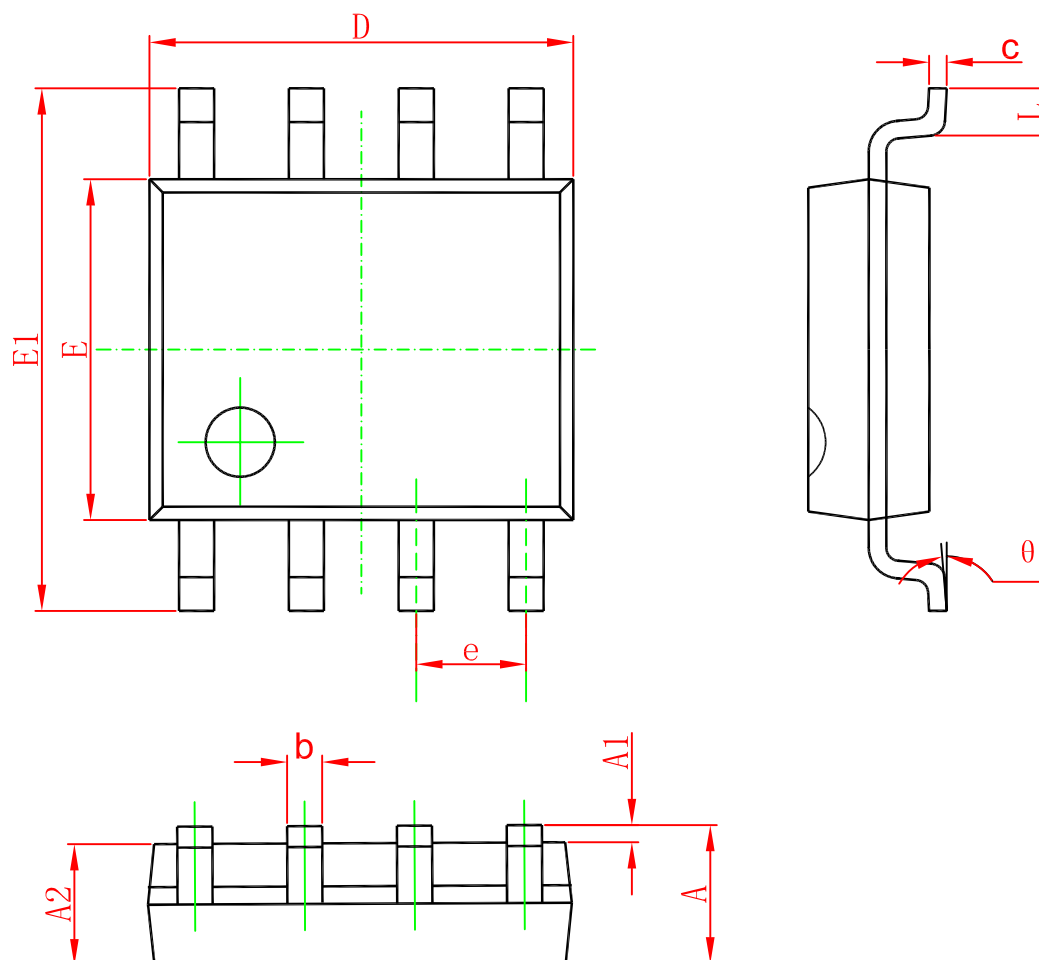


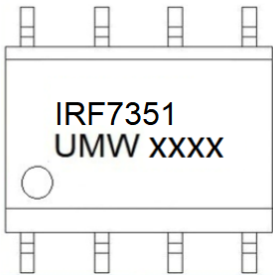
Fig 17b. Gate Charge Waveform

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 IRF7351TR	SOP-8	3000	Tape and reel