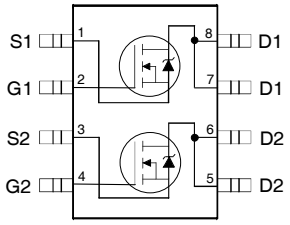
Features

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

Applications

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



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Benefits

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

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°C	Continuous Drain Current, V_{GS} @ 10V	8.0	A
I_D @ T_A = 70°C	Continuous Drain Current, V_{GS} @ 10V	6.4	
I_{DM}	Pulsed Drain Current ①	64	
P_D @T_A = 25°C	Power Dissipation ④	2.0	W
P_D @T_A = 70°C	Power Dissipation ④	1.28	
	Linear Derating Factor	0.016	W/°C
T_J T_{STG}	Operating Junction and Storage Temperature Range	-55 to + 150	°C

Thermal Resistance

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

Static @ T_J = 25°C (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Conditions
BV_{DSS}	Drain-to-Source Breakdown Voltage	60			V	V_{GS} = 0V, I_D = 250μA
$\Delta BV_{DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient		0.068		V/°C	Reference to 25°C, I_D = 1mA
$R_{DS(on)}$	Static Drain-to-Source On-Resistance		13.7	23	mΩ	V_{GS} = 10V, I_D = 8.0A ③
$V_{GS(th)}$	Gate Threshold Voltage			2	V	V_{DS} = V_{GS}, I_D = 50μA
$\Delta V_{GS(th)}$	Gate Threshold Voltage Coefficient		-8.2		mV/°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°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	18			S	V_{DS} = 25V, I_D = 6.4A
Q_g	Total Gate Charge		24	36		
Q_{gs1}	Pre-Vth Gate-to-Source Charge		3.8			V_{DS} = 30V
Q_{gs2}	Post-Vth Gate-to-Source Charge		1.2		nC	V_{GS} = 10V
Q_{gd}	Gate-to-Drain Charge		7.2			I_D = 6.4A
Q_{godr}	Gate Charge Overdrive		11.8			See Fig. 17
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			V_{DD} = 30V, V_{GS} = 10V ③
t_r	Rise Time		5.9		ns	I_D = 6.4A
$t_{d(off)}$	Turn-Off Delay Time		17			R_G = 1.8Ω
t_f	Fall Time		6.7			
C_{iss}	Input Capacitance		1330			V_{GS} = 0V
C_{oss}	Output Capacitance		190		pF	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°C, I_S = 6.4A, V_{GS} = 0V ③
t_{rr}	Reverse Recovery Time		20	30	ns	T_J = 25°C, I_F = 6.4A, V_{DD} = 30V
Q_{rr}	Reverse Recovery Charge		61	92	nC	di/dt = 300A/μs ③

Notes:

① Repetitive rating; pulse width limited by max. junction temperature.

② Starting T_J = 25°C, L = 16mH R_G = 25Ω, I_{AS} = 6.4A.

③ Pulse width ≤ 400μs; duty cycle ≤ 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)

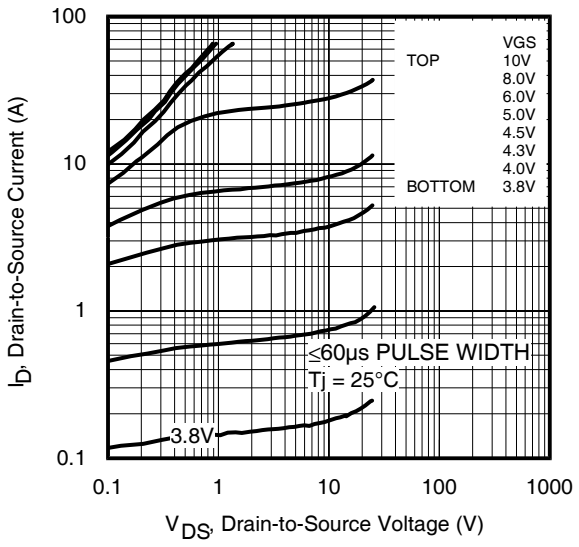

Fig 1. Typical Output Characteristics

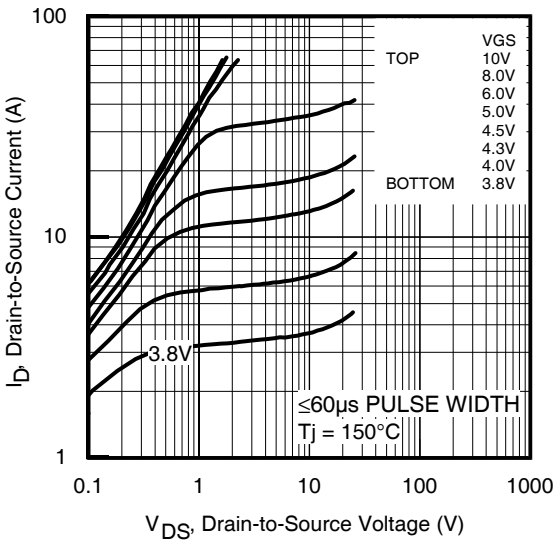

Fig 2. Typical Output Characteristics

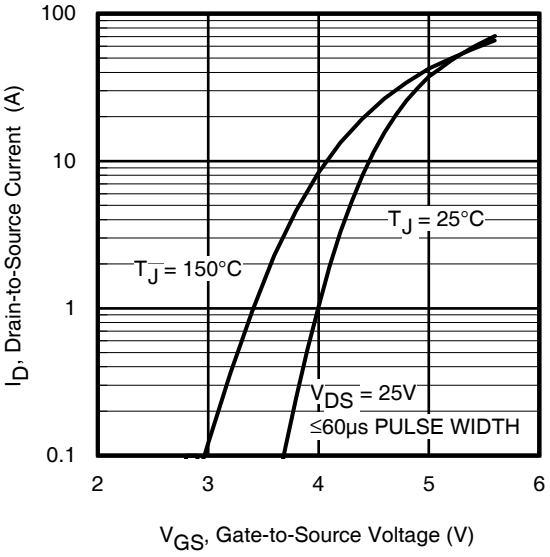

Fig 3. Typical Transfer Characteristics

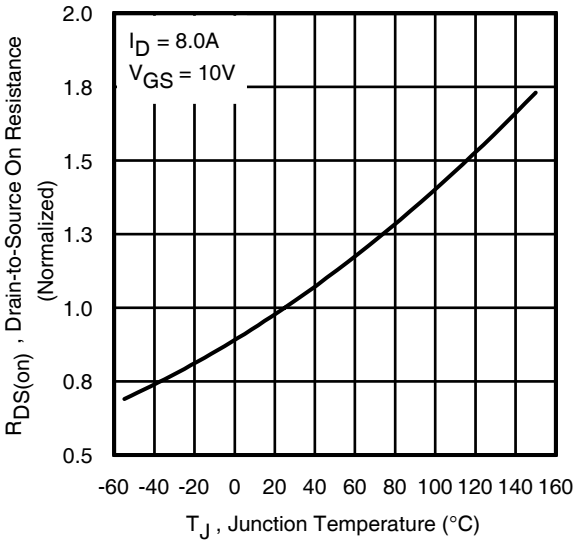

Fig 4. Normalized On-Resistance vs. Temperature

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

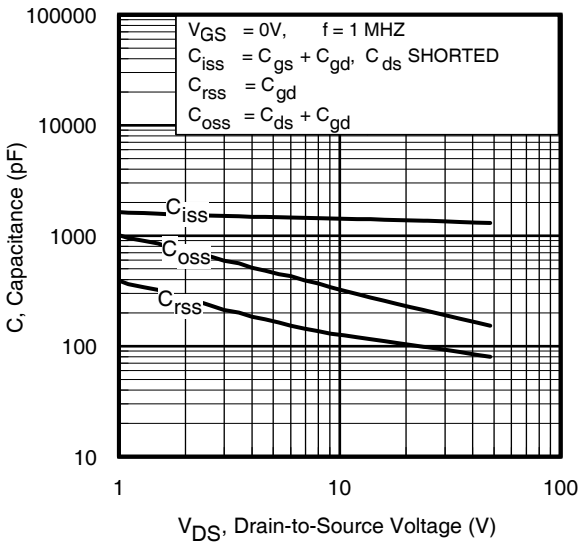

Fig 5. Typical Capacitance vs. Drain-to-Source Voltage

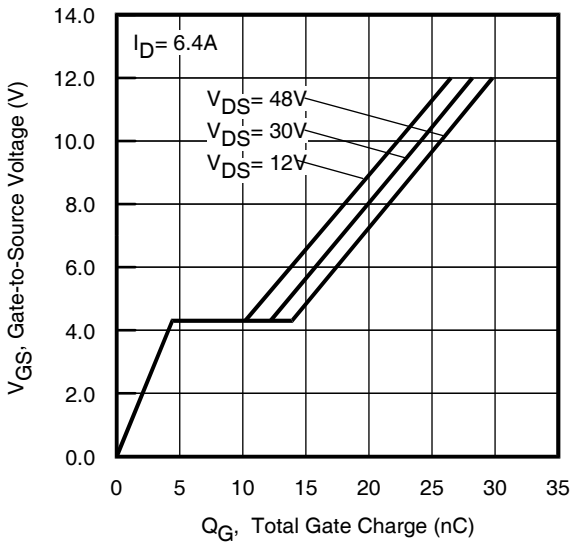

Fig 6. Typical Gate Charge vs. Gate-to-Source Voltage

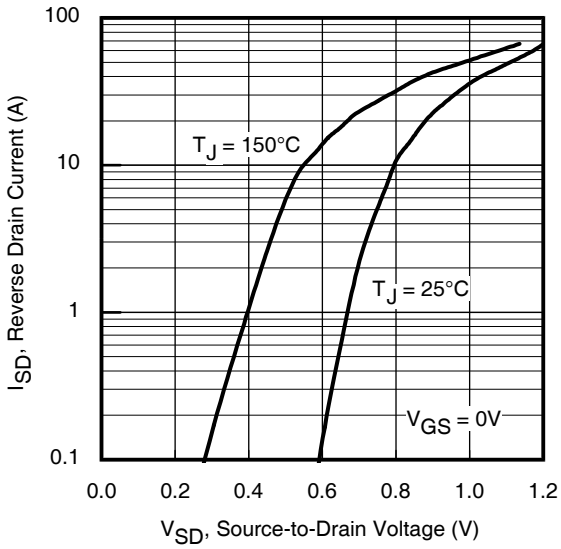

Fig 7. Typical Source-Drain Diode Forward Voltage

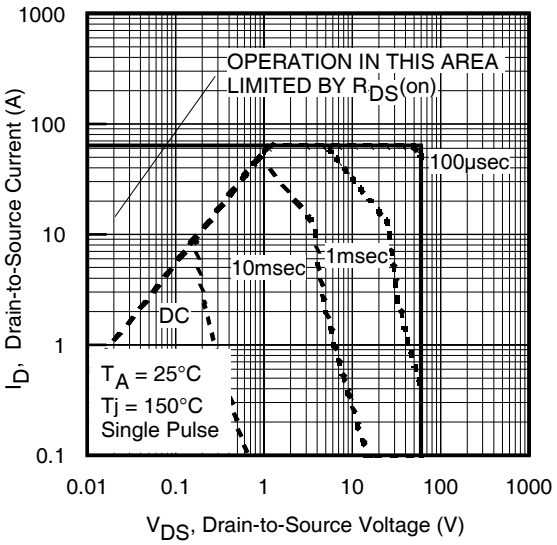

Fig 8. Maximum Safe Operating Area

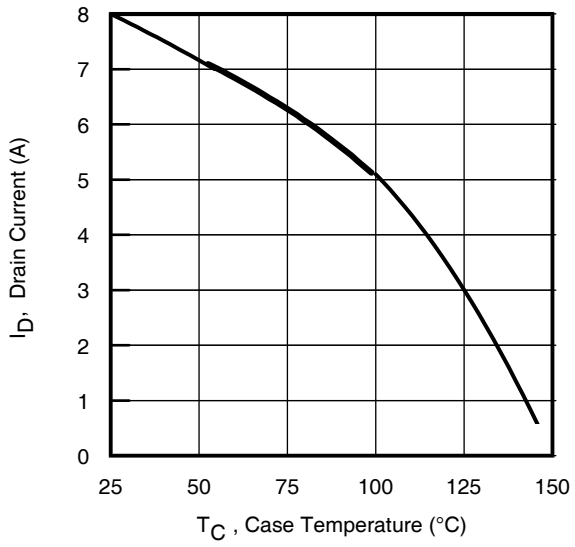

Fig 9. Maximum Drain Current vs. Case Temperature

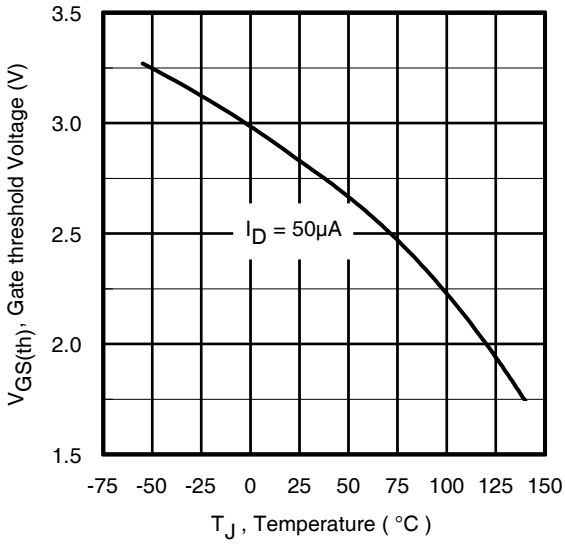

Fig 10. Threshold Voltage vs. Temperature

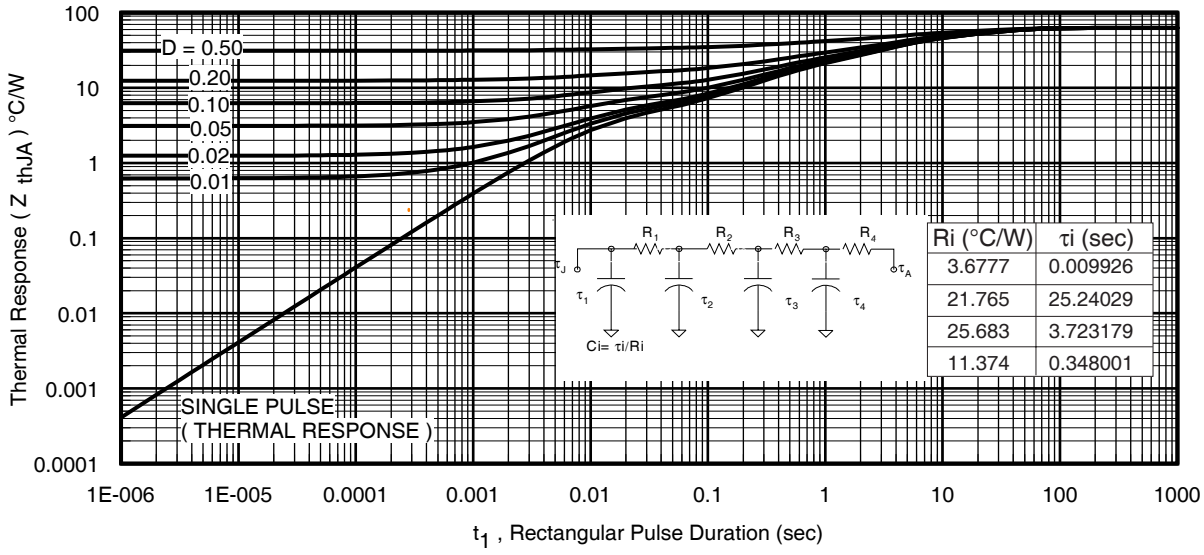

Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

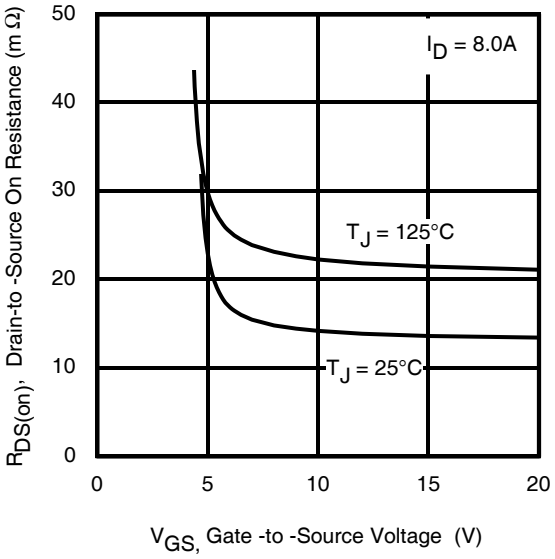

Fig 12. On-Resistance vs. Gate Voltage

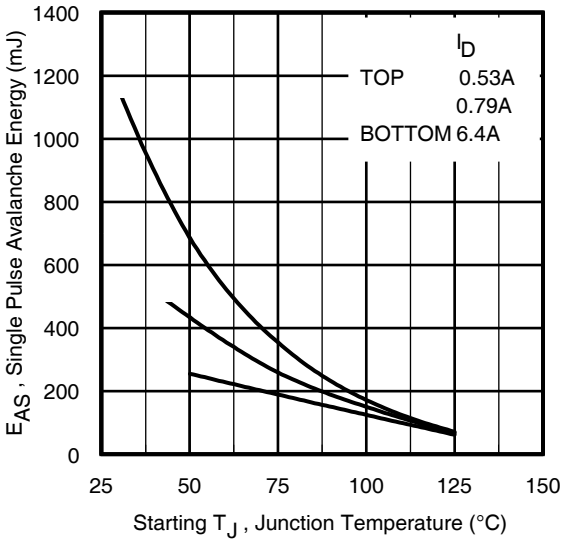

Fig 13. Maximum Avalanche Energy vs. Drain Current

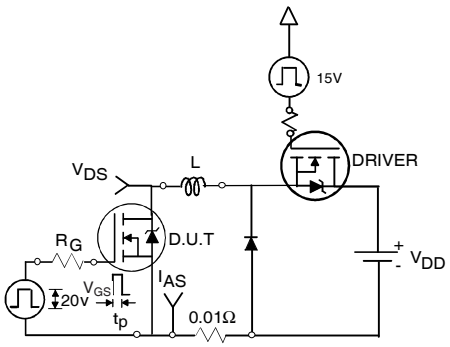

Fig 14a. Unclamped Inductive Test Circuit

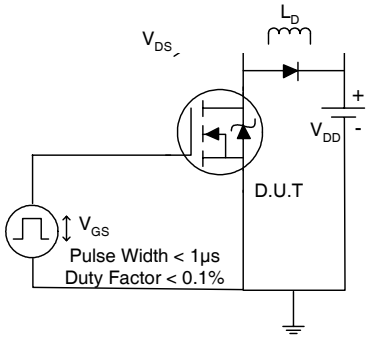

Fig 15a. Switching Time Test Circuit

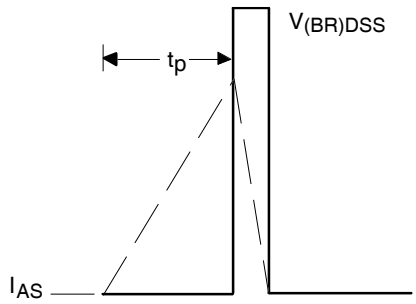

Fig 14b. Unclamped Inductive Waveforms

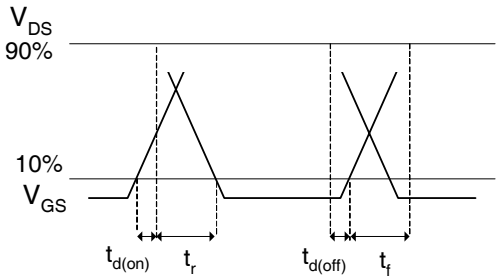

Fig 15b. Switching Time Waveforms

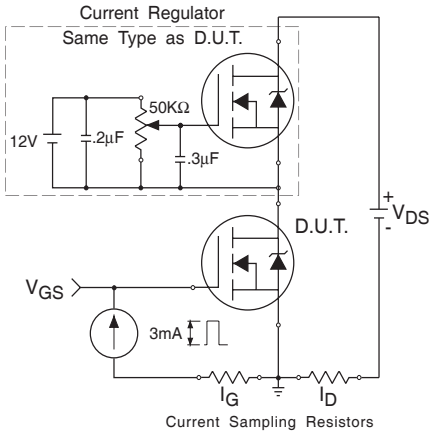

Fig 17a. Gate Charge Test Circuit

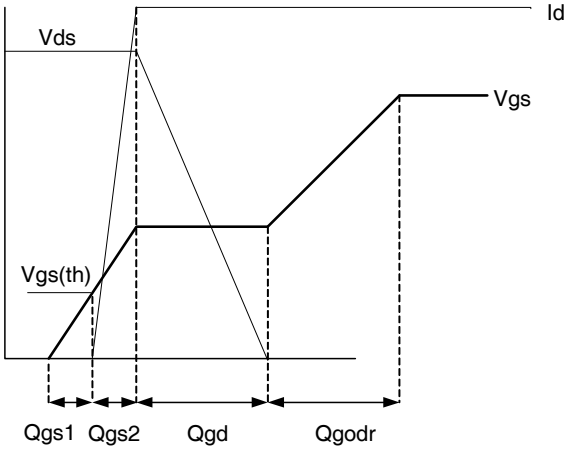

Fig 17b. Gate Charge Waveform

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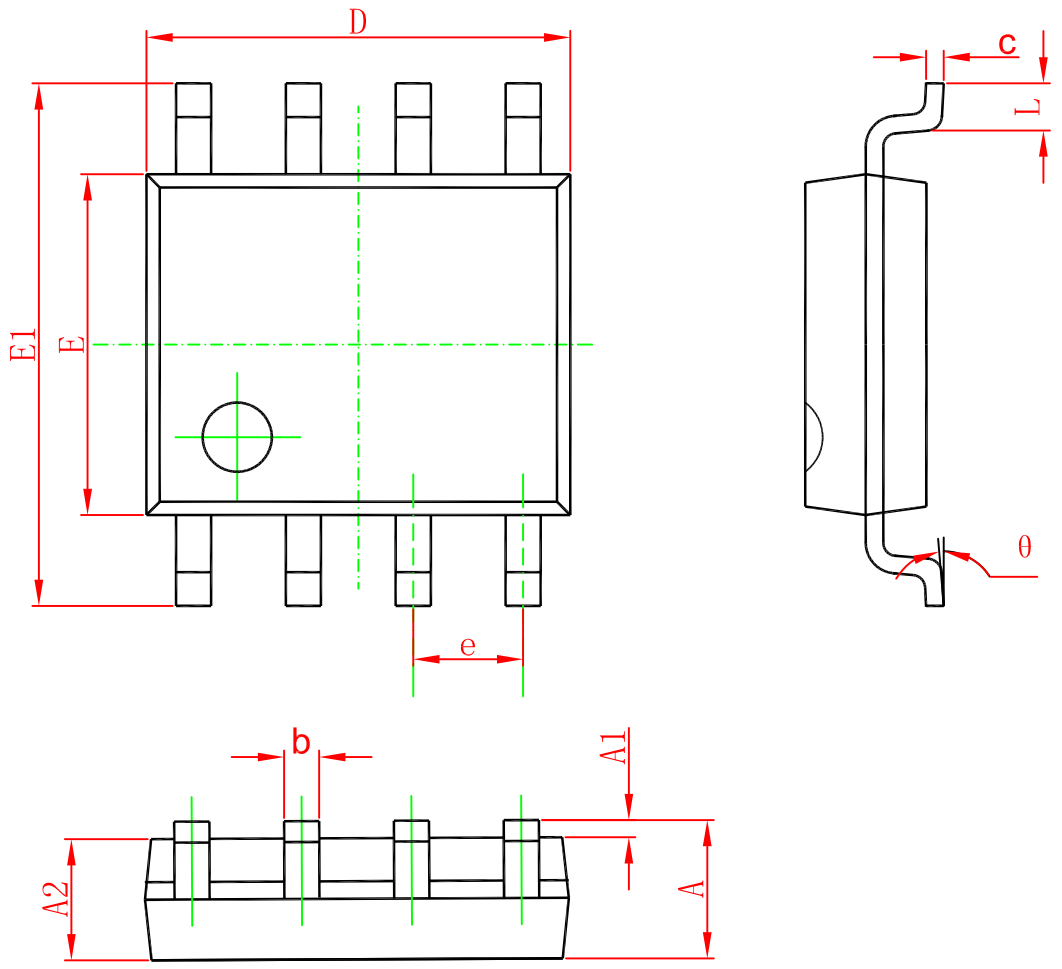
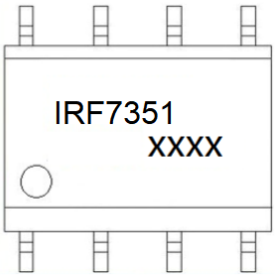


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270(BSC)		0.050(BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°

Marking



Ordering information

Order code	Package	Baseqty	Deliverymode
IRF7351TR	SOP-8	3000	Tape and reel