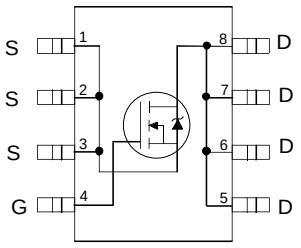
Benefits

- $V_{DS\,(V)}$ = 12V
- $R_{DS(ON)}$ < 8mΩ (V_{GS} = 4.5V)
- $R_{DS(ON)}$ < 30mΩ (V_{GS} = 2.8V)



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Applications

- High Frequency 3.3V and 5V input Point-of-Load Synchronous Buck Converters for Netcom and Computing Applications.
- Power Management for Netcom, Computing and Portable Applications.
- Lead-Free

Absolute Maximum Ratings

Symbol	Parameter	Max.	Units
V_{DS}	Drain-Source Voltage	12	V
V_{GS}	Gate-to-Source Voltage	±12	V
I_D @ T_A = 25°C	Continuous Drain Current, V_{GS} @ 10V	15	A
I_D @ T_A = 70°C	Continuous Drain Current, V_{GS} @ 10V	12	
I_{DM}	Pulsed Drain Current①	120	
P_D @T_A = 25°C	Maximum Power Dissipation④	2.5	W
P_D @T_A = 70°C	Maximum Power Dissipation④	1.6	W
	Linear Derating Factor	0.02	W/°C
T_J , T_{STG}	Junction and Storage Temperature Range	-55 to + 150	°C

Thermal Resistance

Symbol	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°C, L = 2.3mH R_G = 25Ω, I_{AS} = 12A.
③ Pulse width ≤ 400μs; duty cycle
④ When mounted on 1 inch square copper board.

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

	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	12			V	V_{GS} = 0V, I_D = 250μA
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient		0.014		V/°C	Reference to 25°C, I_D = 1mA
$R_{DS(on)}$	Static Drain-to-Source On-Resistance		6.0	8.0	mΩ	V_{GS} = 4.5V, I_D = 15A ③
			12	30		V_{GS} = 2.8V, I_D = 12A ③
$V_{GS(th)}$	Gate Threshold Voltage	0.6		1.9	V	V_{DS} = V_{GS}, I_D = 250μA
I_{DSS}	Drain-to-Source Leakage Current			100	μA	V_{DS} = 9.6V, V_{GS} = 0V
				250		V_{DS} = 9.6V, V_{GS} = 0V, T_J = 125°C
I_{GSS}	Gate-to-Source Forward Leakage			200	nA	V_{GS} = 12V
	Gate-to-Source Reverse Leakage			-200		V_{GS} = -12V

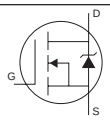
Dynamic @ T_J = 25°C (unless otherwise specified)

Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
g_{fs}	Forward Transconductance	31			S	V_{DS} = 6.0V, I_D = 12A
Q_g	Total Gate Charge		26	40	nC	I_D = 12A
Q_{gs}	Gate-to-Source Charge		4.6			V_{DS} = 10V
Q_{gd}	Gate-to-Drain ("Miller") Charge		11			V_{GS} = 4.5V
Q_{oss}	Output Gate Charge		17			V_{GS} = 0V, V_{DS} = 5.0V
$t_{d(on)}$	Turn-On Delay Time		11		ns	V_{DD} = 6.0V
t_r	Rise Time		29			I_D = 12A
$t_{d(off)}$	Turn-Off Delay Time		19			R_G = 1.8Ω
t_f	Fall Time		8.3			V_{GS} = 4.5V ③
C_{iss}	Input Capacitance		2550		pF	V_{GS} = 0V
C_{oss}	Output Capacitance		2190			V_{DS} = 6.0V
C_{rss}	Reverse Transfer Capacitance		450			f = 1.0MHz

Avalanche Characteristics

Symbol	Parameter	Typ.	Max.	Units
E_{AS}	Single Pulse Avalanche Energy②		160	mJ
I_{AR}	Avalanche Current①		12	A

Diode Characteristics

Symbol	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			120		
V_{SD}	Diode Forward Voltage		0.87	1.2	V	T_J = 25°C, I_S = 12A, V_{GS} = 0V ③
			0.73			T_J = 125°C, I_S = 12A, V_{GS} = 0V ③
t_{rr}	Reverse Recovery Time		55	82	ns	T_J = 25°C, I_F = 12A, V_R=12V
Q_{rr}	Reverse Recovery Charge		59	89	nC	di/dt = 100A/μs ③
t_{rr}	Reverse Recovery Time		54	81	ns	T_J = 125°C, I_F = 12A, V_R=12V
Q_{rr}	Reverse Recovery Charge		60	90	nC	di/dt = 100A/μs ③

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

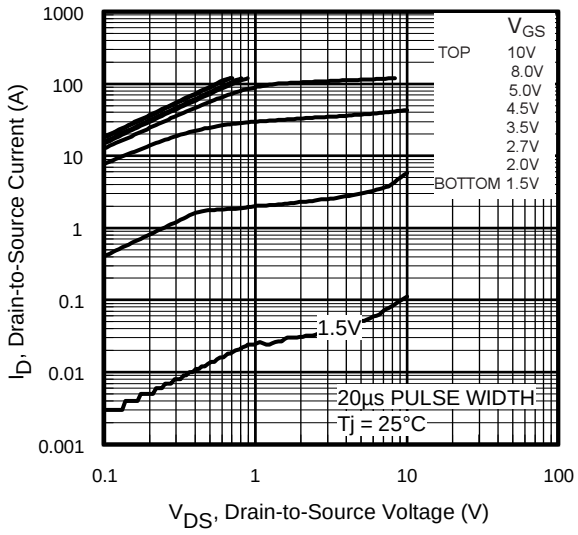


Fig 1. Typical Output Characteristics

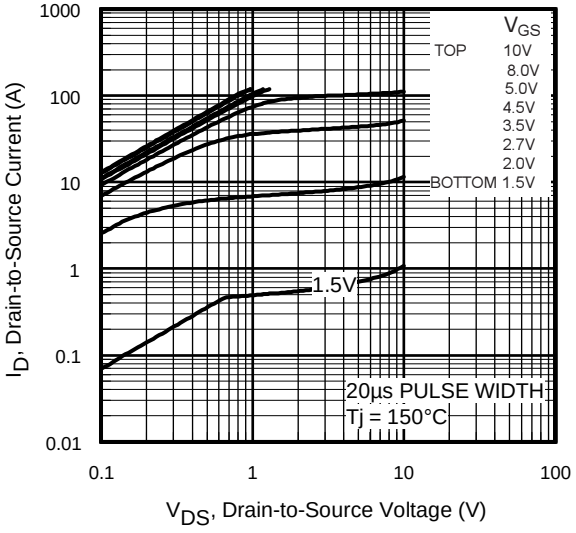


Fig 2. Typical Output Characteristics

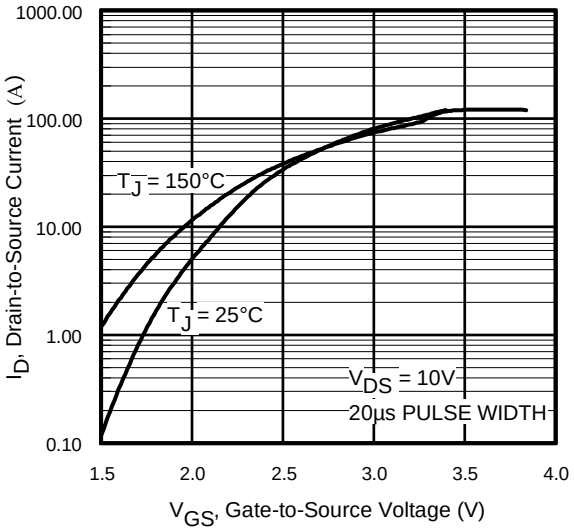


Fig 3. Typical Transfer Characteristics

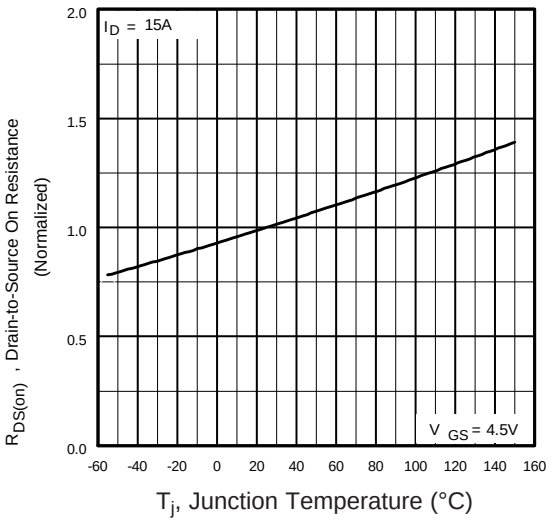


Fig 4. Normalized On-Resistance Vs. Temperature

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

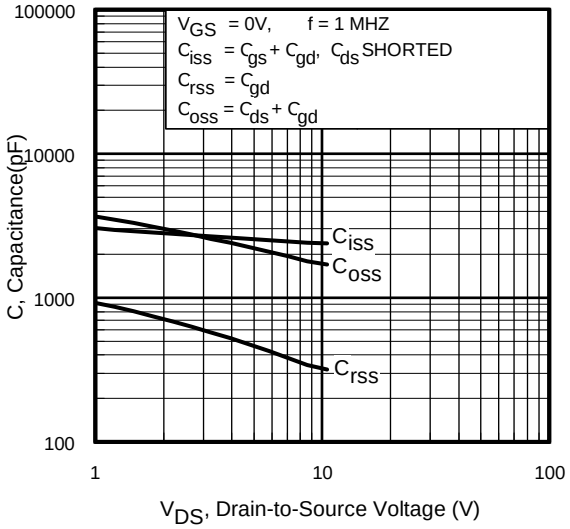


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

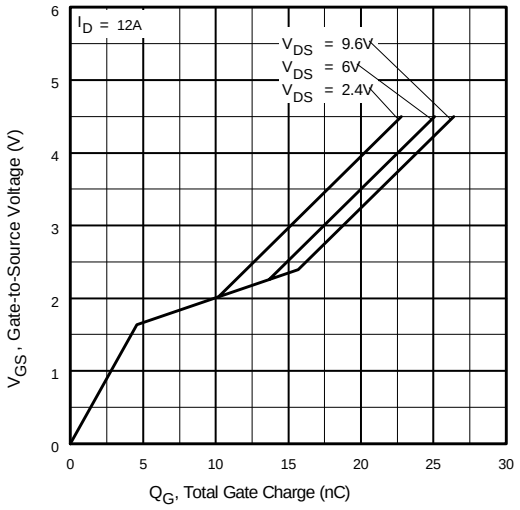


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

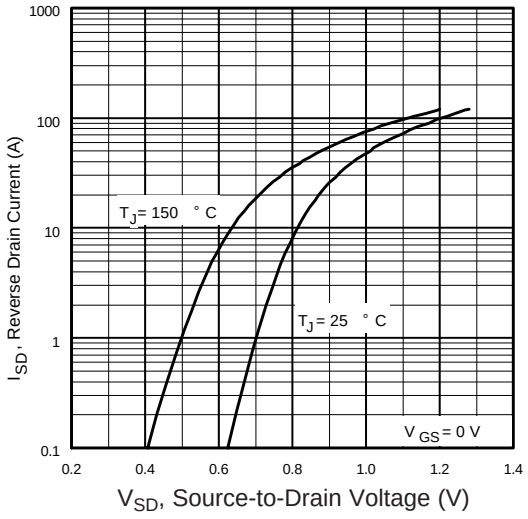


Fig 7. Typical Source-Drain Diode Forward Voltage

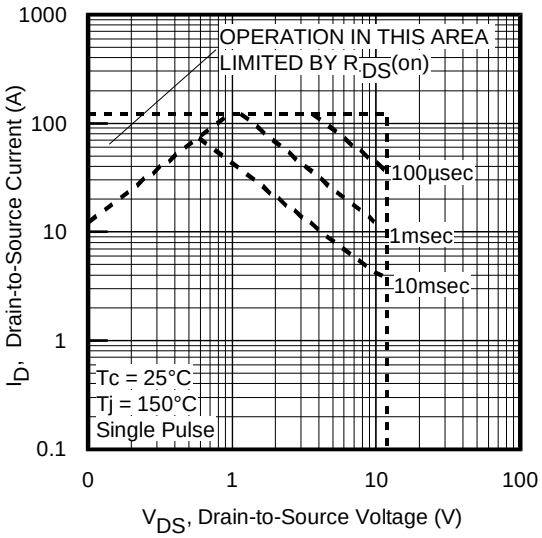


Fig 8. Maximum Safe Operating Area

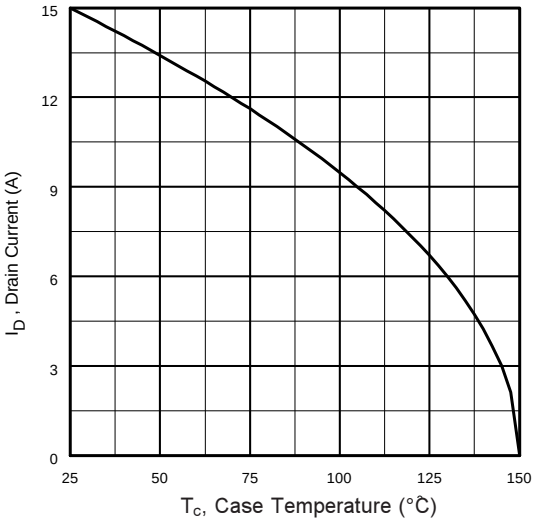


Fig 9. Maximum Drain Current Vs. Case Temperature

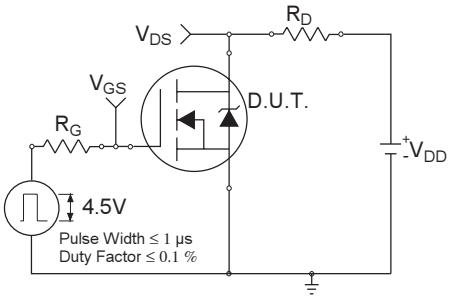


Fig 10a. Switching Time Test Circuit

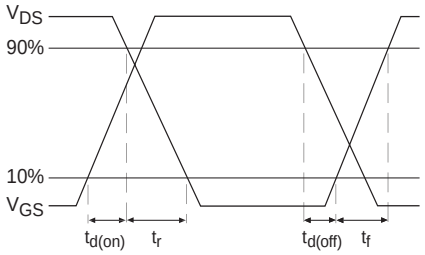


Fig 10b. Switching Time Waveforms

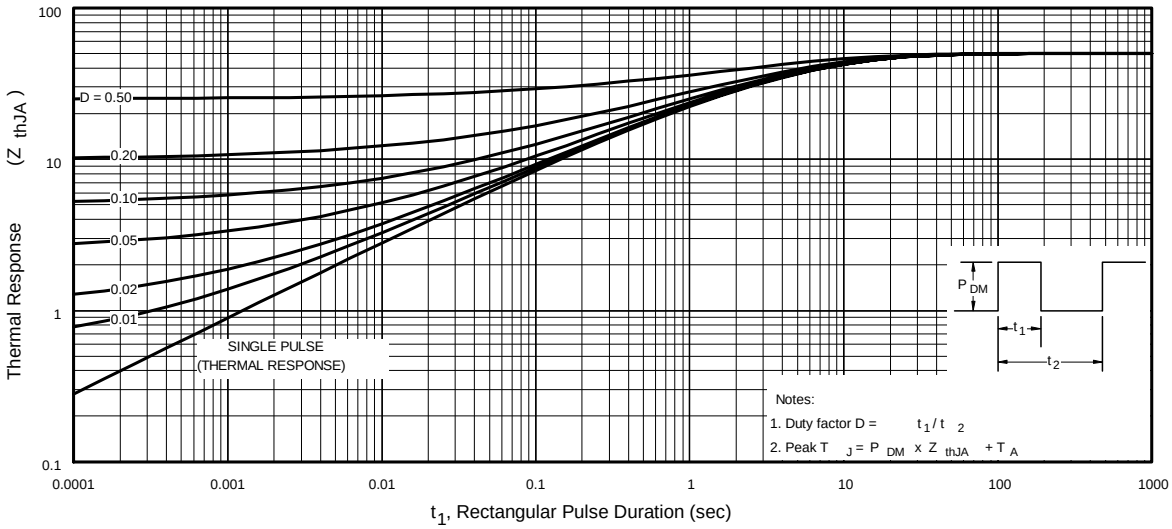


Fig 10. Maximum Effective Transient Thermal Impedance, Junction-to-Case

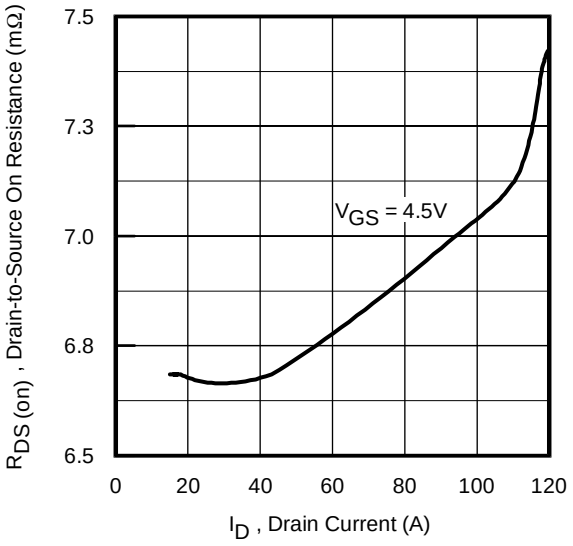


Fig 12. On-Resistance Vs. Drain Current

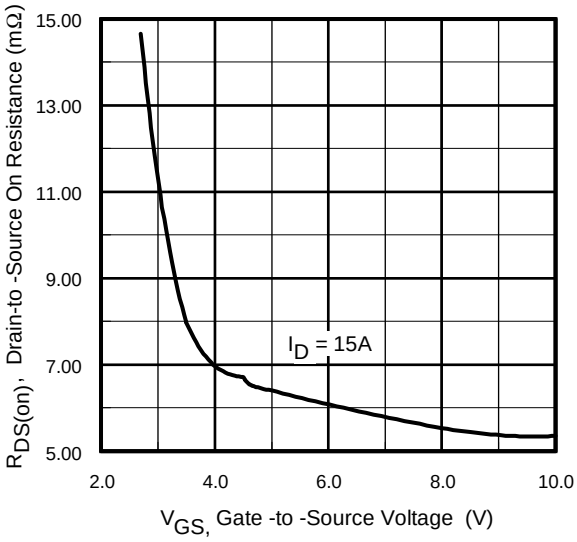


Fig 13. On-Resistance Vs. Gate Voltage

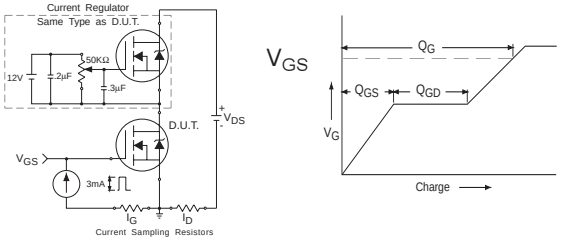


Fig 13a&b. Basic Gate Charge Test Circuit and Waveform

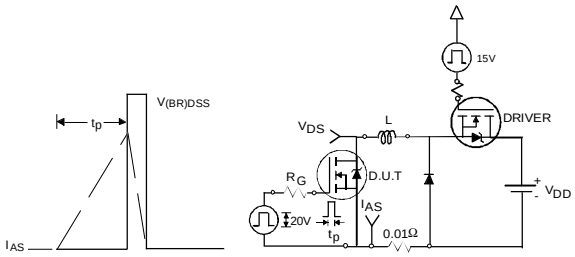


Fig 14a&b. Unclamped Inductive Test circuit and Waveforms

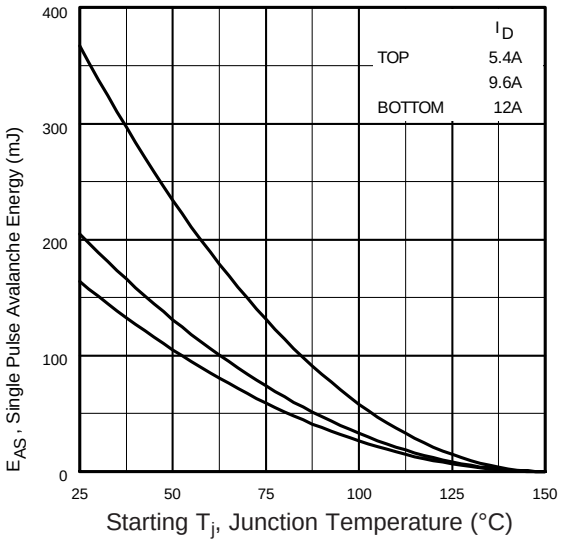


Fig 14c. Maximum Avalanche Energy Vs. Drain Current

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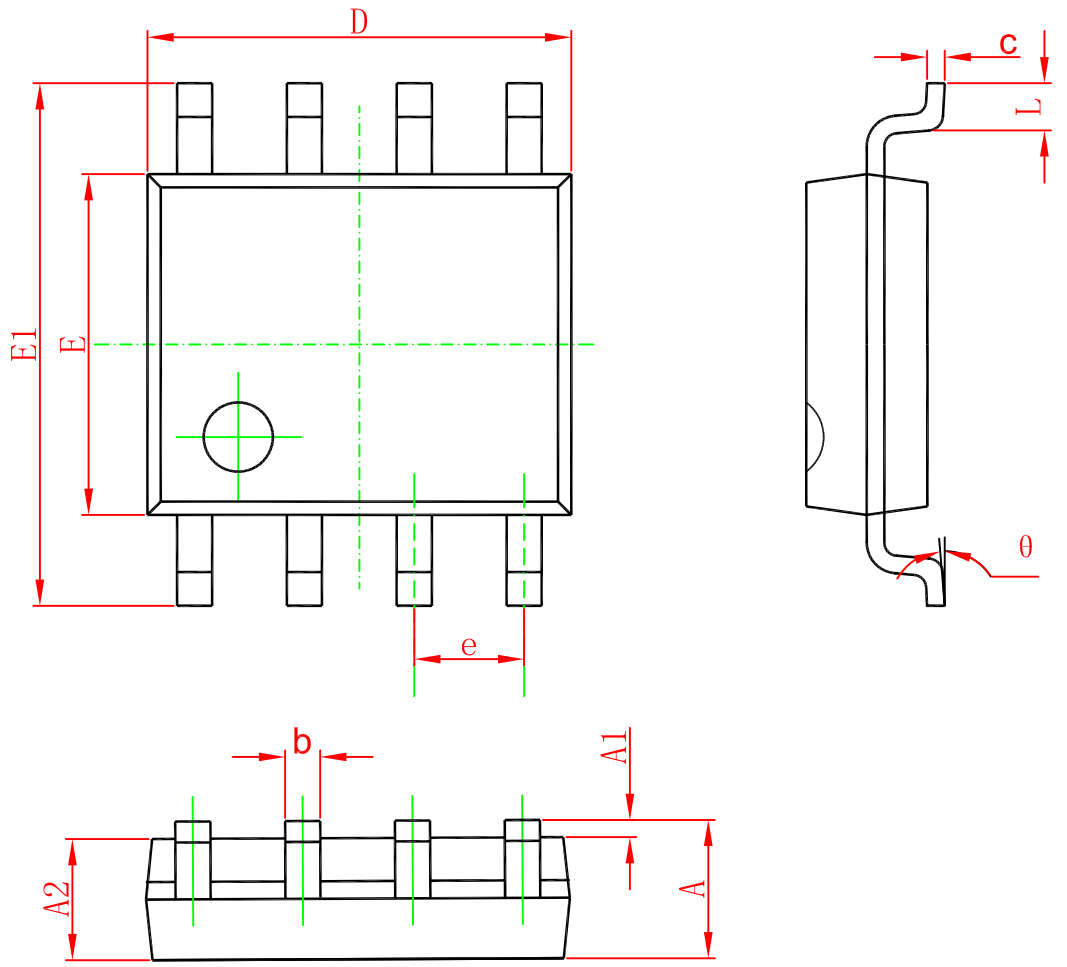
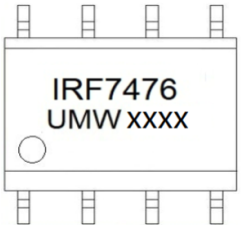


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270(BSC)		0.050(BSC)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

Marking



Ordering information

Order code	Package	Baseqty	Deliverymode
UMW IRF7476TR	SOP-8	3000	Tape and reel