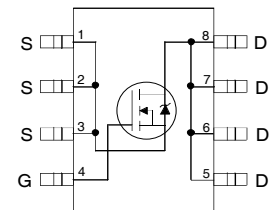


Applications

- High Frequency DC-DC Converters with Synchronous Rectification
- Lead-Free

Benefits

- Ultra-Low $R_{DS(on)}$ at 4.5V V_{GS}
- Low Charge and Low Gate Impedance to Reduce Switching Losses
- Fully Characterized Avalanche Voltage and Current



Top View

Features

- $V_{DS(V)} = 30V$
- $I_D = 16 A$ ($V_{GS} = 10V$)
- $R_{DS(ON)} < 6.5m\Omega$ ($V_{GS}=10V$)
- $R_{DS(ON)} < 7.5 m\Omega$ ($V_{GS}=4.5V$)

Absolute Maximum Ratings

Symbol	Parameter	Max.	Units
V_{DS}	Drain-Source Voltage	30	V
V_{GS}	Gate-to-Source Voltage	± 12	V
$I_D @ T_A = 25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$	16	A
$I_D @ T_A = 70^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$	13	
I_{DM}	Pulsed Drain Current ^①	130	
$P_D @ T_A = 25^\circ C$	Maximum Power Dissipation ^③	2.5	W
$P_D @ T_A = 70^\circ C$	Maximum Power Dissipation ^③	1.6	W
	Linear Derating Factor	0.02	W/ $^\circ C$
T_J, T_{STG}	Junction and Storage Temperature Range	-55 to + 150	$^\circ C$

Thermal Resistance

	Parameter	Max.	Units
$R_{\theta JA}$	Maximum Junction-to-Ambient ^④	50	$^\circ C/W$

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

	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	30			V	$V_{GS} = 0V, I_D = 250\mu A$
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient		0.024		V/ $^\circ\text{C}$	Reference to $25^\circ\text{C}, I_D = 1\text{mA}$
$R_{DS(on)}$	Static Drain-to-Source On-Resistance		4.7	6.5	m Ω	$V_{GS} = 10V, I_D = 16A$ ③
			5.7	7.5		$V_{GS} = 4.5V, I_D = 13A$ ③
			11	20		$V_{GS} = 2.8V, I_D = 3.5A$ ③
$V_{GS(th)}$	Gate Threshold Voltage	0.6		2.0	V	$V_{DS} = V_{GS}, I_D = 250\mu A$
I_{DSS}	Drain-to-Source Leakage Current			20	μA	$V_{DS} = 16V, V_{GS} = 0V$
				100		$V_{DS} = 16V, V_{GS} = 0V, T_J = 125^\circ\text{C}$
I_{GSS}	Gate-to-Source Forward Leakage			200	nA	$V_{GS} = 12V$
	Gate-to-Source Reverse Leakage			-200		$V_{GS} = -12V$

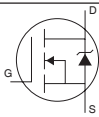
Dynamic @ $T_J = 25^\circ\text{C}$ (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Conditions
g_{fs}	Forward Transconductance	44			S	$V_{DS} = 10V, I_D = 16A$
Q_g	Total Gate Charge		41	62	nC	$I_D = 16A$
Q_{gs}	Gate-to-Source Charge		9.7	15		$V_{DS} = 16V$
Q_{gd}	Gate-to-Drain ("Miller") Charge		18	27		$V_{GS} = 5.0V$, ③
$t_{d(on)}$	Turn-On Delay Time		20			$V_{DD} = 10V$
t_r	Rise Time		25		ns	$I_D = 1.0A$
$t_{d(off)}$	Turn-Off Delay Time		50			$R_G = 6.0\Omega$
t_f	Fall Time		52			$V_{GS} = 4.5V$ ③
C_{iss}	Input Capacitance		3640		pF	$V_{GS} = 0V$
C_{oss}	Output Capacitance		1570			$V_{DS} = 15V$
C_{rss}	Reverse Transfer Capacitance		330			$f = 1.0\text{MHz}$

Avalanche Characteristics

	Parameter	Typ.	Max.	Units
E_{AS}	Single Pulse Avalanche Energy②		250	mJ
I_{AR}	Avalanche Current①		16	A
E_{AR}	Repetitive Avalanche Energy①		0.25	mJ

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	$T_J = 25^\circ\text{C}, I_S = 2.5A, V_{GS} = 0V$ ③
t_{rr}	Reverse Recovery Time		48	72	ns	$T_J = 25^\circ\text{C}, I_F = 2.5A$
Q_{rr}	Reverse Recovery Charge		74	110	nC	$di/dt = 100A/\mu s$ ③

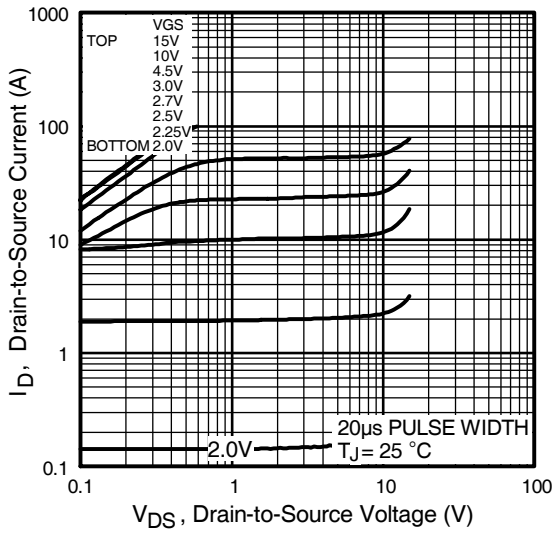


Fig 1. Typical Output Characteristics

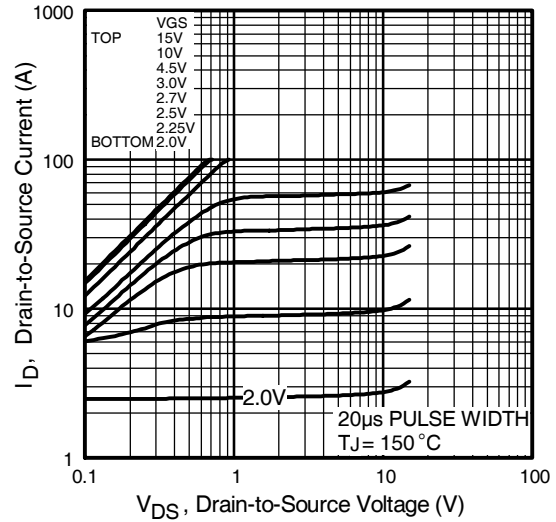


Fig 2. Typical Output Characteristics

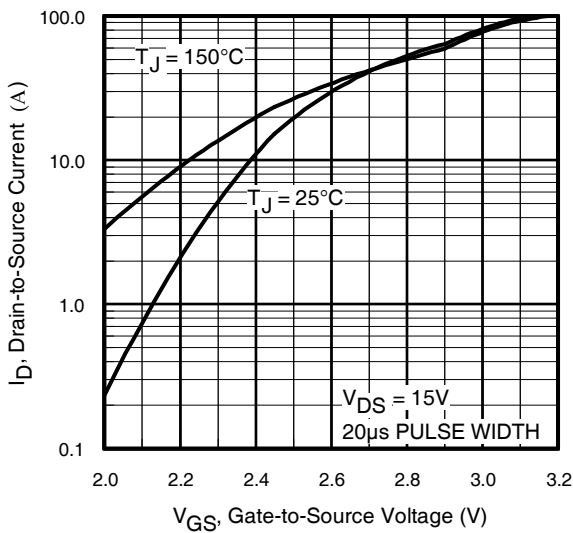


Fig 3. Typical Transfer Characteristics

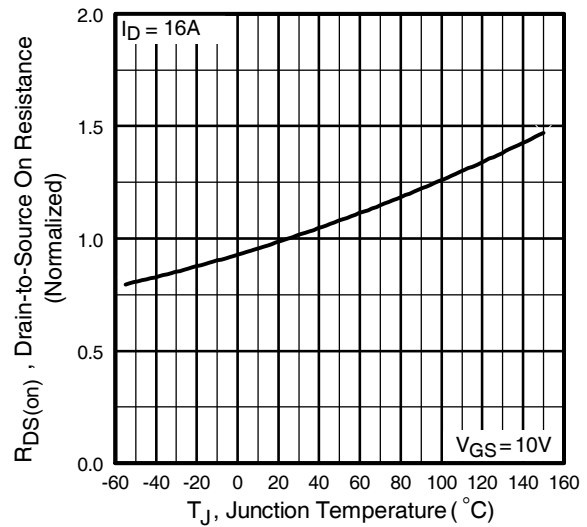


Fig 4. Normalized On-Resistance Vs. Temperature

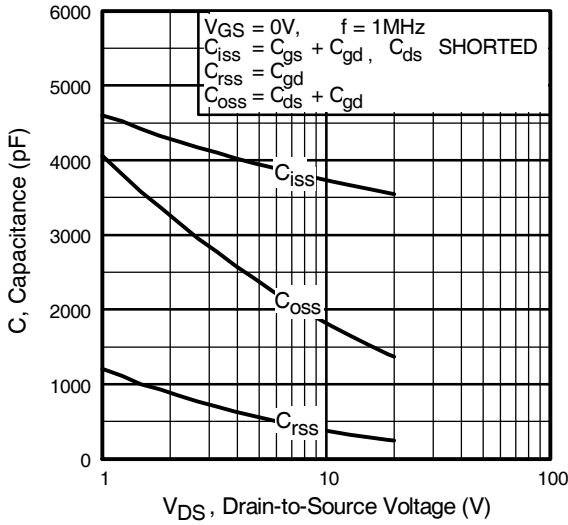


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

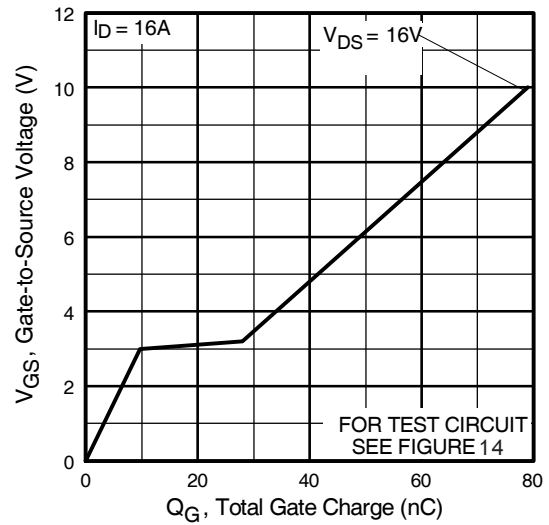


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

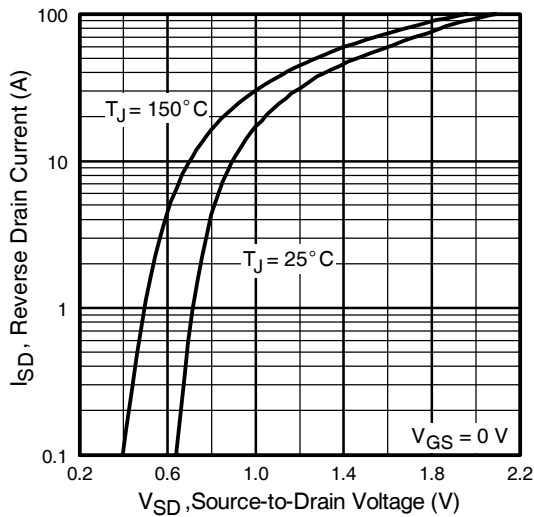


Fig 7. Typical Source-Drain Diode Forward Voltage

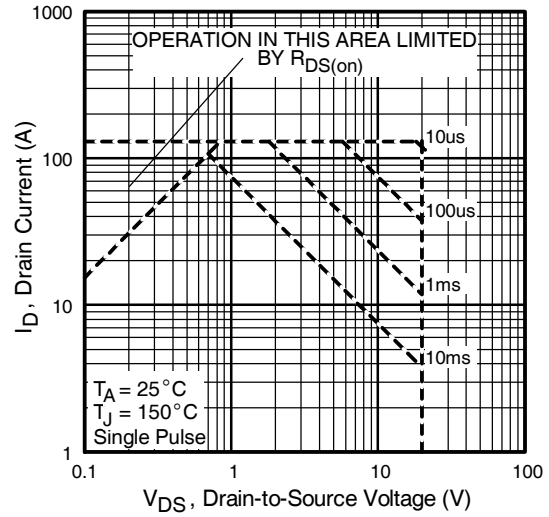


Fig 8. Maximum Safe Operating Area

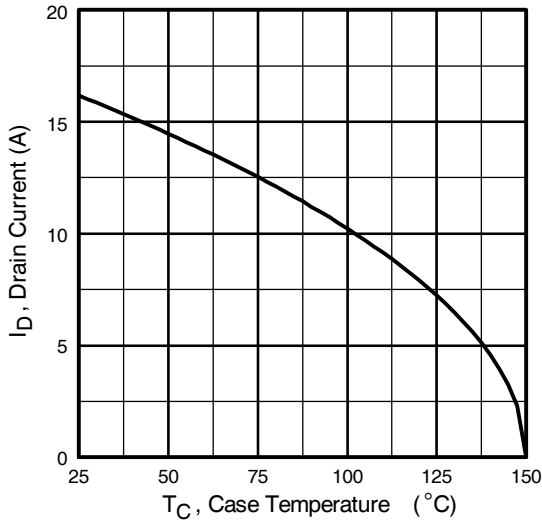


Fig 9. Maximum Drain Current Vs. Case Temperature

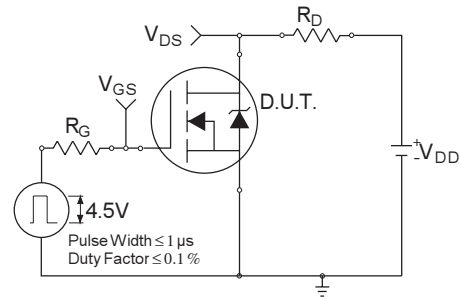


Fig 10a. Switching Time Test Circuit

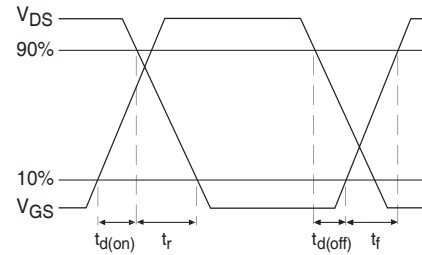


Fig 10b. Switching Time Waveforms

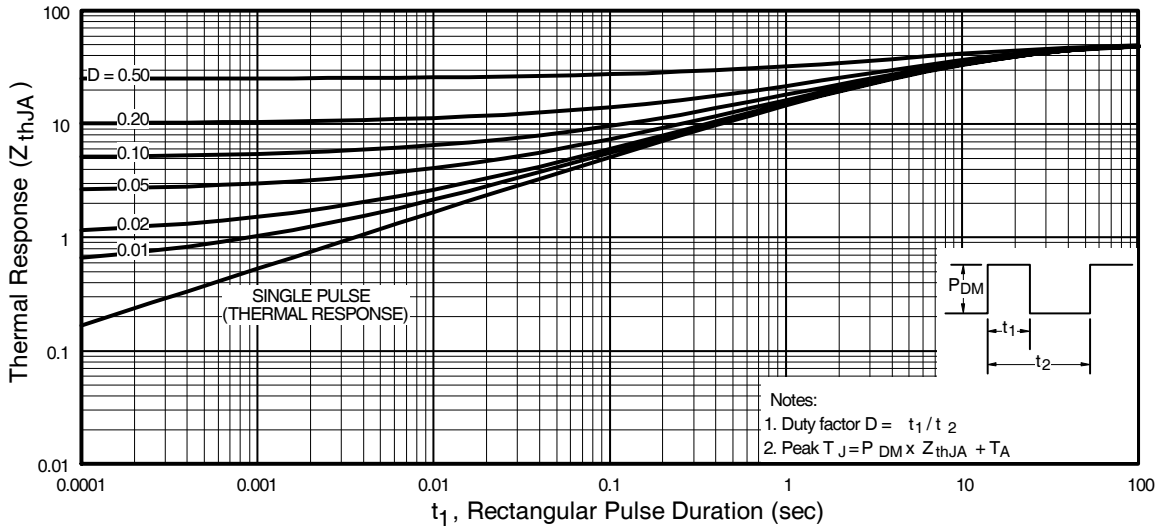


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Case

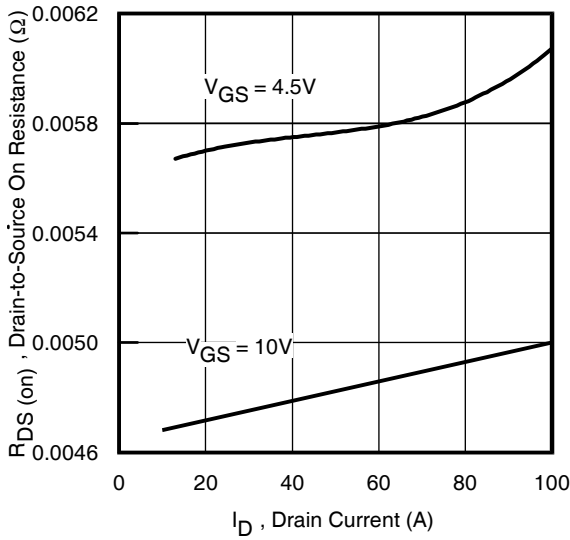


Fig 12. On-Resistance Vs. Drain Current

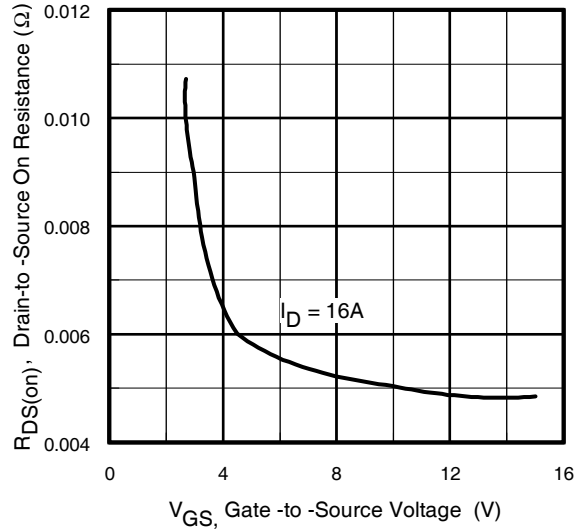


Fig 13. On-Resistance Vs. Gate Voltage

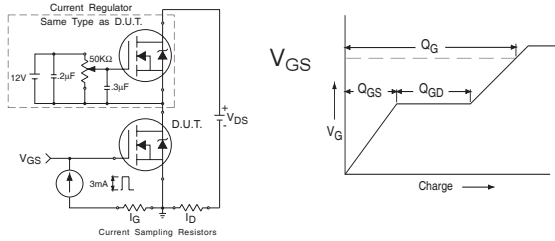


Fig 14a&b. Basic Gate Charge Test Circuit and Waveform

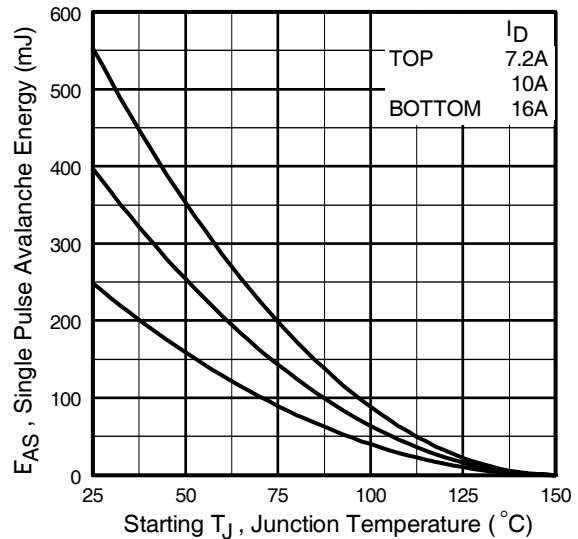


Fig 15c. Maximum Avalanche Energy Vs. Drain Current

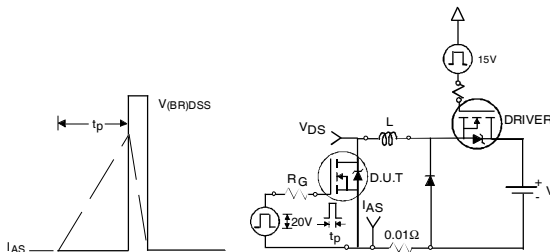
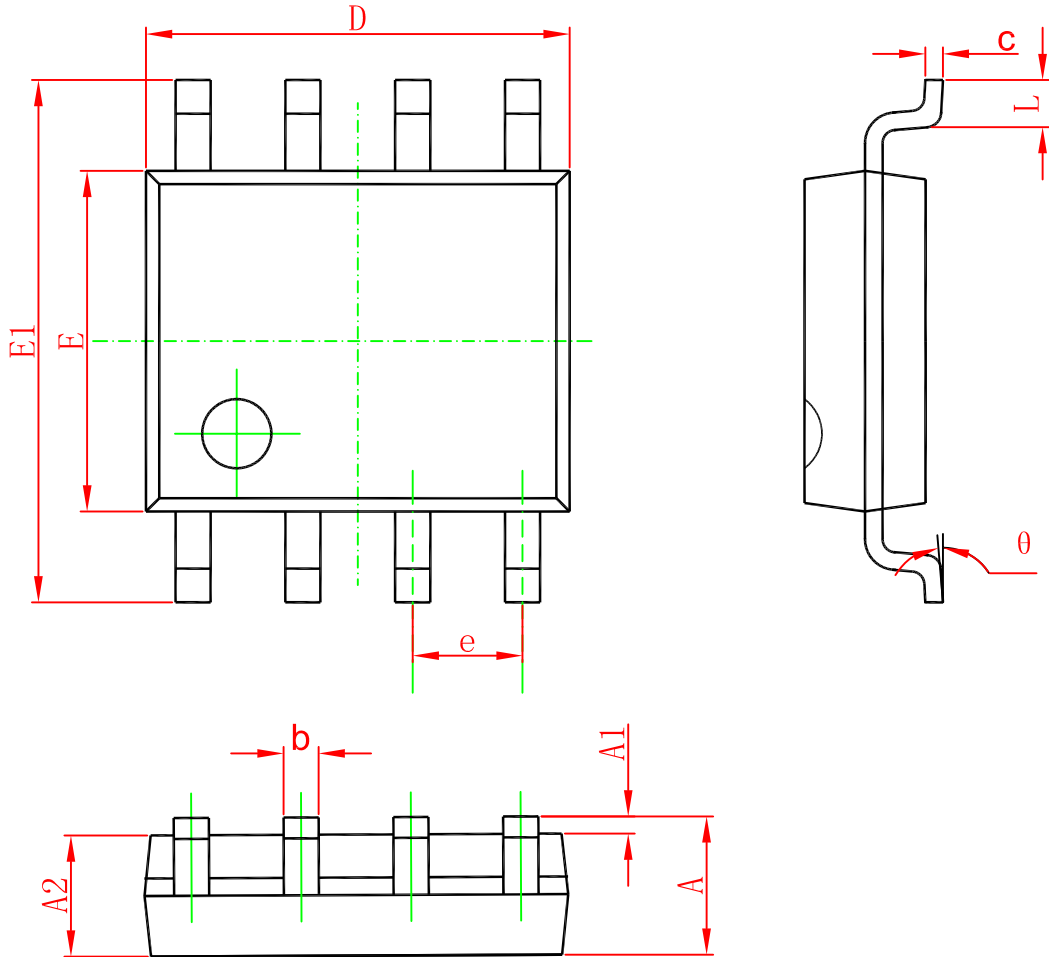


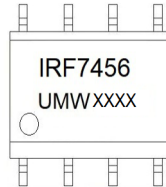
Fig 15a&b. Unclamped Inductive Test circuit and Waveforms

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
UMWIRF7456TR	SOP-8	3000	Tape and reel

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[DMN2990UFB-7B](#) [SSM3K35CT,L3F](#) [IPLK60R1K0PFD7ATMA1](#) [2N7002W-G](#) [MCAC30N06Y-TP](#) [IPWS65R035CFD7AXKSA1](#)
[MCQ7328-TP](#) [SSM3J143TU,LXHF](#) [PJMF280N65E1_T0_00201](#) [PJMF380N65E1_T0_00201](#) [PJMF280N60E1_T0_00201](#)
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