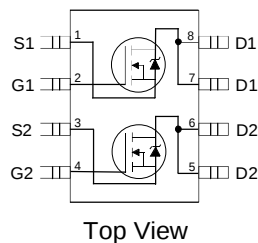


Description

The SOP-8 has been modified through a customized deadframe for enhanced thermal characteristics and multiple-die capability making it ideal in a variety of power applications. With these improvements, multiple devices can be used in an application with dramatically reduced board space. The package is designed for vapor phase, infra red, or wave soldering techniques.



Features

- $V_{DS(V)} = 30V$
- $I_D = 2.2A$ ($V_{GS} = -10V$)
- $R_{DS(ON)} < 100m\Omega$ ($V_{GS} = -10V$)
- $R_{DS(ON)} < 200 m\Omega$ ($V_{GS} = -4.5V$)
- Generation V Technology
- Ultra Low On-Resistance
- Surface Mount
- Very Low Gate Charge and Switching Losses
- Fully Avalanche Rated
- Lead-Free

Absolute Maximum Ratings ($T_A = 25^\circ C$ Unless Otherwise Noted)

	Symbol	Maximum	Units
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	± 20	
Continuous Drain Current ⑤	I_D	$T_A = 25^\circ C$ 3.5	A
		$T_A = 70^\circ C$ 2.8	
Pulsed Drain Current	I_{DM}	16	
Continuous Source Current (Diode Conduction)	I_S	1.7	
Maximum Power Dissipation ⑤	P_D	$T_A = 25^\circ C$ 2.0	W
		$T_A = 70^\circ C$ 1.3	
Single Pulse Avalanche Energy ②	E_{AS}	44	mJ
Avalanche Current	I_{AR}	2.0	A
Repetitive Avalanche Energy	E_{AR}	0.20	mJ
Peak Diode Recovery dv/dt ③	dv/dt	5.0	V/ ns
Junction and Storage Temperature Range	T_J, T_{STG}	-55 to + 150	$^\circ C$

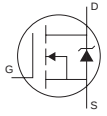
Thermal Resistance Ratings

Parameter	Symbol	Limit	Units
Maximum Junction-to-Ambient ⑤	$R_{\theta JA}$	62.5	$^\circ C/W$

Electrical Characteristics @ T = 25°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		0.015		V/°C	Reference to 25°C, $I_D = 1mA$
$R_{DS(on)}$	Static Drain-to-Source On-Resistance		60 90	100 200	mΩ	$V_{GS} = 10V, I_D = 2.2A$ ④ $V_{GS} = 4.5V, I_D = 1.0A$ ④
$V_{GS(th)}$	Gate Threshold Voltage	1.0			V	$V_{DS} = V_{GS}, I_D = 250\mu A$
g_{fs}	Forward Transconductance		12		S	$V_{DS} = 15V, I_D = 3.5A$
I_{DSS}	Drain-to-Source Leakage Current			2.0 25	μA	$V_{DS} = 24V, V_{GS} = 0V$ $V_{DS} = 24V, V_{GS} = 0V, T_J = 125^\circ C$
I_{GSS}	Gate-to-Source Forward Leakage			100	nA	$V_{GS} = 24V$
	Gate-to-Source Reverse Leakage			-100	nA	$V_{GS} = -24V$
Q_g	Total Gate Charge		6.9	14	nC	$I_D = 1.8A$
Q_{gs}	Gate-to-Source Charge		1.0	2.0	nC	$V_{DS} = 10V$
Q_{gd}	Gate-to-Drain ("Miller") Charge		1.8	3.5	nC	$V_{GS} = 10V$, See Fig. 10 ④
$t_{d(on)}$	Turn-On Delay Time		6.2	12	ns	$V_{DD} = 10V$
t_r	Rise Time		8.8	18	ns	$I_D = 1.0A$
$t_{d(off)}$	Turn-Off Delay Time		13	26	ns	$R_G = 6.0\Omega$
t_f	Fall Time		3.0	6.0	ns	$R_D = 10\Omega$ ④
C_{iss}	Input Capacitance		190		pF	$V_{GS} = 0V$
C_{oss}	Output Capacitance		120		pF	$V_{DS} = 15V$
C_{rss}	Reverse Transfer Capacitance		61		pF	$f = 1.0MHz$, See Fig. 9

Source-Drain Ratings and Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)			1.7	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I_{SM}	Pulsed Source Current (Body Diode) ①			16	A	
V_{SD}	Diode Forward Voltage		0.82	1.2	V	$T_J = 25^\circ C, I_S = 1.25A, V_{GS} = 0V$ ③
t_{rr}	Reverse Recovery Time		27	53	ns	$T_J = 25^\circ C, I_F = 1.25A$
Q_{rr}	Reverse Recovery Charge		28	57	nC	$di/dt = 100A/\mu s$ ③

Notes:

- ① Repetitive rating; pulse width limited by max. junction temperature. (See fig. 11)
- ② Starting $T_J = 25^\circ C$, $L = 22mH$
 $R_G = 25\Omega$, $I_{AS} = 2.0A$.
- ③ $I_{SD} \leq 2.0A$, $di/dt \leq 100A/\mu s$, $V_{DD} \leq V_{(BR)DSS}$,
 $T_J \leq 150^\circ C$
- ④ Pulse width $\leq 300\mu s$; duty cycle $\leq 2\%$.
- ⑤ Surface mounted on FR-4 board, $t \leq 10sec$.

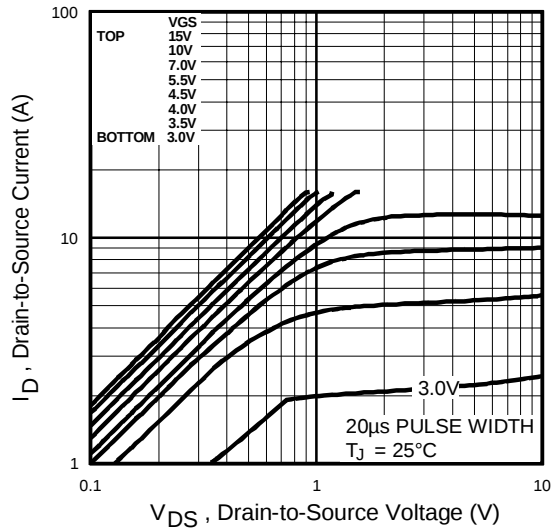


Fig 1. Typical Output Characteristics

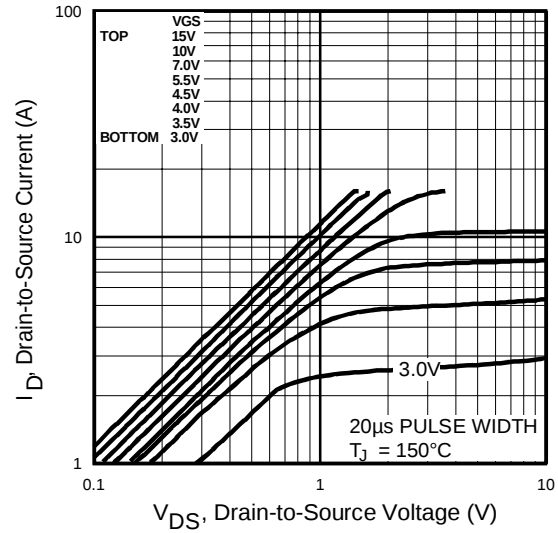


Fig 2. Typical Output Characteristics

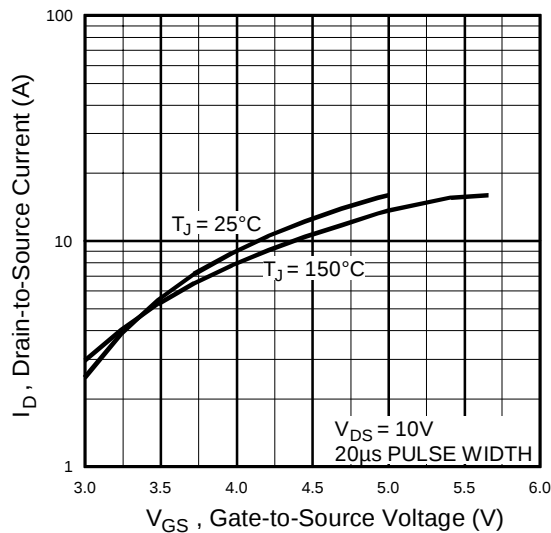


Fig 3. Typical Transfer Characteristics

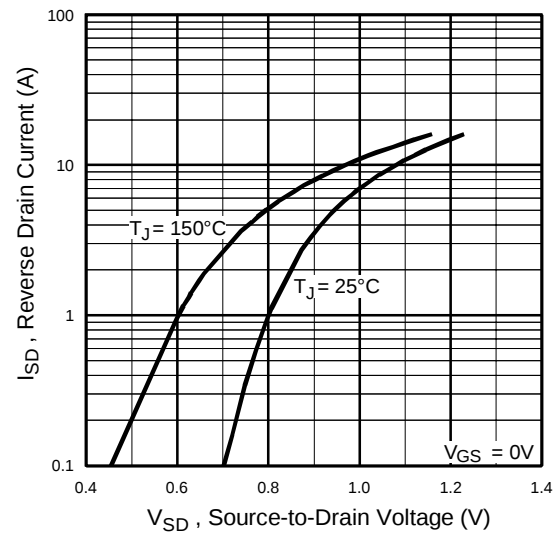


Fig 4. Typical Source-Drain Diode Forward Voltage

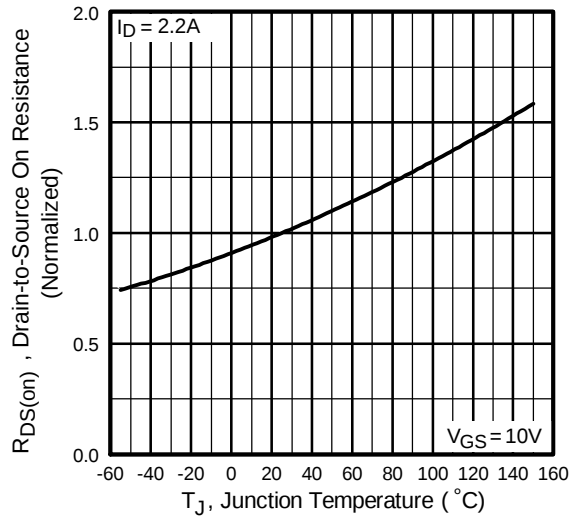


Fig 4. Normalized On-Resistance Vs. Temperature

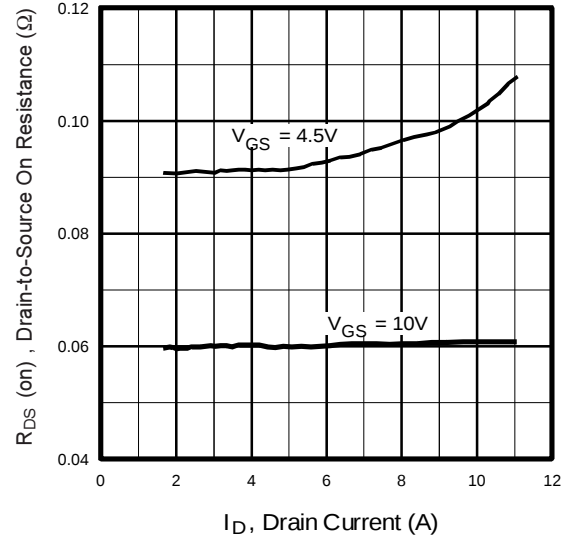


Fig 6. Typical On-Resistance Vs. Drain Current

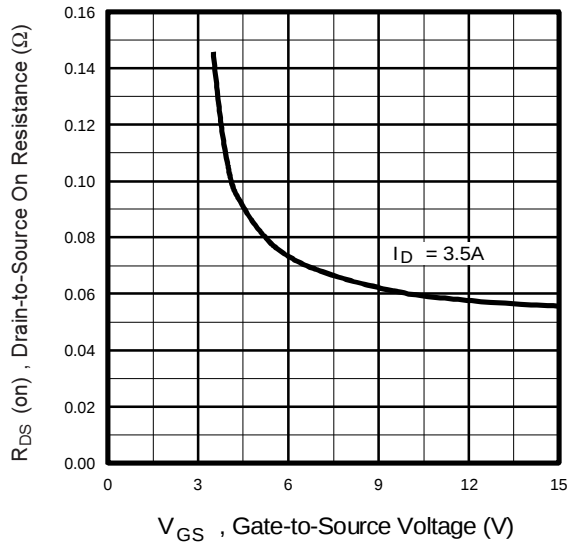


Fig 7. Typical On-Resistance Vs. Gate Voltage

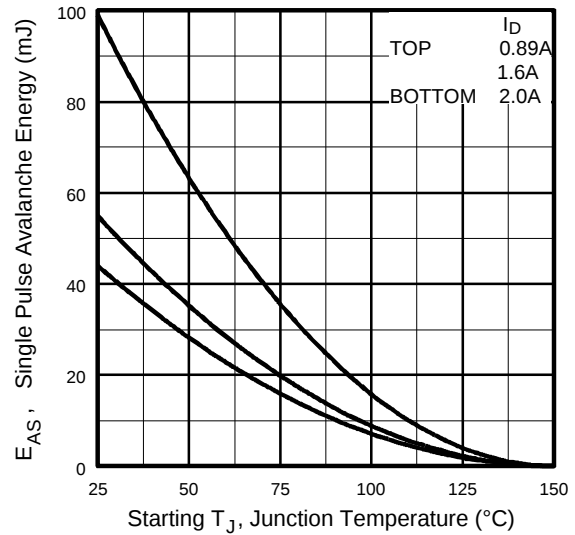
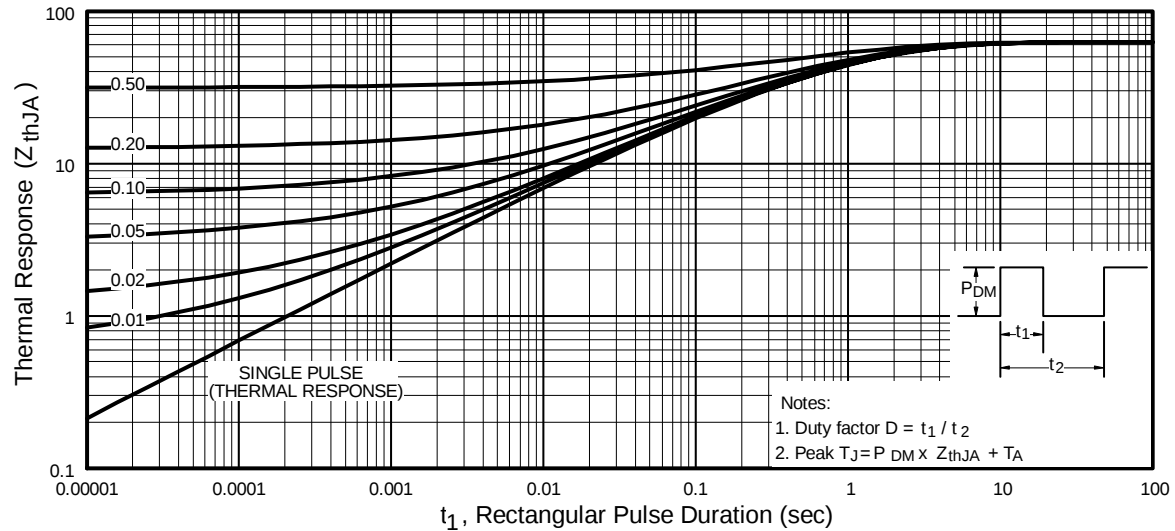
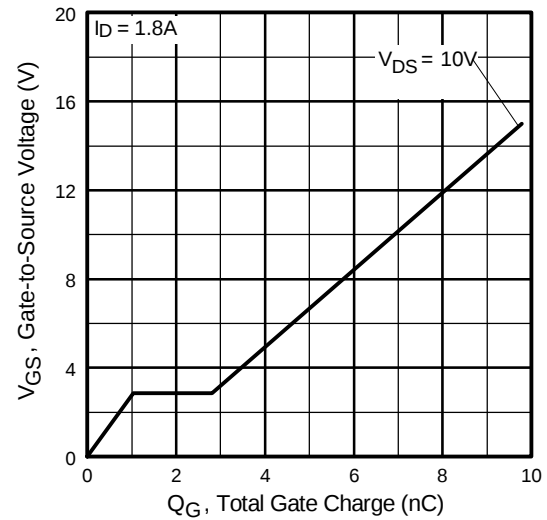
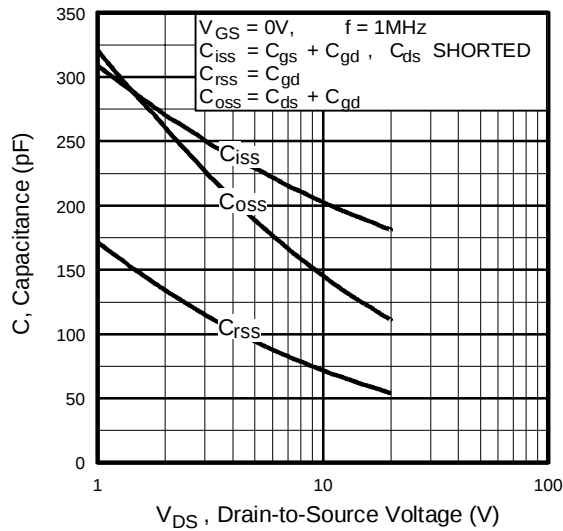
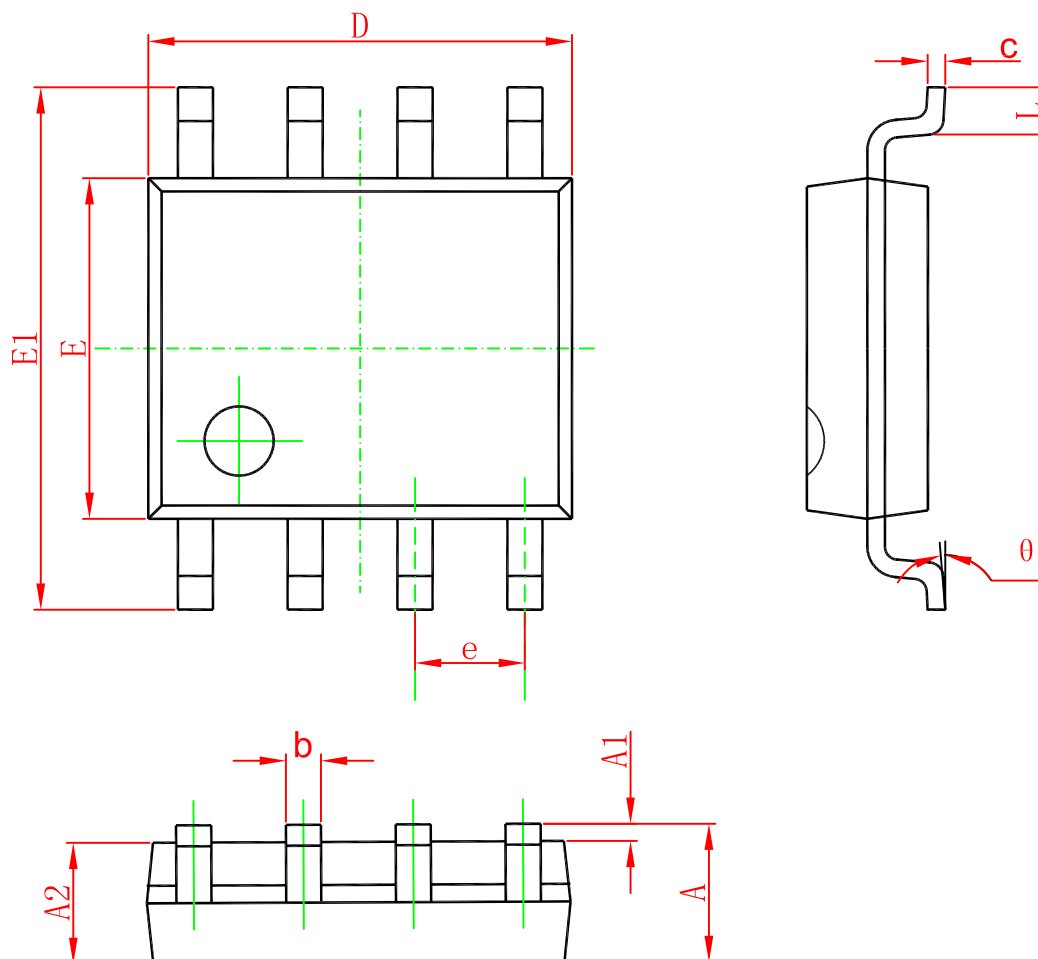


Fig 8. Maximum Avalanche Energy Vs. Drain Current

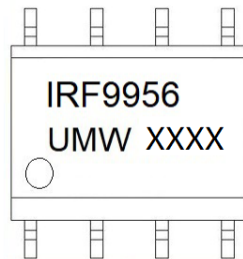


Package Mechanical Data SOP-8



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 IRF9956TR	SOP-8	3000	Tape and reel