UMW IRF9956TR

30V 2N-Channel MOSFET

1.Description

The SOP-8 has been modified through a customized eadframe for enhanced thermalcharacteristics and multiple-die capabilitymaking it ideal in a variety of powerapplications.With these improvements.multiple devices can be used in an appication with dramatically reduced board space. The package is designed for vapor phase, infrared, or wave sodering technique.

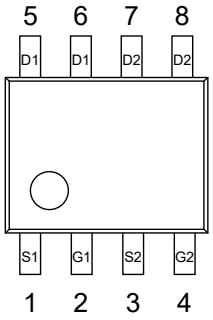
2.Features

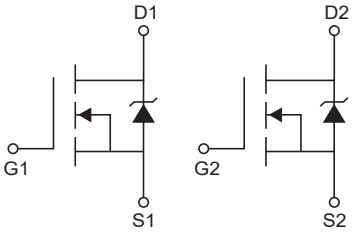
- $V_{DS\ (V)}$=30V, I_D=3.5A
- $R_{DS(ON)}$<80mΩ(V_{GS}=-10V)
- $R_{DS(ON)}$<150mΩ(V_{GS}=-4.5V)
- Generation V Technolog
- Ultra Low On-Resistance
- Surface Mount
- Fully Avalanche Rated
- Lead-Free

3.Pinning information

Pin	Symbol	Description
2,4	G1,G2	GATE
1,3	S1,S2	SOURCE
5,6,7,8	D1,D2	DRAIN

SOP-8





4.Absolute Maximum Ratings T_A=25°C unless otherwise noted

Parameter		Symbol	Rating	Units
Drain-Source Voltage		V_{DS}	30	V
Gate-Source Voltage		V_{GS}	±20	
Continuous Drain Current ⑤	T_A=25°C	I_D	3.5	A
	T_A=70°C		2.8	
Pulsed Drain Current		I_{DM}	16	
Continuous Source Current (Diode Conduction)		I_S	1.7	
Maximum Power Dissipation ⑤	T_A=25°C	P_D	2	W
	T_A=70°C		1.3	W
Single Pulse Avalanche Energy②		E_{AS}	44	mJ
Avalanche Current		I_{AR}	2	A

Repetitive Avalanche Energy	E_{AR}	0.2	mJ
Peak Diode Recovery dv/dt ③	dv/dt	5	V/ns
Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 150	°C

5.Thermal Resistance Rating

Parameter	Symbol	Typ	Max	Units
Maximum Junction-to-Ambient ⑤	$R_{\theta JA}$		62.5	°C/W

6.Electrical Characteristics T_J=25°C

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	I_D=250μA, V_{GS}=0V	30			V
Breakdown Voltage Temp. Coefficient	$\Delta V_{(BR)DSS}/\Delta T_J$	I_D=1mA,Reference to 25°C		0.015		V/°C
Static Drain-to-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=2.2A ④		50	80	mΩ
		V_{GS}=4.5V, I_D=1A ④		70	150	
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250μA	1			V
Forward Transconductance	g_{FS}	V_{DS}=15V, I_D=3.5A		12		S
Drain-to-Source Leakage Current	I_{DSS}	V_{DS}=24V, V_{GS}=0V			2	μA
		V_{DS}=24V,V_{GS}=0V,T_J=125°C			25	
Gate-to-Source Forward Leakage	I_{GSS}	V_{GS}=20V			100	nA
Gate-to-Source Reverse Leakage		V_{GS}=-20V			-100	
Total Gate Charge	Q_g	I_D=1.8A		6.9	14	nC
Gate-to-Source Charge	Q_{gs}	V_{DS}=10V, V_{GS}=10V		1	2	
Gate-to-Drain ("Miller") Charge	Q_{gd}	See Fig. 10 ④		1.8	3.5	
Turn-On Delay Time	$t_{D(on)}$	V_{DD}=10V		6.2	12	ns
Rise Time	t_r	I_D=1A		8.8	18	ns
Turn-Off Delay Time	$t_{D(off)}$	R_G=6Ω		13	26	ns
Fall Time	t_f	R_D=10Ω ④		3	6	ns
Input Capacitance	C_{iss}	V_{GS}=0V		190		pF
Output Capacitance	C_{oss}	V_{DS}=15V		120		pF
Reverse Transfer Capacitance	C_{rss}	f=1.0MHz, See Fig. 9		61		pF

Source-Drain Ratings and Characteristics						
Continuous Source Current (Body Diode)	I_S	MOSFET symbol showing the integral reverse p-n junction diode.			1.7	A
Pulsed Source Current (Body Diode) ①	I_{SM}				16	
Diode Forward Voltage	V_{SD}	T_J=25°C,I_S=1.25A,V_{GS}=0V③		0.82	1.2	V
Reverse Recovery Time	t_{rr}	T_J=25°C, I_F=1.25A		27	53	ns
Reverse Recovery Charge	Q_{rr}	dI/dt=100A/μs ③		28	57	nC

Notes:

① Repetitive rating; pulse width limited by max.junction temperature.(See fig.11)

②Starting T_J= 25°C,L=22mH, R_G= 25Ω, I_{AS}= 2A.

③ I_{SD}≤ 2.0A, didt ≤100A/μs, V_{DD}≤ $V_{(BR)DSS}$,T_J≤ 150°C

④ Pulse width ≤ 300μs; duty cycle ≤ 2%.

⑤ Surface mounted on FR-4 board, t ≤ 10sec.

7.1Typical Characterisitics

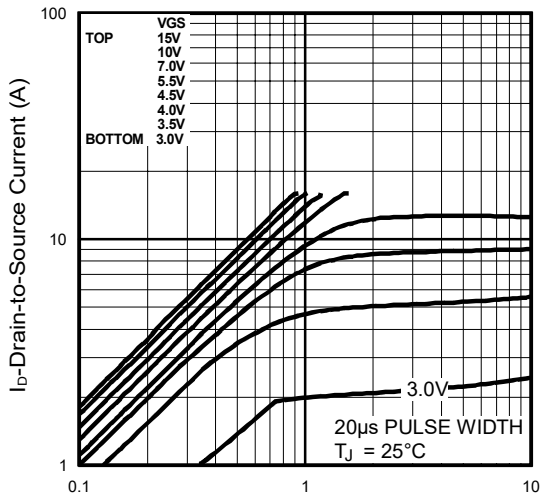


Fig 1. Typical Output Characteristics

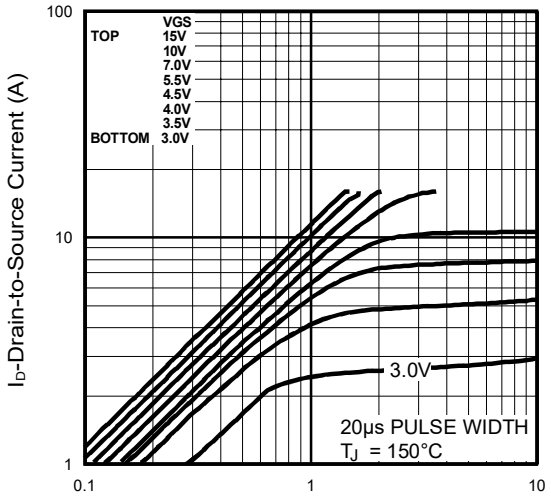


Fig 2. Typical Output Characteristics

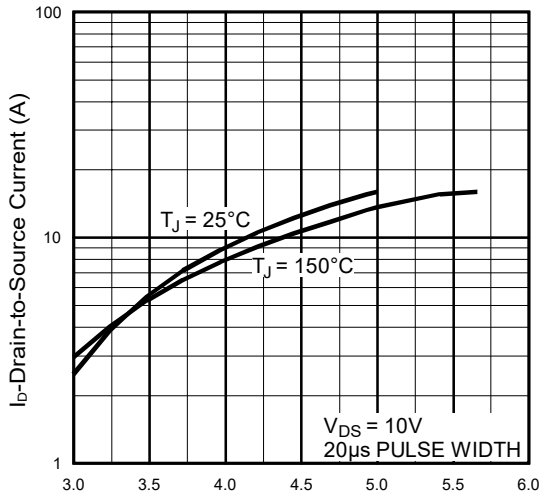


Fig 3. Typical Transfer Characteristics

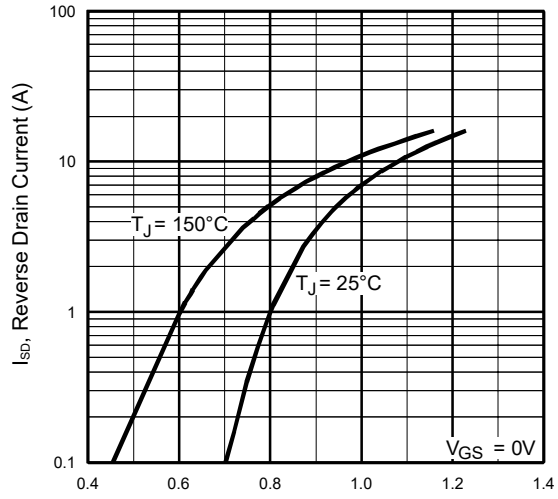
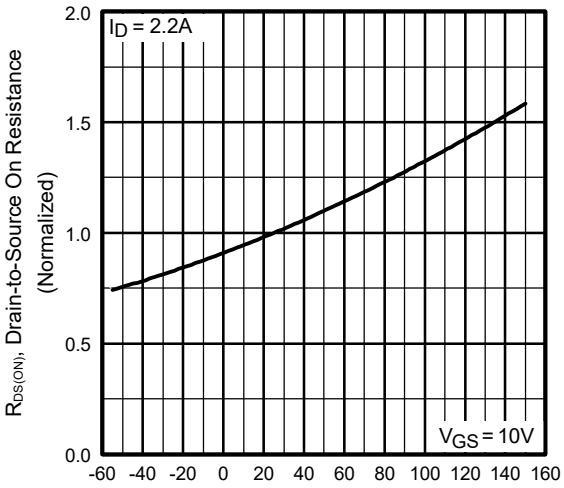


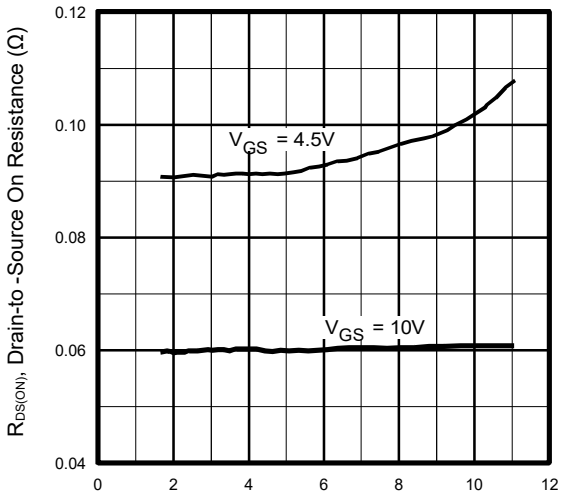
Fig 7. Typical Source-Drain Diode Forward Voltage

7.2Typical Characterisitics



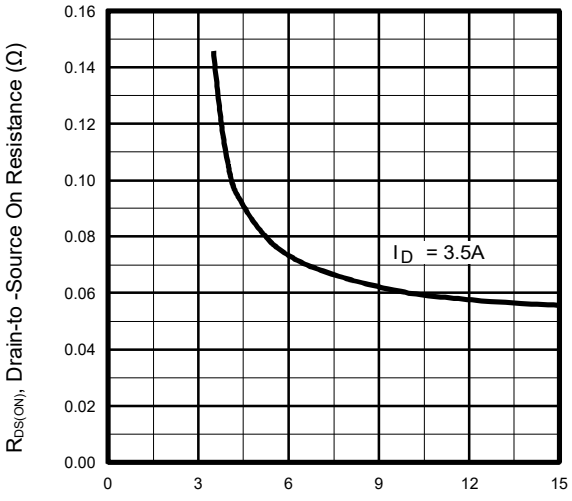
V_{GS}, Gate-to-Source Voltage (V)

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



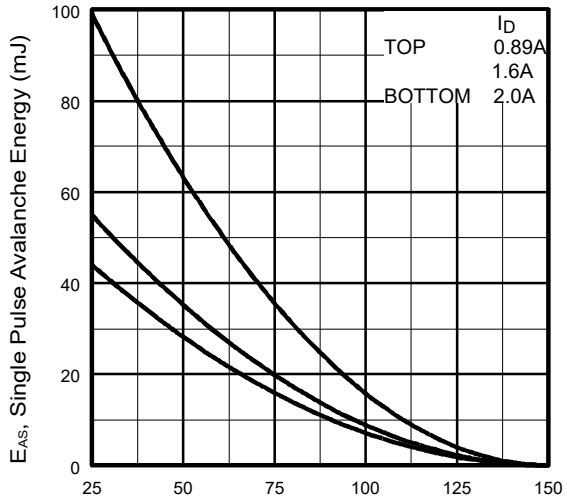
I_D, Drain Current (A)

Fig 6. Typical On-Resistance Vs. Drain Current



V_{GS}, Gate-to-Source Voltage (V)

Fig 11. Typical On-Resistance Vs. Gate Voltage



Starting T_J, Junction Temperature (°C)

Fig 12. Maximum Avalanche Energy Vs. Drain Current

7.3Typical Characterisitics

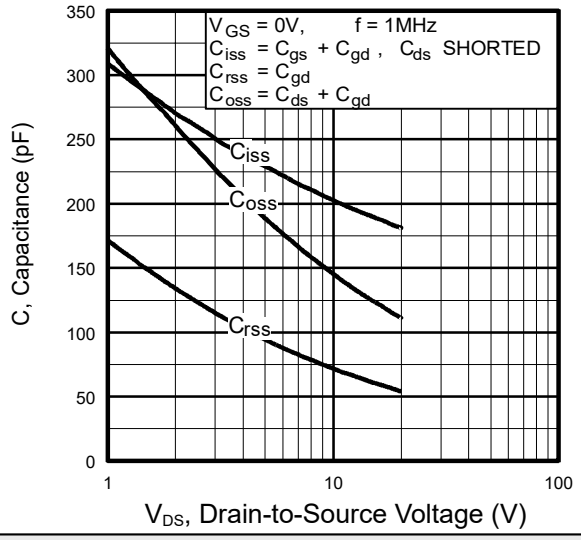


Fig 9. Typical capacitance Vs.Drain-to-Source Voltage

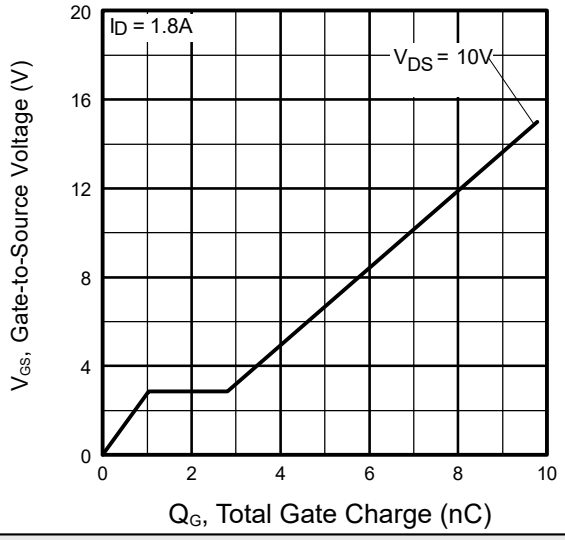


Fig 10. Typical Gate Charge Vs.Gate-to-Source Voltage

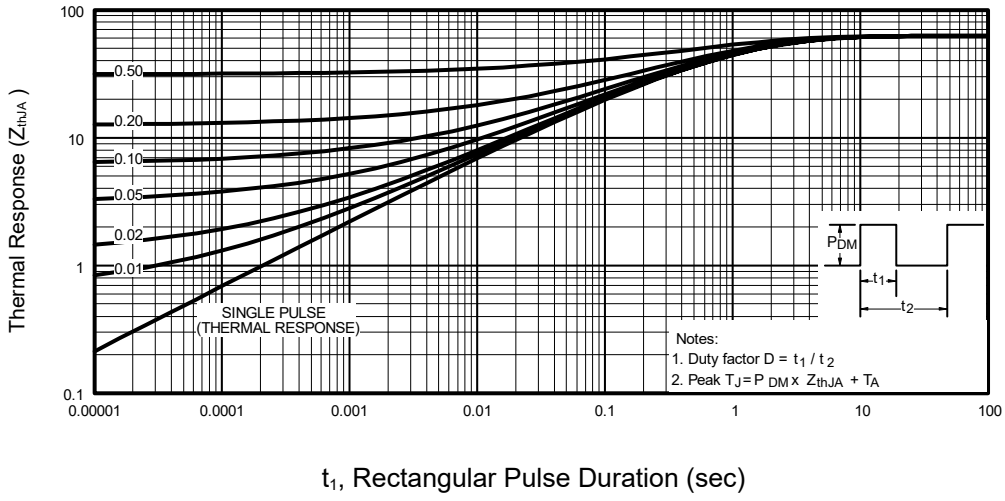
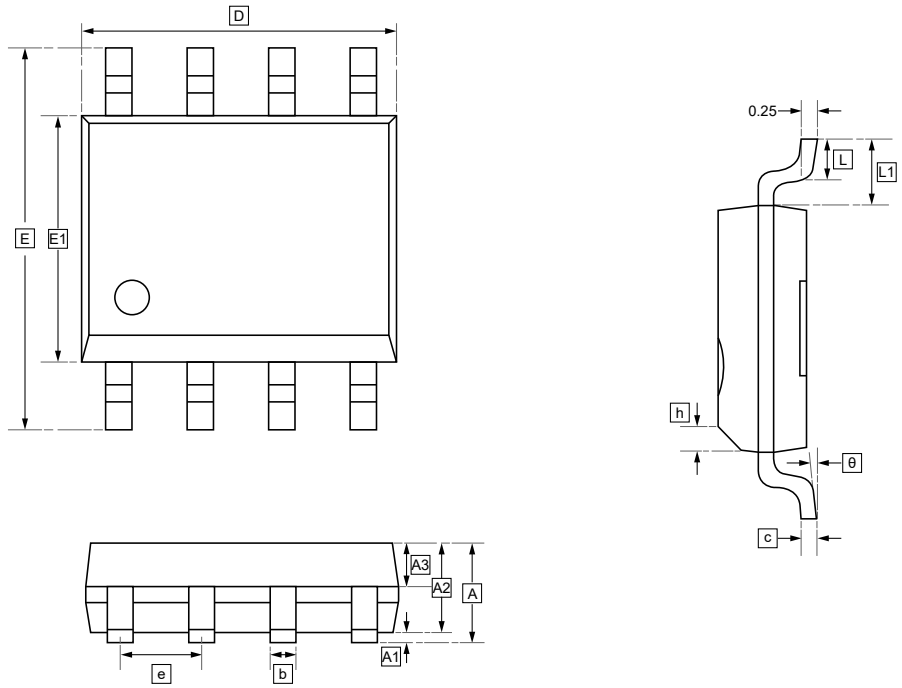


Fig 11. Maximum Effective Transient Themal Impedance, Junction-to-Ambient

8.SOP-8 Package Outline Dimensions

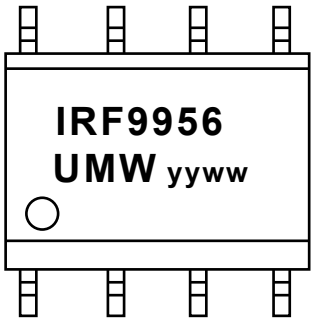


DIMENSIONS (mm are the original dimensions)

Symbol	A	A1	A2	A3	b	c	D	E	E1	e	h	L
Min	-	0.05	1.30	0.60	0.39	0.20	4.80	5.80	3.80	1.24	0.30	0.50
Max	1.75	0.20	1.50	0.70	0.47	0.24	5.00	6.20	4.00	1.30	0.50	0.80

Symbol	L1	θ
Min	1.00	0°
Max	1.10	8°

9.Ordering information



yy: Year Code
ww: Week Code

Order Code	Package	Base QTY	Delivery Mode
UMW IRF9956TR	SOP-8	3000	Tape and reel

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