UMW IRF7456TR

30V N-Channel MOSFET

1.Features

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

2.Applications

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

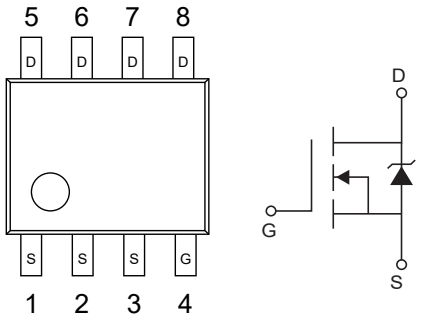
3.Benefits

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

4.Pinning information

Pin	Symbol	Description
1,2,3	S	SOURCE
4	G	GATE
5,6,7,8	D	DRAIN

SOP-8



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

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

6.Thermal Resistance Rating

Parameter	Symbol	Typ	Max	Units
Maximum Junction-to-Ambient ④	$R_{\theta JA}$		50	°C/W

7.Electrical Characteristics T_J=25°C

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	I_D=250μA, V_{GS}=0V	30			V
Breakdown Voltage Temp. Coefficient	$\Delta V_{(BR)DSS}/T_J$	I_D=1mA,Reference to 25°C		0.024		V/°C
Static Drain-to-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=16A ③		4.7	6.5	mΩ
		V_{GS}=4.5V, I_D=13A ③		5.7	7.5	
		V_{GS}=2.8V, I_D=3.5A ③		11	20	
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250μA	0.6		2	V
Drain-to-Source Leakage Current	I_{DSS}	V_{DS}=16V, V_{GS}=0V			20	μA
		V_{DS}=16V,V_{GS}=0V,T_J=125°C			100	μA
Gate-to-Source Forward Leakage	I_{GSS}	V_{GS}=12V			200	nA
Gate-to-Source Reverse Leakage		V_{GS}=-12V			-200	nA
Dynamic						
Forward Transconductance	g_{FS}	V_{DS}=10V, I_D=16V	44			S
Total Gate Charge	Q_g	V_{DS}=16V		41	62	nC
Gate-to-Source Charge	Q_{gs}	V_{GS}=5V ③		9.7	15	nC
Gate-to-Drain ("Miller") Charge	Q_{gd}	I_D=16A		18	27	nC
Turn-On Delay Time	$t_{D(on)}$	V_{DD}=10V		20		ns
Rise Time	t_r	I_D=1A		25		ns
Turn-Off Delay Time	$t_{D(off)}$	R_G=6Ω		50		ns
Fall Time	t_f	V_{GS}=4.5V ③		52		ns
Input Capacitance	C_{iss}	V_{GS}=0V		3640		pF
Output Capacitance	C_{oss}	V_{DS}=15V		1570		pF
Reverse Transfer Capacitance	C_{rss}	f=1.0MHz		330		pF
Avalanche Characteristics						
Single Pulse Avalanche Energy ②	E_{AS}				250	mJ
Avalanche Current ①	I_{AR}				16	A
Repetitive Avalanche Energy ①	E_{AR}				0.25	mJ

Diode Characteristics						
Continuous Source Current (Body Diode)	I_S	MOSFET symbol showing the integral reverse p-n junction diode.			2.5	A
Pulsed Source Current (Body Diode) ①	I_{SM}				130	
Diode Forward Voltage	V_{SD}	T_J=25°C,I_S=2.5A,V_{GS}=0V③			1.2	V
Reverse Recovery Time	t_{rr}	T_J=25°C, I_F=2.5A		48	72	ns
Reverse Recovery Charge	Q_{rr}	dI/dt=100A/μs ③		74	110	nC

8.1Typical Characterisitics

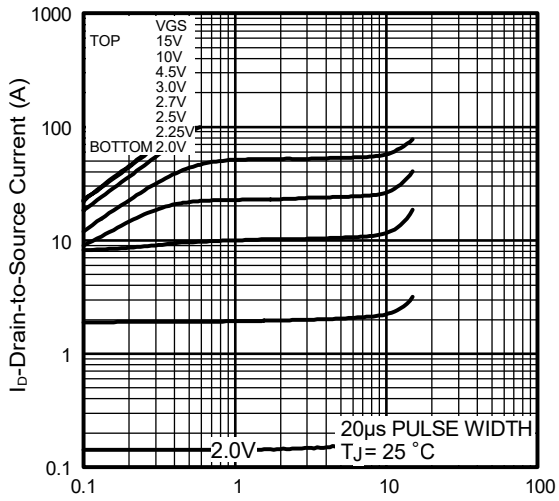


Fig 1. Typical Output Characteristics

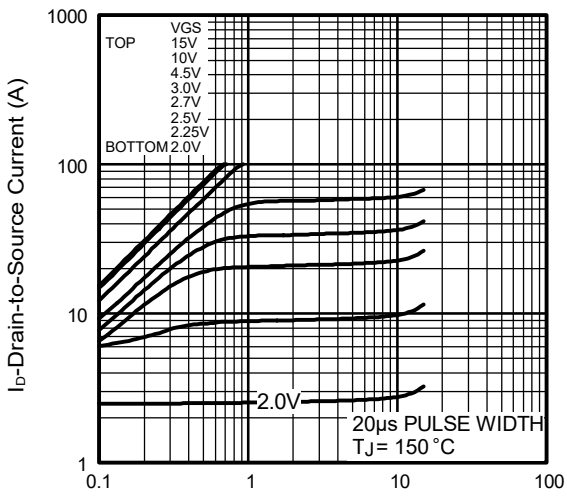


Fig 2. Typical Output Characteristics

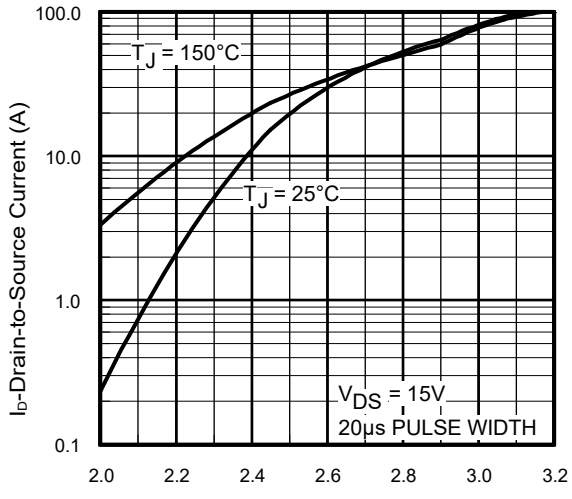


Fig 3. Typical Transfer Characteristics

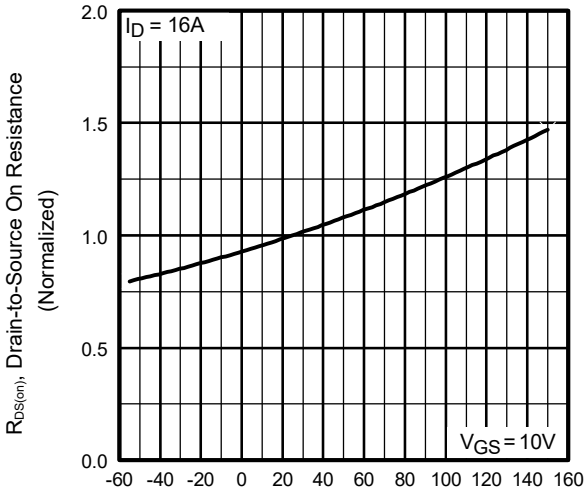
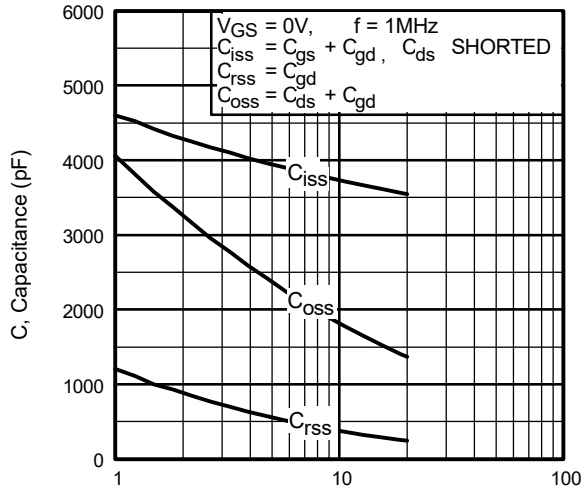


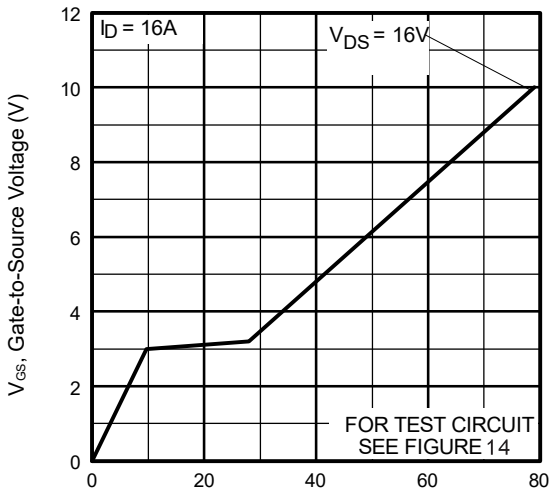
Fig 4. Nomalized On-ResistanceVs. Temperature

8.2Typical Characterisitics



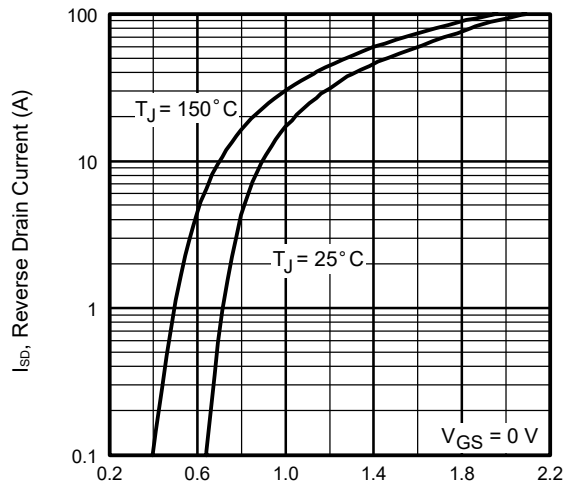
V_{DS} ,Drain-to-Source Voltage (V)

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



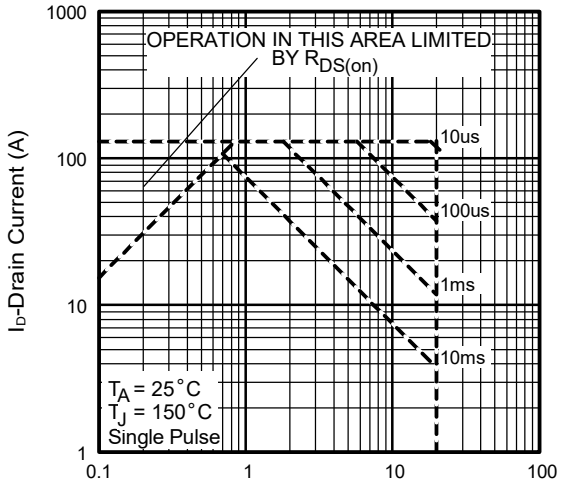
Q_G, Total Gate Charge (nC)

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



V_{SD}, Source-to-Drain Voltage (V)

Fig 7. Typical Source-Drain Diode Forward Voltage



V_{DS}, Drain-to-Source Voltage (V)

Fig 8. Maximum Safe Operating Area

8.3Typical Characterisitics

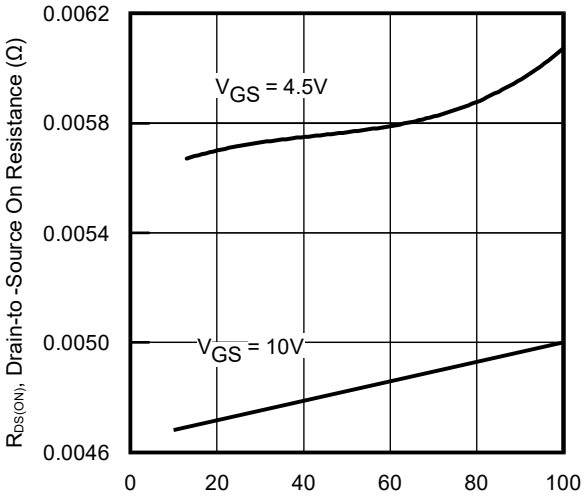


Fig 9. On-Resistance Vs. Drain Current

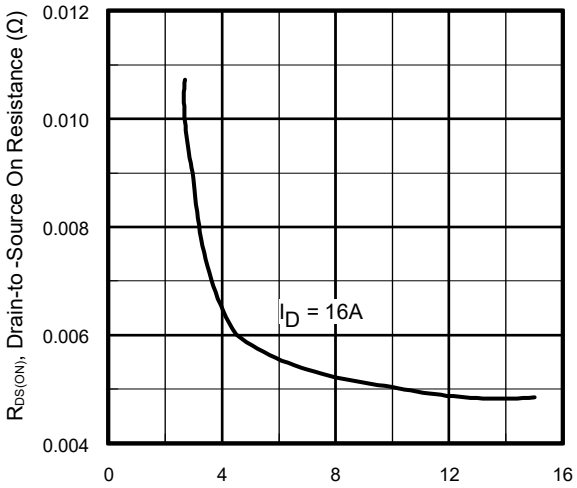


Fig 10. On-Resistance Vs. Drain Current

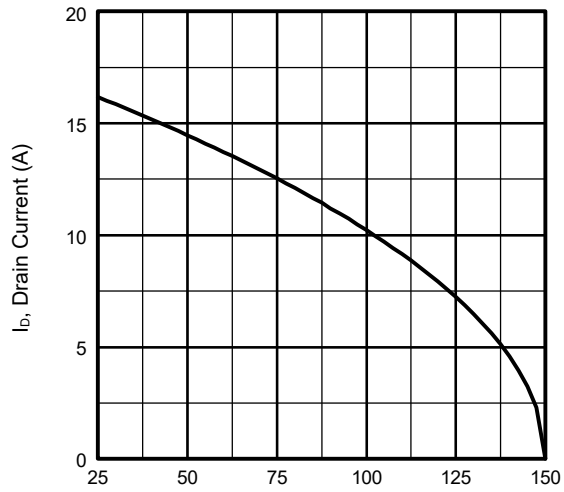


Fig 11. On-Resistance Vs. Drain Current

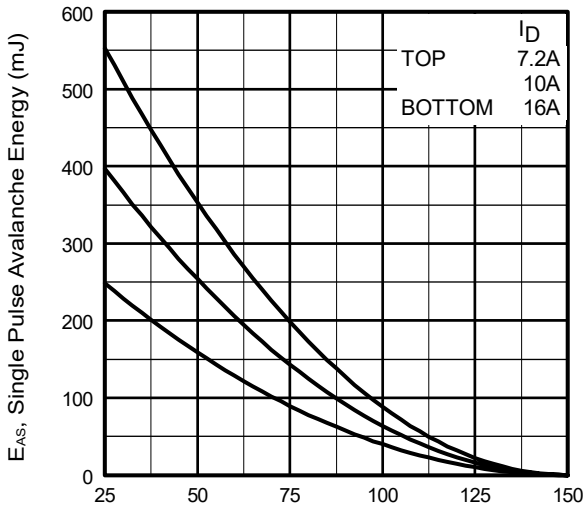


Fig 12. Maximum Avalanche Energy Vs. Drain Current

8.4Typical Characterisitics

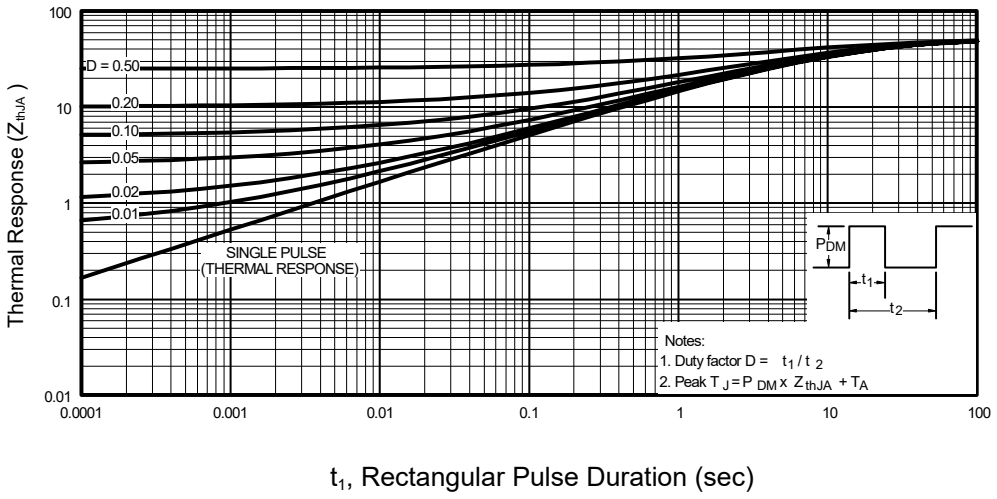


Fig 14. Maximum Effective Transient Themal Impedance, Junction-to-Ambient

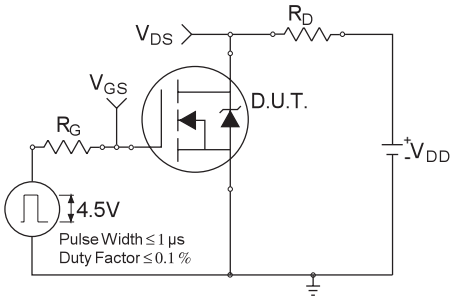


Fig 15a. Switching Time Test Circuit

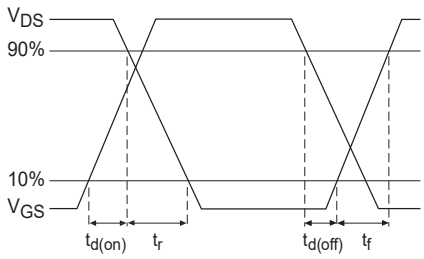
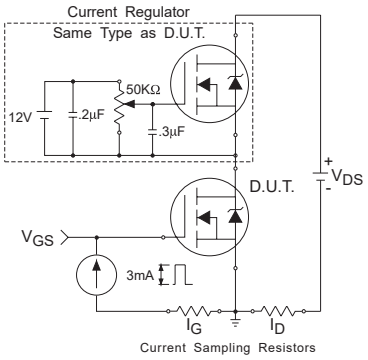


Fig 15b. Switching Time Waveforms



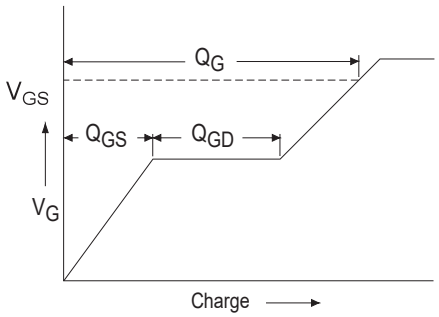
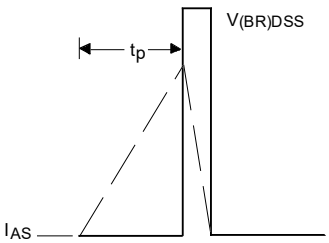


Fig 16a&b. Basic Gate Charge Test Circuit and Waveform



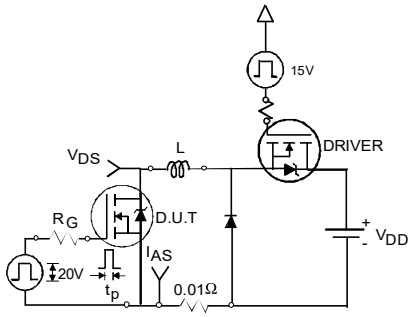
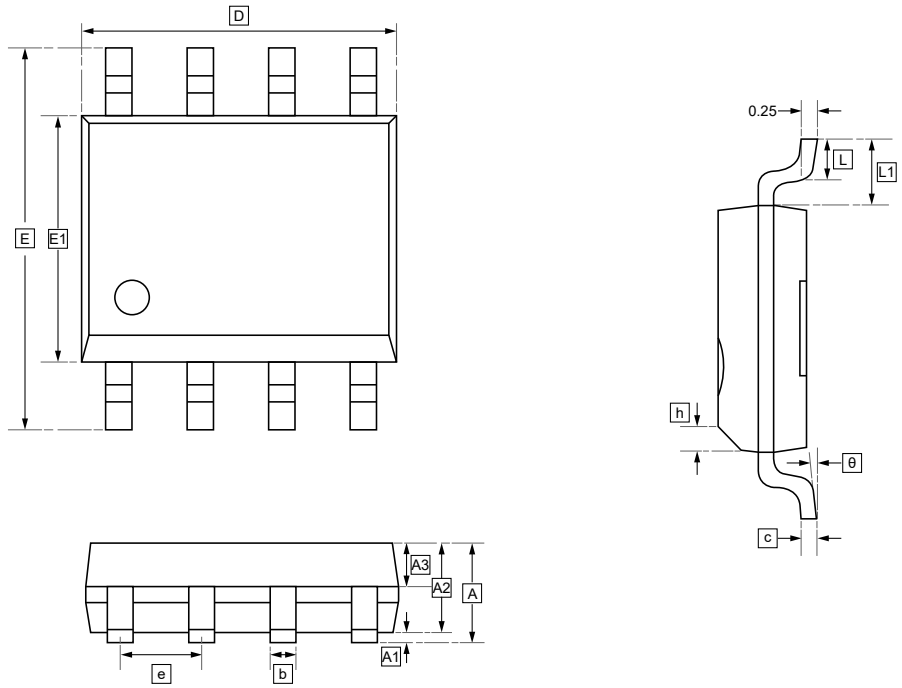


Fig 17a&b. Unclamped Inductive Test circuitand Waveforms

9.SOP-8 Package Outline Dimensions

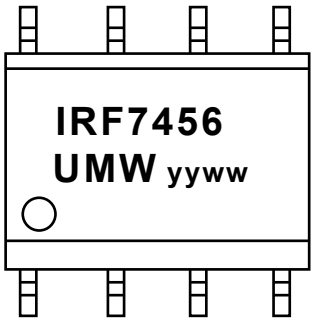


DIMENSIONS (mm are the original dimensions)

Symbol	A	A1	A2	A3	b	c	D	E	E1	e	h	L
Min	-	0.05	1.30	0.60	0.39	0.20	4.70	5.80	3.80	1.24	0.30	0.50
Max	1.75	0.20	1.50	0.70	0.47	0.24	5.10	6.20	4.00	1.30	0.50	0.80

Symbol	L1	θ
Min	1.00	0°
Max	1.10	8°

10.Ordering information



yy: Year Code
ww: Week Code

Order Code	Package	Base QTY	Delivery Mode
UMW IRF7456TR	SOP-8	3000	Tape and reel

11.Disclaimer

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