UMW IRF7476TR

12V N-Channel MOSFET

1.Features

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

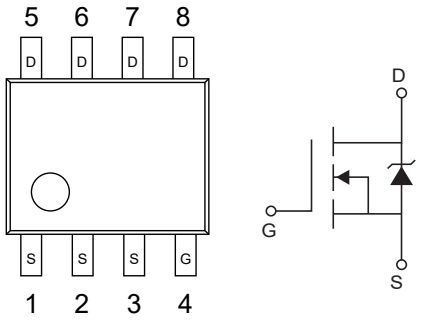
2.Applications

- 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

3.Pinning information

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

SOP-8



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

Parameter		Symbol	Rating	Units
Drain- Source Voltage		V_{DS}	12	V
Gate-to-Source Voltage		V_{GS}	±12	A
Continuous Drain Current, V_{GS}=10V	T_A=25°C	I_D	15	A
Continuous Drain Current, V_{GS}=10V	T_A=70°C		12	A
Pulsed Drain Current ①		I_{DM}	120	W
Maximum Power Dissipation ④	T_A=25°C	P_D	2.5	W
Maximum Power Dissipation ④	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

5.Thermal Resistance Rating

Parameter	Symbol	Typ	Max	Units
Junction-to-Drain Lead	$R_{\theta JL}$		20	°C/W
Junction-to-Ambient ④	$R_{\theta JA}$		50	°C/W

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.

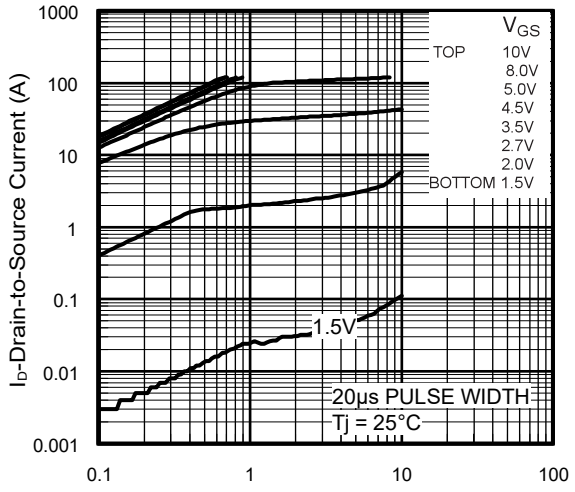
④ When mounted on 1 inch square copper board.

6.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	12			V
Breakdown Voltage Temp. Coefficient	$\Delta V_{(BR)DSS}/\Delta T_J$	I_D=1mA,Reference to 25°C		0.014		V/°C
Static Drain-to-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=4.5V, I_D=15A ③		6	8	mΩ
		V_{GS}=2.8V, I_D=12A ③		12	30	
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250μA	0.6		1.9	V
Drain-to-Source Leakage Current	I_{DSS}	V_{DS}=9.6V, V_{GS}=0V			100	μA
		V_{DS}=9.6V, V_{GS}=0V, T_J=125°C			250	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}=6V, I_D=12A	31			S
Total Gate Charge	Q_g	I_D=12A		26	40	nC
Gate-to-Source Charge	Q_{gs}	V_{DS}=10V		4.6		nC
Gate-to-Drain ("Miller") Charge	Q_{gd}	V_{GS}=4.5V		11		nC
Output Gate Charge	Q_{oss}	V_{GS}=0V, V_{DS}=5V		17		nC
Turn-On Delay Time	$t_{D(on)}$	V_{DD}=6V		11		ns
Rise Time	t_r	I_D=12A		29		ns
Turn-Off Delay Time	$t_{D(off)}$	R_G=1.8Ω		19		ns
Fall Time	t_f	V_{GS}=4.5V ③		8.3		ns
Input Capacitance	C_{iss}	V_{GS}=0V		2550		pF
Output Capacitance	C_{oss}	V_{DS}=6V		2190		pF
Reverse Transfer Capacitance	C_{rss}	f=1.0MHz		450		pF
Avalanche Characteristics						
Single Pulse Avalanche Energy ②	E_{AS}				160	mJ
Avalanche Current ①	I_{AR}				12	A

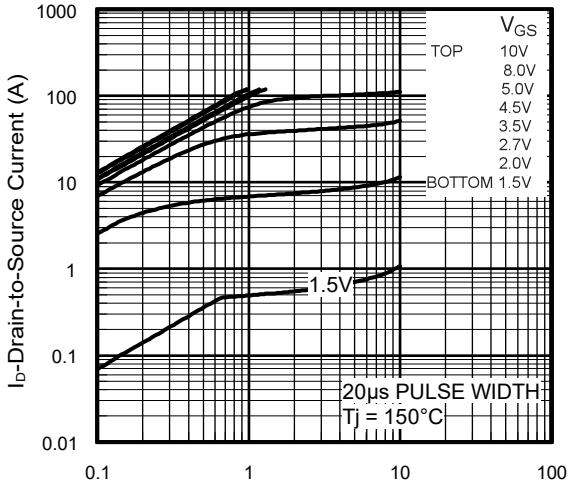
Diode Characteristics						
Continuous Source Current (Body Diode)	I_S	MOSFET symbol showing the integral reverse p-n junction diode.			2.5	A
Pulsed Source Current (Body Diode) ①	I_{SM}				120	A
Diode Forward Voltage	V_{SD}	T_J=25°C,I_S=12A,V_{GS}=0V ③		0.87	1.2	V
		T_J=125°C,I_S=12A,V_{GS}=0V		0.73		V
Reverse Recovery Time	t_{rr}	T_J=25°C,I_F=12A, V_R=12V		55	82	ns
Reverse Recovery Charge	Q_{rr}	dI/dt=100A/μs ③		59	89	nC
Reverse Recovery Time	t_{rr}	T_J=125°C,I_F=12A, V_R=12V		54	81	ns
Reverse Recovery Charge	Q_{rr}	dI/dt=100A/μs ③		60	90	nC

7.1Typical Characterisitics



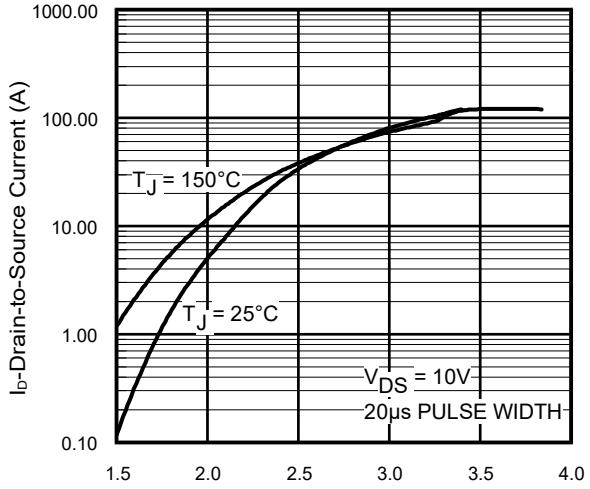
V_{DS} - Drain-to-Source Voltage (V)

Fig 1. Typical Output Characteristics



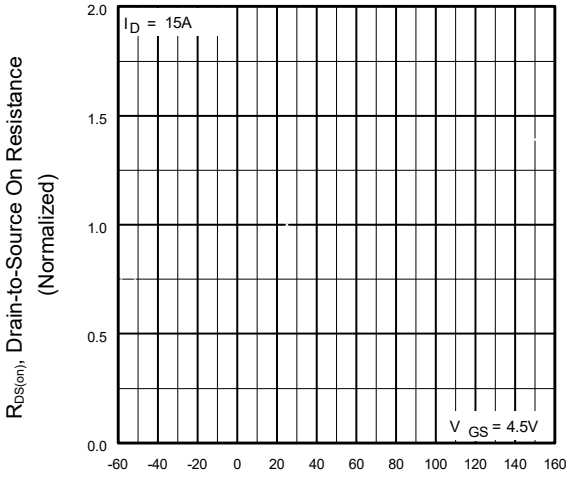
V_{DS} - Drain-to-Source Voltage (V)

Fig 2. Typical Output Characteristics



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

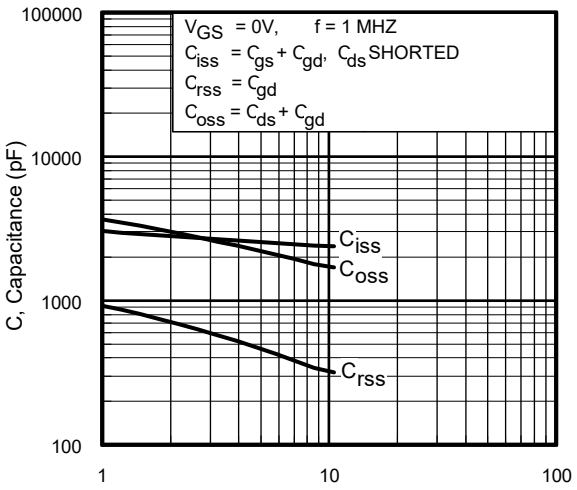
Fig 3. Typical Transfer Characteristics



T_J, Junction Temperature (°C)

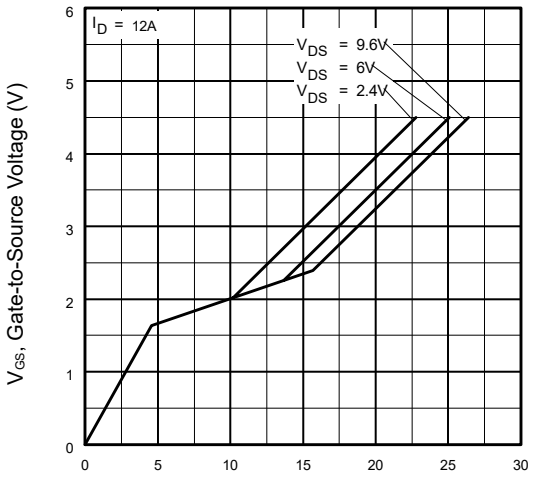
Fig 4. Nomalized On-ResistanceVs. Temperature

7.2Typical Characterisitics



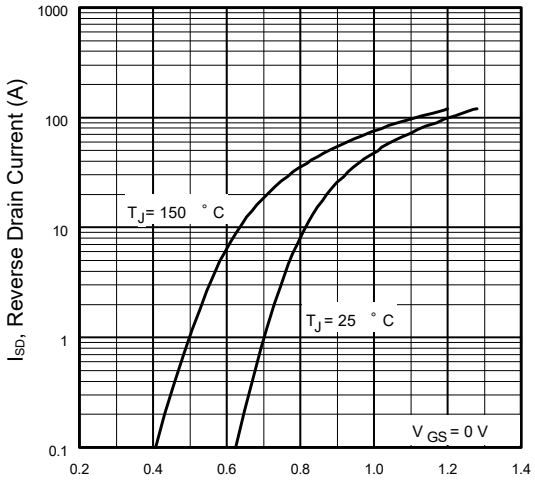
V_{DS} ,Drain-to-Source Voltage (V)

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



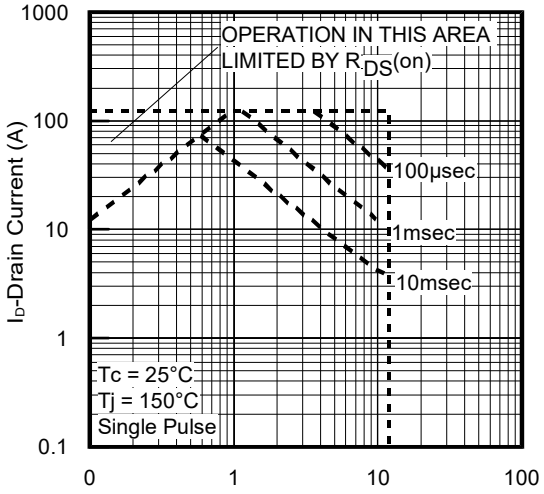
Q_G, Total Gate Charge (nC)

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

7.3Typical Characterisitics

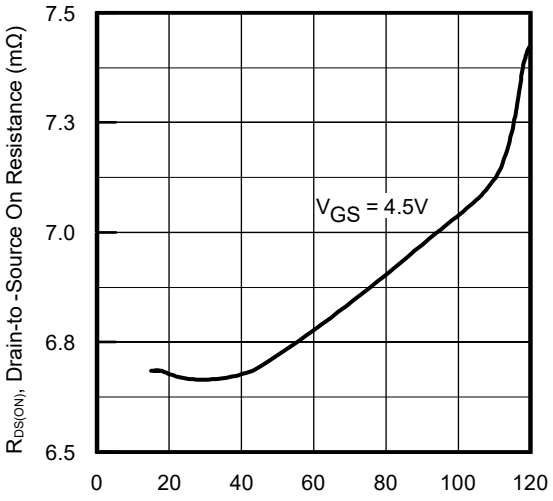


Fig 9. On-Resistance Vs. Drain Current

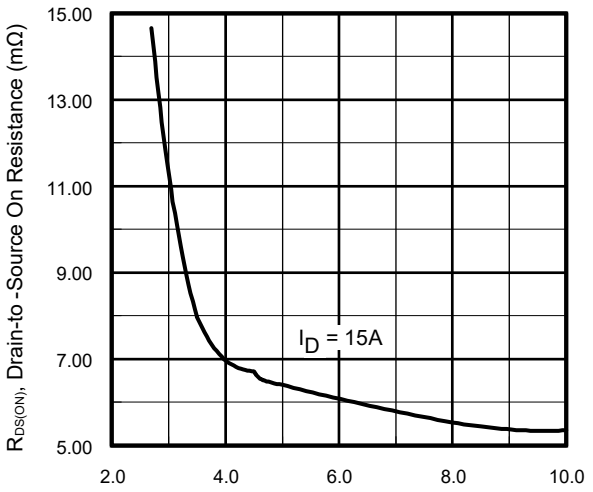


Fig 10. On-Resistance Vs. Drain Current

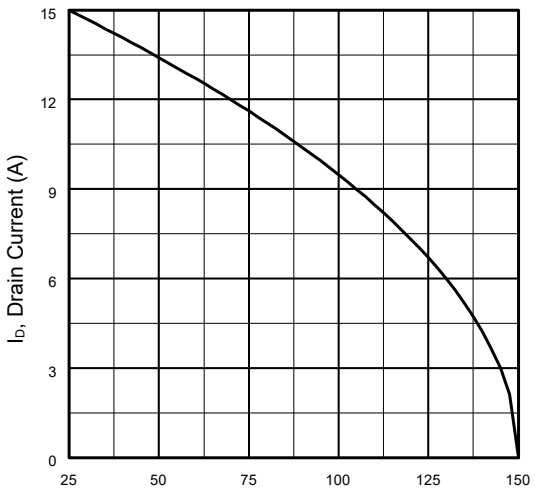


Fig 11. On-Resistance Vs. Drain Current

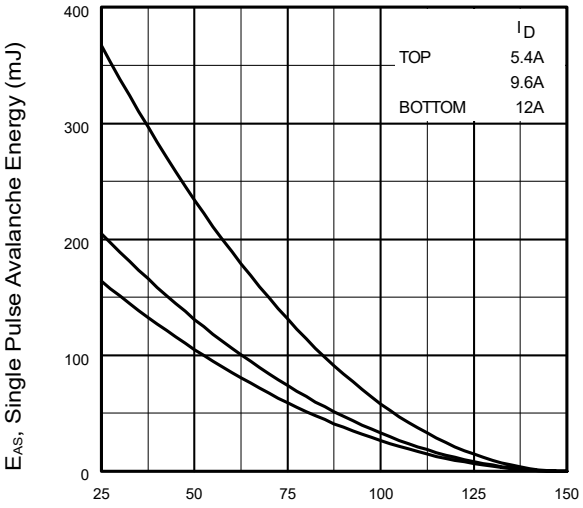


Fig 12. Maximum Avalanche Energy Vs. Drain Current

7.4Typical Characterisitics

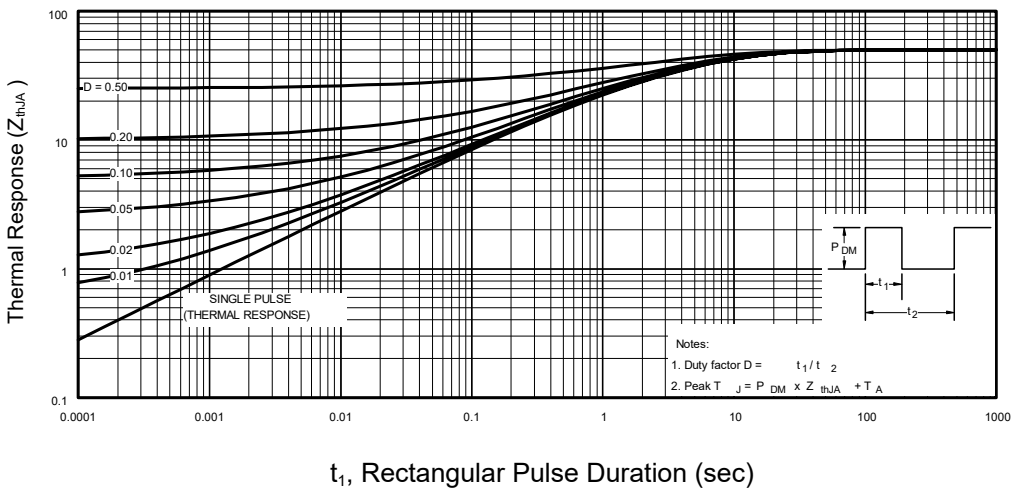


Fig 13. Maximum Effective Transient Themal Impedance, Junction-to-Ambient

7.5Typical Characterisitics

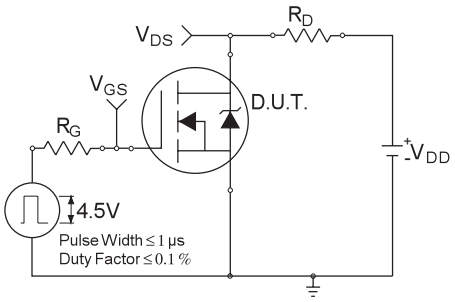


Fig 14a. Switching Time Test Circuit

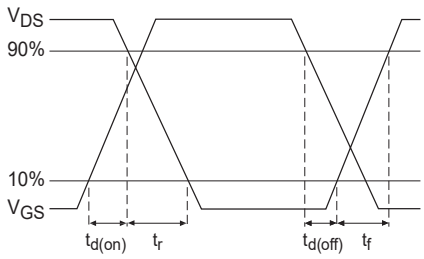
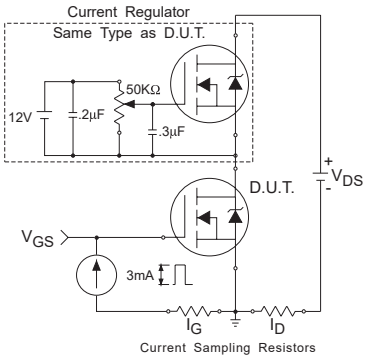


Fig 14b. Switching Time Waveforms



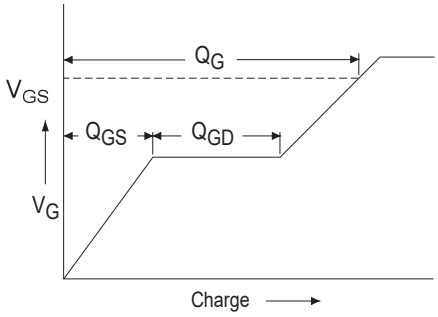
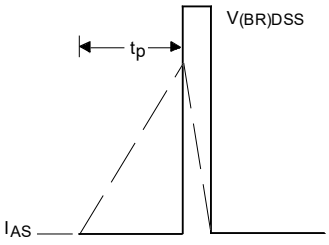


Fig 15a&b. Basic Gate Charge Test Circuit and Waveform



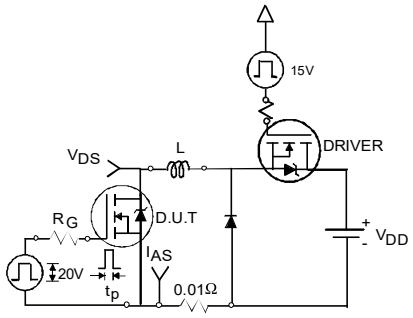
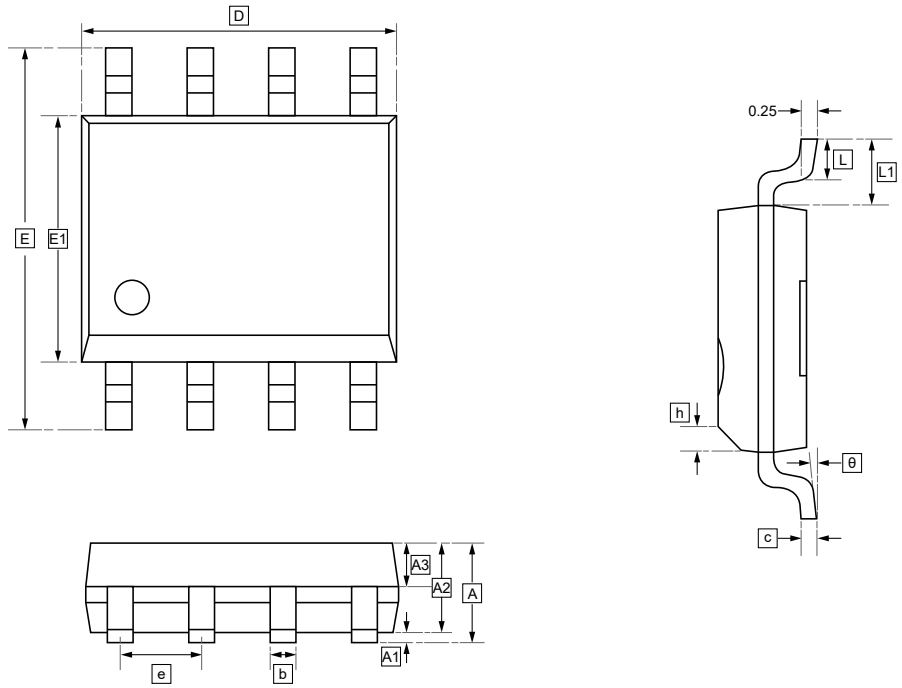


Fig 16a&b. Unclamped Inductive Test circuitand Waveforms

8.SOP-8 Package Outline Dimensions

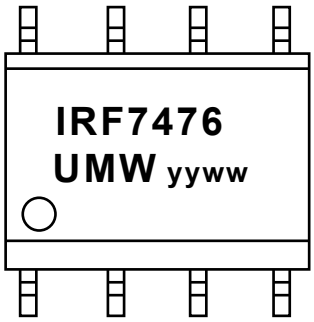


DIMENSIONS (mm are the original dimensions)

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 IRF7476TR	SOP-8	3000	Tape and reel

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