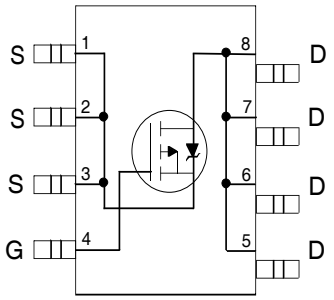
-40V P-Channel MOSFET

Features

- $V_{DS\,(V)}$ = -40V
- I_D = -6.2A(V_{GS} = -10V)
- $R_{DS(ON)}$ < 41mΩ (V_{GS}=-10V)
- $R_{DS(ON)}$ < 70mΩ (V_{GS}=-4.5V)
- Trench Technology
- Ultra Low On-Resistance
- P-Channel MOSFET
- Lead-Free



Top View

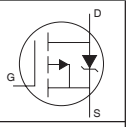
Absolute Maximum Ratings

	Parameter	Max.	Units
V_{DS}	Drain- Source Voltage	-40	V
I_D @ T_A = 25°C	Continuous Drain Current, V_{GS} @ -10V	-6.2	A
I_D @ T_A= 70°C	Continuous Drain Current, V_{GS} @ -10V	-4.9	
I_{DM}	Pulsed Drain Current ①	-25	
P_D @T_A = 25°C	Power Dissipation ③	2.5	W
P_D @T_A = 70°C	Power Dissipation ③	1.6	
	Linear Derating Factor	20	mW/°C
V_{GS}	Gate-to-Source Voltage	± 20	V
T_J, T_{STG}	Junction and Storage Temperature Range	-55 to + 150	°C

Thermal Resistance

Symbol	Parameter	Typ.	Max.	Units
$R_{\theta JL}$	Junction-to-Drain Lead		20	°C/W
$R_{\theta JA}$	Junction-to-Ambient ③		50	

Electrical Characteristics @ T_J = 25°C (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	-40			V	V_{GS} = 0V, I_D = -250μA
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient		0.03		V/°C	Reference to 25°C, I_D = -1mA
$R_{DS(on)}$	Static Drain-to-Source On-Resistance		25	41	mΩ	V_{GS} = -10V, I_D = -6.2A ②
			45	70		V_{GS} = -4.5V, I_D = -5.0A ②
$V_{GS(th)}$	Gate Threshold Voltage	-1.0		-3.0	V	V_{DS} = V_{GS}, I_D = -250μA
g_{fs}	Forward Transconductance	8.9			S	V_{DS} = -10V, I_D = -6.2A
I_{DSS}	Drain-to-Source Leakage Current			-10	μA	V_{DS} = -32V, V_{GS} = 0V
				-25		V_{DS} = -32V, V_{GS} = 0V, T_J = 70°C
I_{GSS}	Gate-to-Source Forward Leakage			-100	nA	V_{GS} = -20V
	Gate-to-Source Reverse Leakage			100		V_{GS} = 20V
Q_g	Total Gate Charge		53	80	nC	I_D = -6.2A
Q_{gs}	Gate-to-Source Charge		14	21		V_{DS} = -32V
Q_{gd}	Gate-to-Drain ("Miller") Charge		3.9	5.9		V_{GS} = -10V
$t_{d(on)}$	Turn-On Delay Time		24		ns	V_{DD} = -20V ②
t_r	Rise Time		280			I_D = -1.0A
$t_{d(off)}$	Turn-Off Delay Time		210			R_G = 6.0Ω
t_f	Fall Time		100			V_{GS} = -10V
C_{iss}	Input Capacitance		3220		pF	V_{GS} = 0V
C_{oss}	Output Capacitance		160			V_{DS} = -25V
C_{rss}	Reverse Transfer Capacitance		190			f = 1.0kHz
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			-25		
V_{SD}	Diode Forward Voltage			-1.2	V	T_J = 25°C, I_S = -2.5A, V_{GS} = 0V ②
t_{rr}	Reverse Recovery Time		32	48	ns	T_J = 25°C, I_F = -2.5A
Q_{rr}	Reverse Recovery Charge		45	68	nC	di/dt = -100A/μs ②

Notes:

① Repetitive rating; pulse width limited by max. junction temperature.

② Pulse width ≤ 400μs; duty cycle ≤ 2%.

③ Surface mounted on 1 in square Cu board

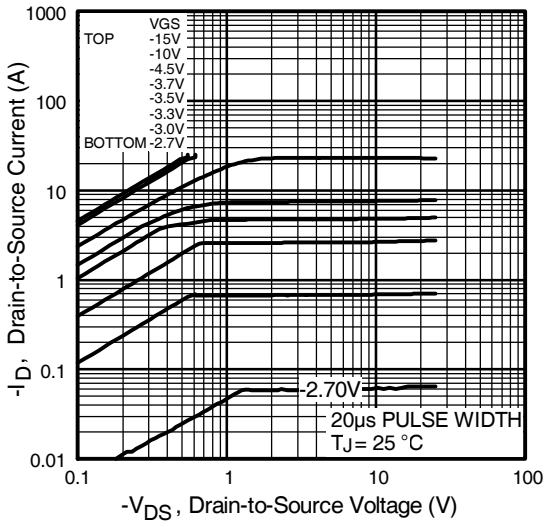


Fig 1. Typical Output Characteristics

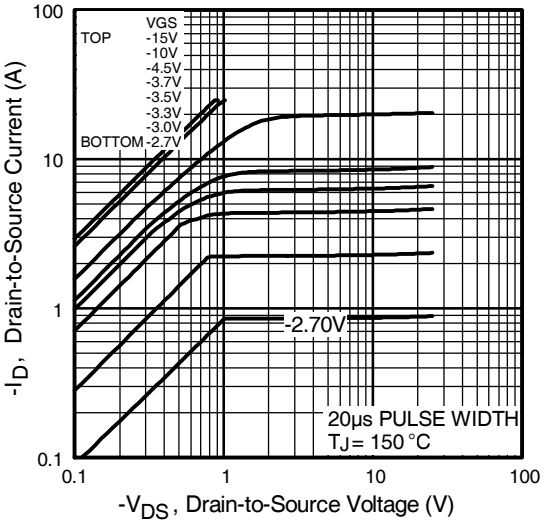


Fig 2. Typical Output Characteristics

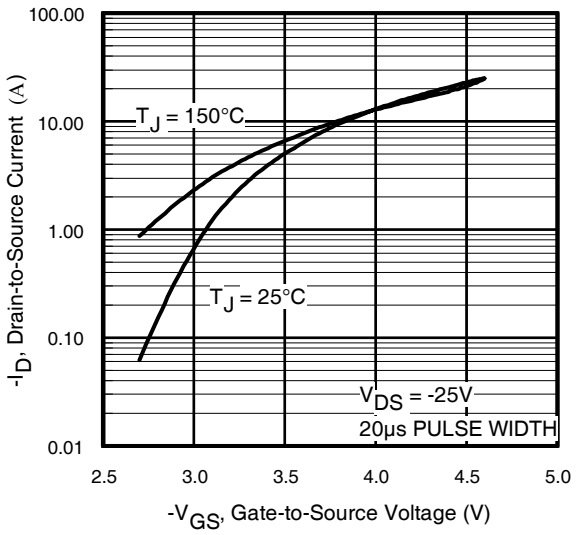


Fig 3. Typical Transfer Characteristics

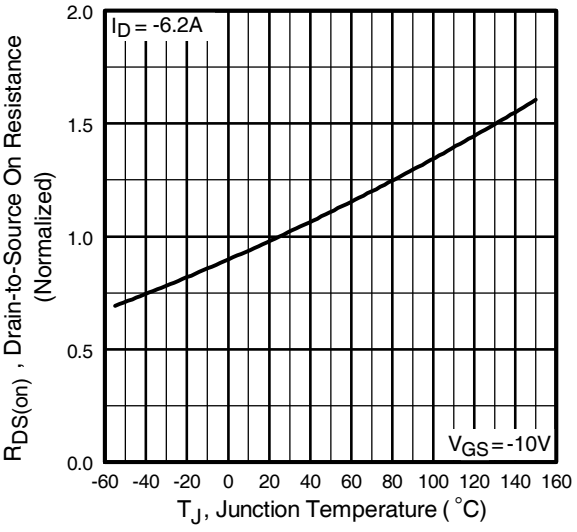


Fig 4. Normalized On-Resistance Vs. Temperature

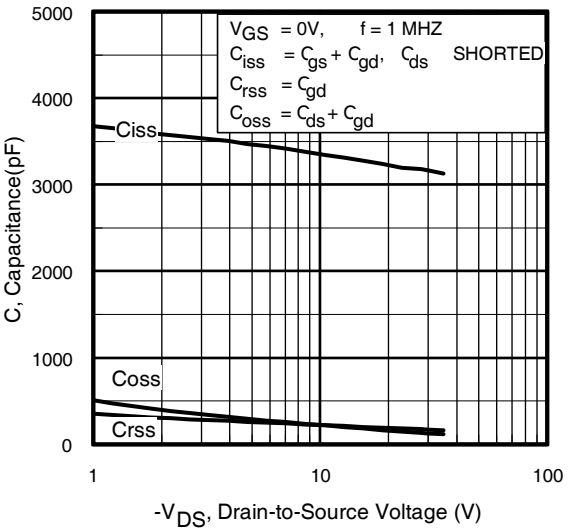


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

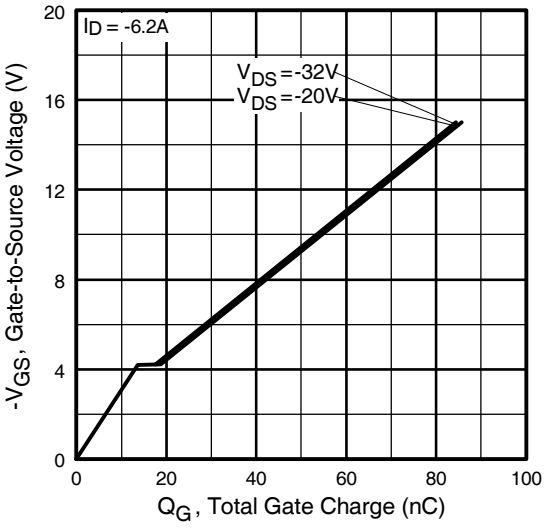


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

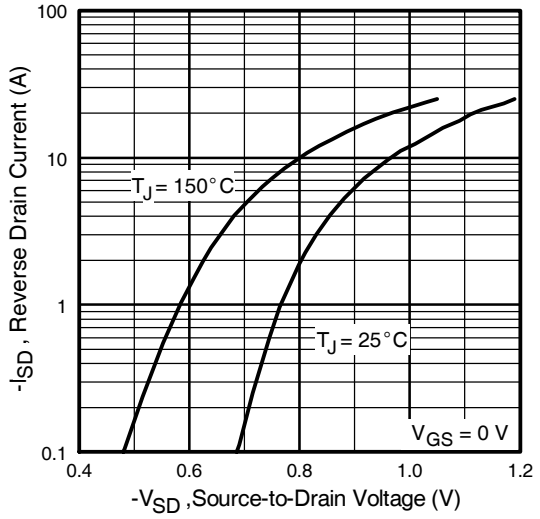


Fig 7. Typical Source-Drain Diode Forward Voltage

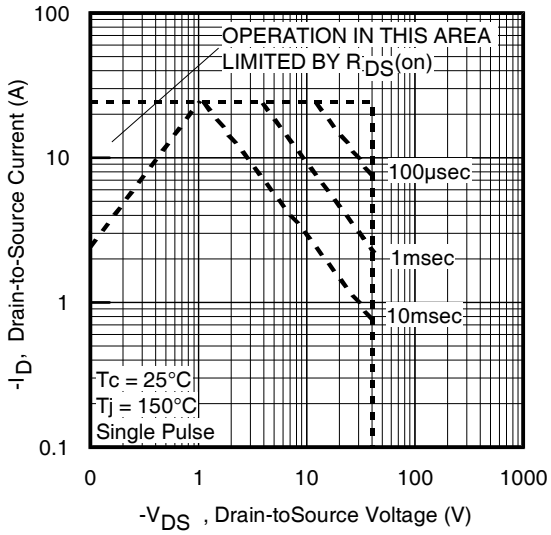


Fig 8. Maximum Safe Operating Area

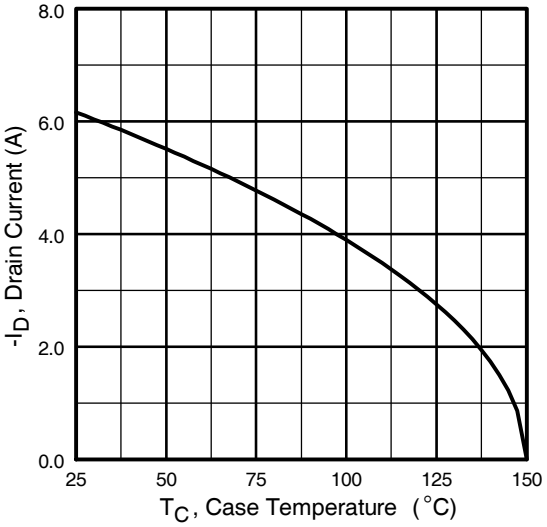


Fig 9. Maximum Drain Current Vs. Case Temperature

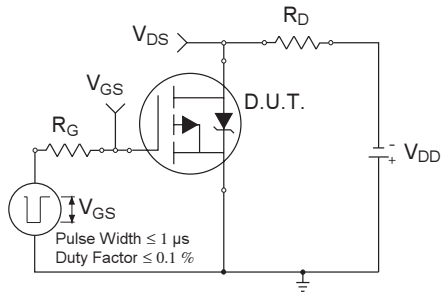


Fig 10a. Switching Time Test Circuit

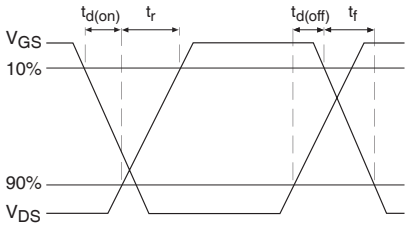


Fig 10b. Switching Time Waveforms

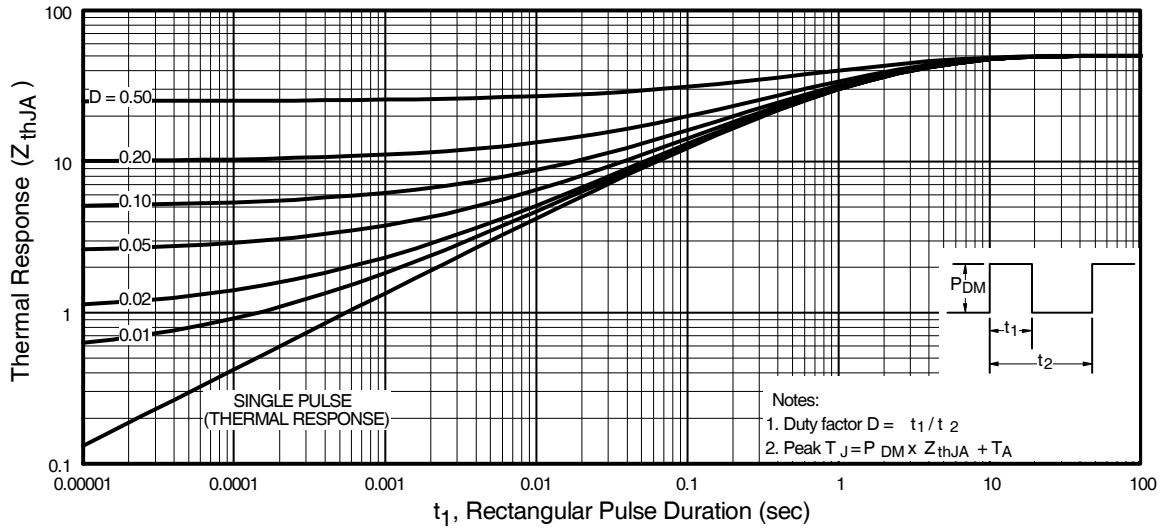


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

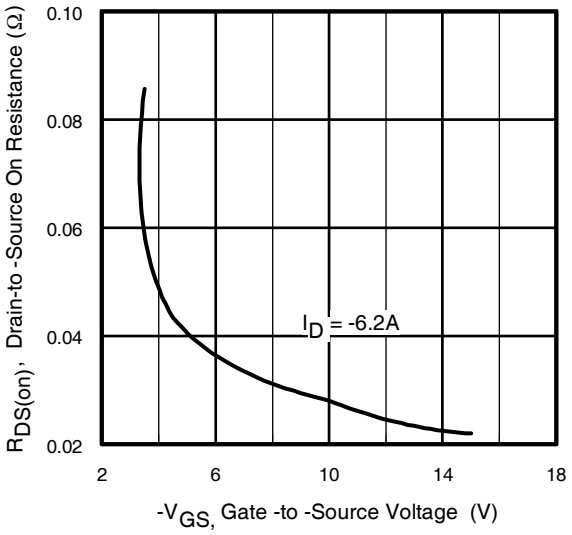


Fig 12. Typical On-Resistance Vs. Gate Voltage

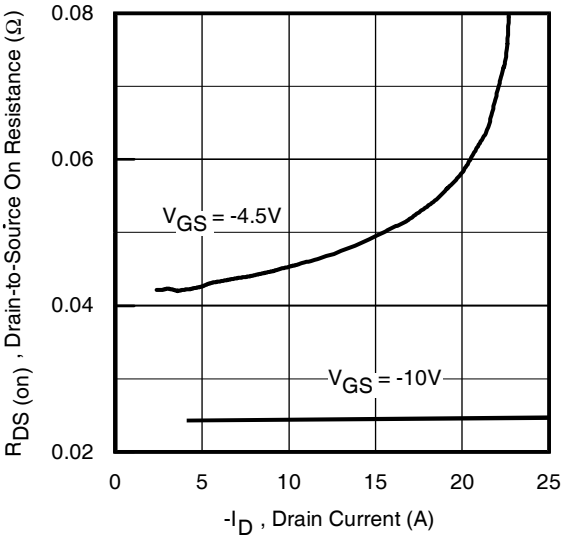


Fig 13. Typical On-Resistance Vs. Drain Current

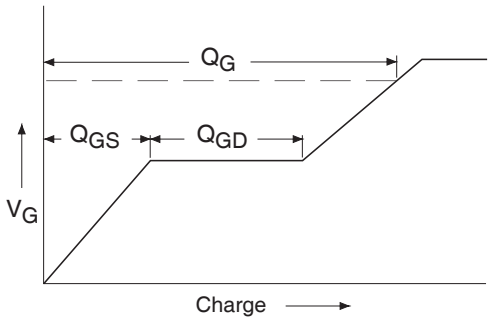


Fig 14a. Basic Gate Charge Waveform

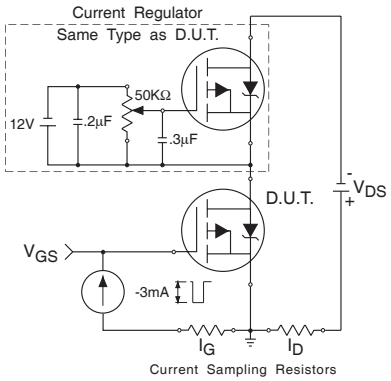


Fig 14b. Gate Charge Test Circuit

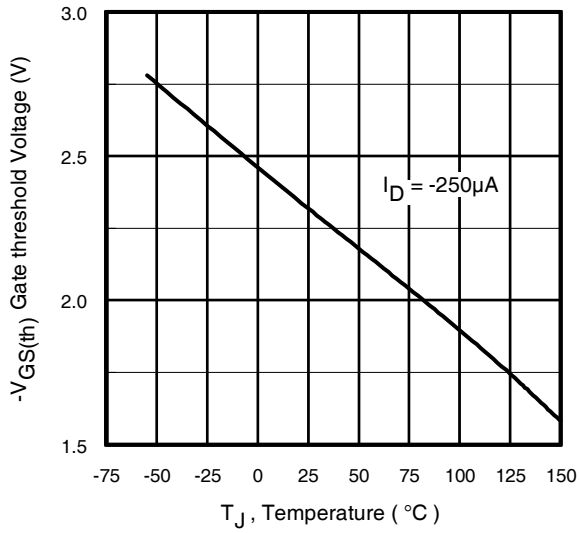


Fig 15. Typical Vgs(th) Vs. Junction Temperature

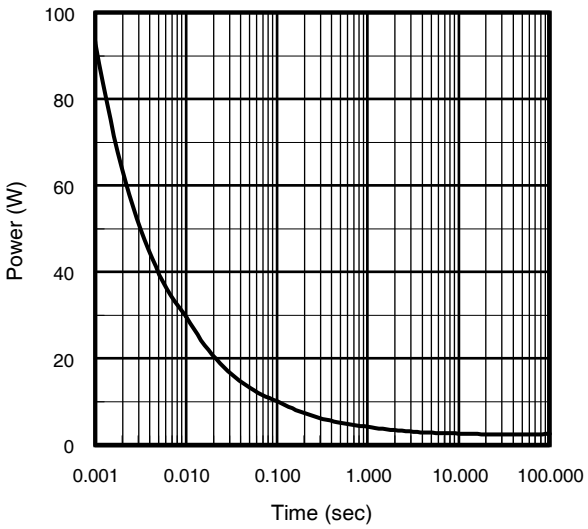
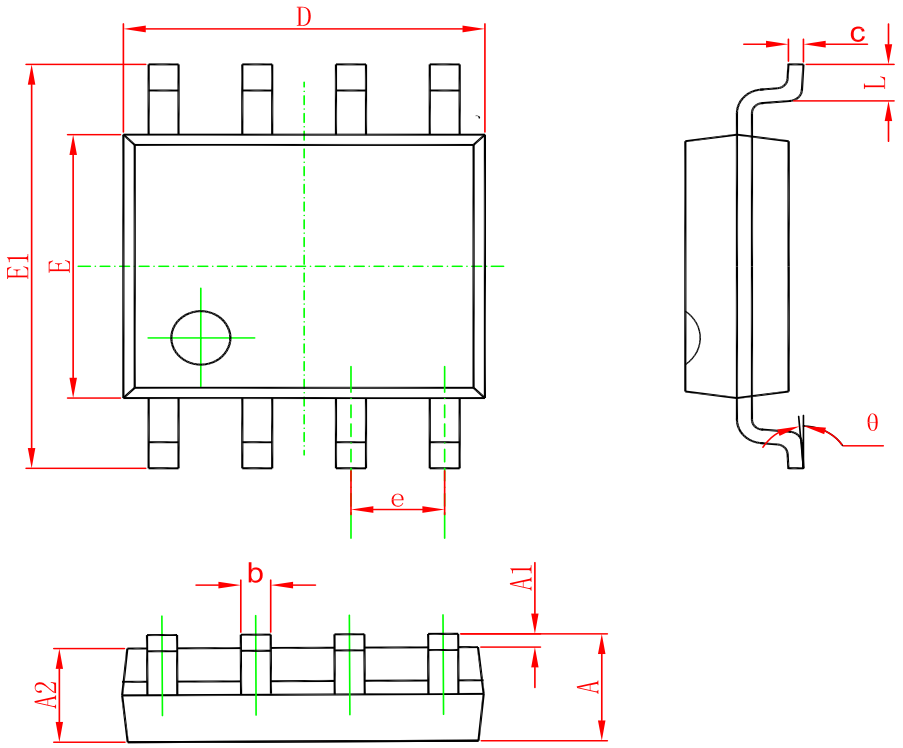


Fig 16. Typical Power Vs. Time

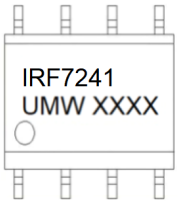
PACKAGE OUTLINE DIMENSIONS

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



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Order code	Package	Baseqty	Deliverymode
UMW IRF7241TR	SOP-8	3000	Tape and reel

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