

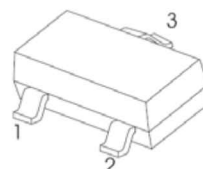
Product summary

V_{DS} (V)	$R_{DS(on)}$ (m Ω)
60	92 at $V_{GS} = 10$ V
	116 at $V_{GS} = 4.5$ V

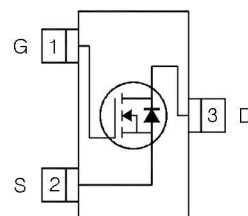
Features

- Industry-standard pinout
- Compatible with existing Surface Mount Techniques
- compliant containing no lead, no bromide and no halogen
- Industrial qualification

SOT - 23



1. GATE
2. SOURCE
3. DRAIN



SOT23

Absolute Maximum Ratings

Symbol	Parameter	Max.	Units
V_{DS}	Drain-Source Voltage	60	V
I_D @ $T_A = 25^\circ\text{C}$	Continuous Drain Current, V_{GS} @ 10V	2.7	A
I_D @ $T_A = 70^\circ\text{C}$	Continuous Drain Current, V_{GS} @ 10V	2.1	
I_{DM}	Pulsed Drain Current	11	
P_D @ $T_A = 25^\circ\text{C}$	Maximum Power Dissipation	1.25	W
P_D @ $T_A = 70^\circ\text{C}$	Maximum Power Dissipation	0.80	
	Linear Derating Factor	0.01	W/ $^\circ\text{C}$
V_{GS}	Gate-to-Source Voltage	± 16	V
T_J, T_{STG}	Junction and Storage Temperature Range	-55 to + 150	$^\circ\text{C}$

Thermal Resistance

Symbol	Parameter	Typ.	Max.	Units
$R_{\theta JA}$	Junction-to-Ambient ^③	—	100	$^\circ\text{C/W}$
$R_{\theta JA}$	Junction-to-Ambient ($t < 10\text{s}$) ^④	—	99	

Electric Characteristics @ $T_J = 25^\circ\text{C}$ (unless otherwise specified)

Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	60	—	—	V	$V_{GS} = 0V, I_D = 250\mu A$
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	—	0.06	—	V/ $^\circ\text{C}$	Reference to $25^\circ\text{C}, I_D = 1\text{mA}$
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	—	98	116	$m\Omega$	$V_{GS} = 4.5V, I_D = 2.2A$ ②
		—	78	92		$V_{GS} = 10V, I_D = 2.7A$ ②
$V_{GS(th)}$	Gate Threshold Voltage	1.0	—	2.5	V	$V_{DS} = V_{GS}, I_D = 25\mu A$
I_{DSS}	Drain-to-Source Leakage Current	—	—	20	μA	$V_{DS} = 60V, V_{GS} = 0V$
		—	—	250		$V_{DS} = 60V, V_{GS} = 0V, T_J = 125^\circ\text{C}$
I_{GSS}	Gate-to-Source Forward Leakage	—	—	100	nA	$V_{GS} = 20V$
	Gate-to-Source Reverse Leakage	—	—	-100		$V_{GS} = -20V$
R_G	Internal Gate Resistance	—	1.6	—	Ω	
g_{fs}	Forward Transconductance	7.6	—	—	S	$V_{DS} = 25V, I_D = 2.7A$
Q_g	Total Gate Charge	—	2.5	—	nC	$I_D = 2.7A$
Q_{gs}	Gate-to-Source Charge	—	0.7	—		$V_{DS} = 30V$
Q_{gd}	Gate-to-Drain ("Miller") Charge	—	1.3	—		$V_{GS} = 4.5V$ ②
$t_{d(on)}$	Turn-On Delay Time	—	5.4	—	ns	$V_{DD} = 30V$ ②
t_r	Rise Time	—	6.3	—		$I_D = 1.0A$
$t_{d(off)}$	Turn-Off Delay Time	—	6.8	—		$R_G = 6.8\Omega$
t_f	Fall Time	—	4.2	—		$V_{GS} = 4.5V$
C_{iss}	Input Capacitance	—	290	—	pF	$V_{GS} = 0V$
C_{oss}	Output Capacitance	—	37	—		$V_{DS} = 25V$
C_{rss}	Reverse Transfer Capacitance	—	21	—		$f = 1.0\text{MHz}$

Source - Drain Ratings and Characteristics

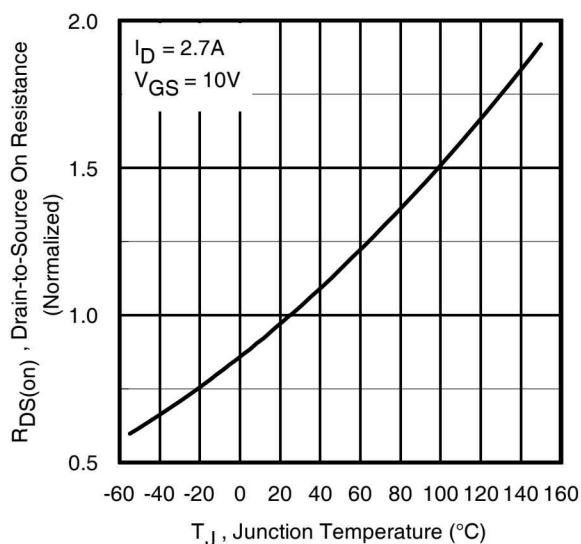
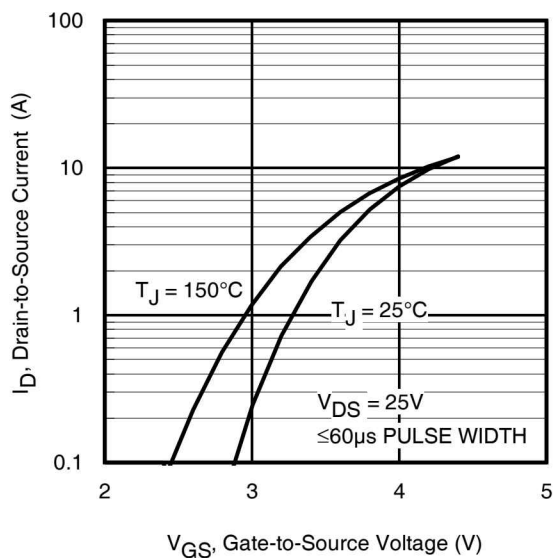
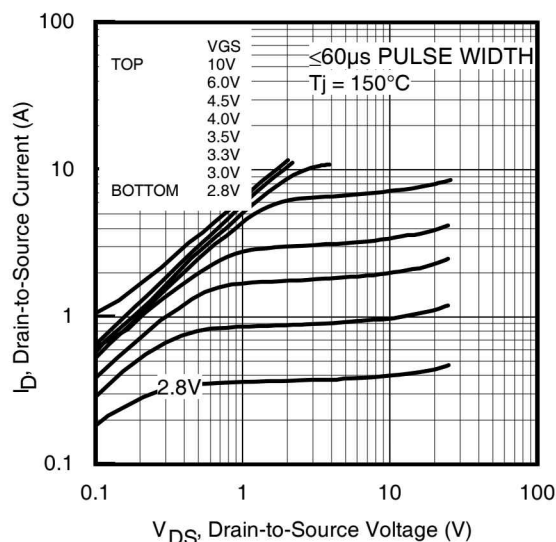
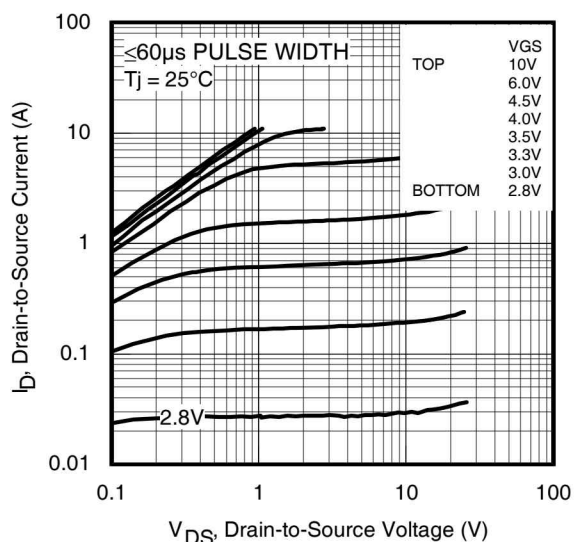
Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	—	—	1.6	A	MOSFET symbol showing the integral reverse p-n junction diode.
I_{SM}	Pulsed Source Current (Body Diode) ①	—	—	11		
V_{SD}	Diode Forward Voltage	—	—	1.3	V	$T_J = 25^\circ\text{C}, I_S = 2.7A, V_{GS} = 0V$ ②
t_{rr}	Reverse Recovery Time	—	14	21	ns	$T_J = 25^\circ\text{C}, V_R = 30V, I_F = 1.6A$
Q_{rr}	Reverse Recovery Charge	—	13	20	nC	$di/dt = 100A/\mu s$ ②

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

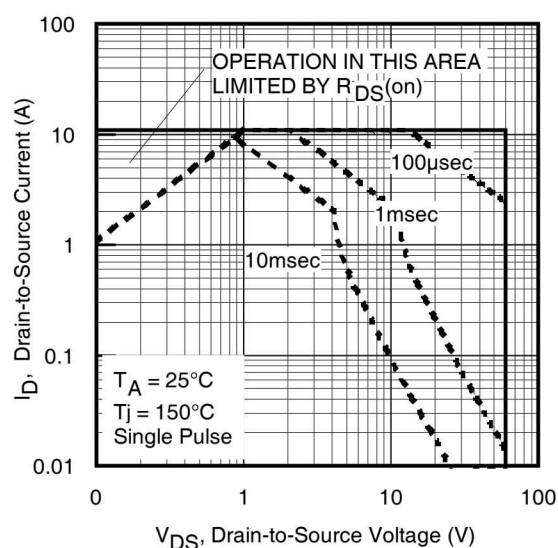
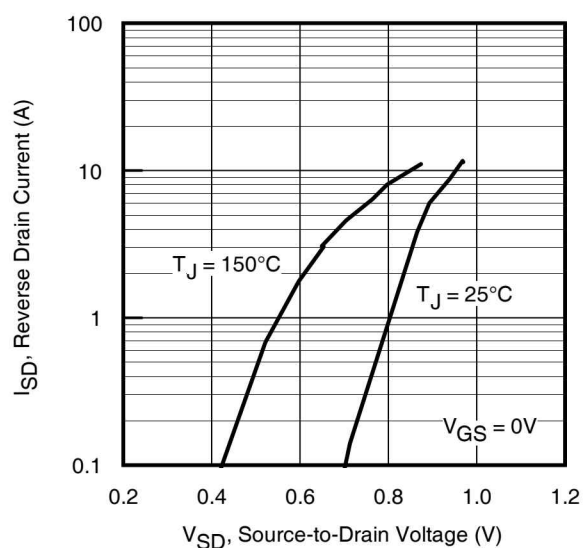
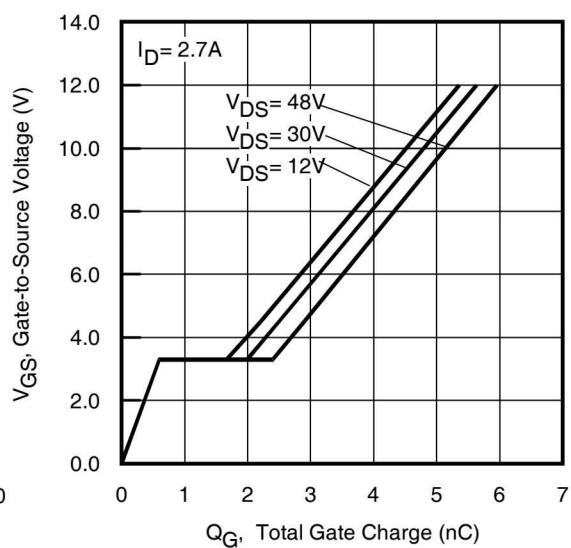
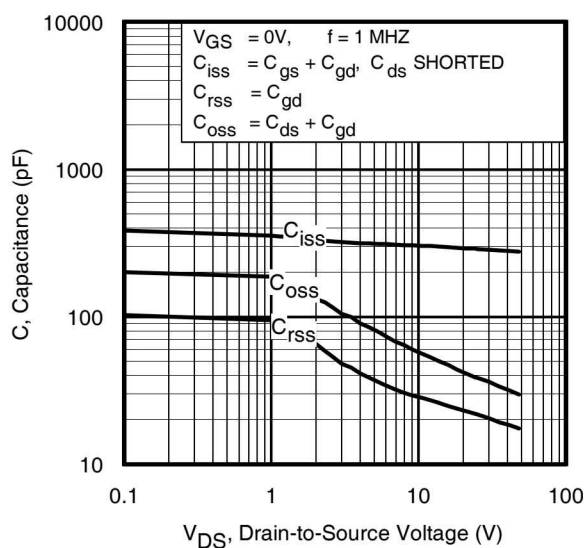
② Pulse width $\leq 400\mu s$; duty cycle $\leq 2\%$.

③ Surface mounted on 1 in square Cu board.

Typical Characteristics



Typical Characteristics



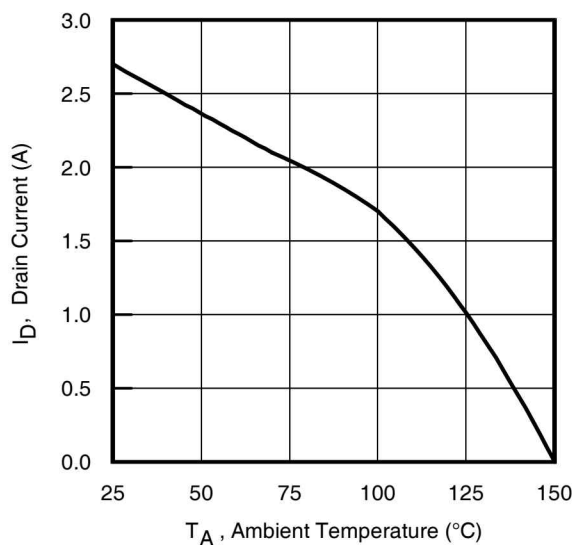


Fig 9. Maximum Drain Current vs. Ambient Temperature

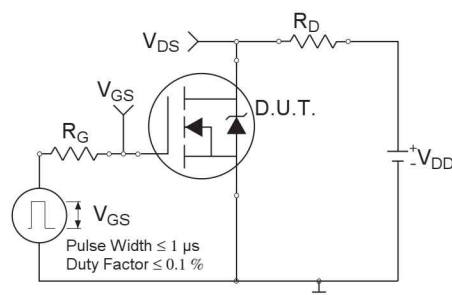


Fig 10a. Switching Time Test Circuit

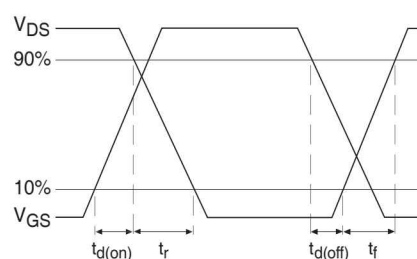


Fig 10b. Switching Time Waveforms

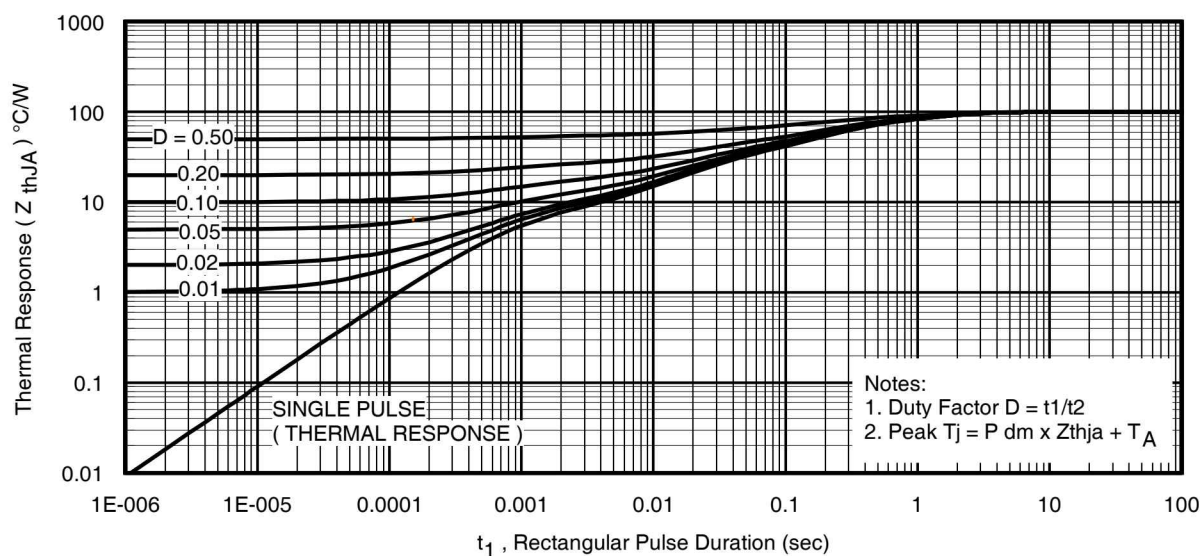


Fig 11. Typical Effective Transient Thermal Impedance, Junction-to-Ambient

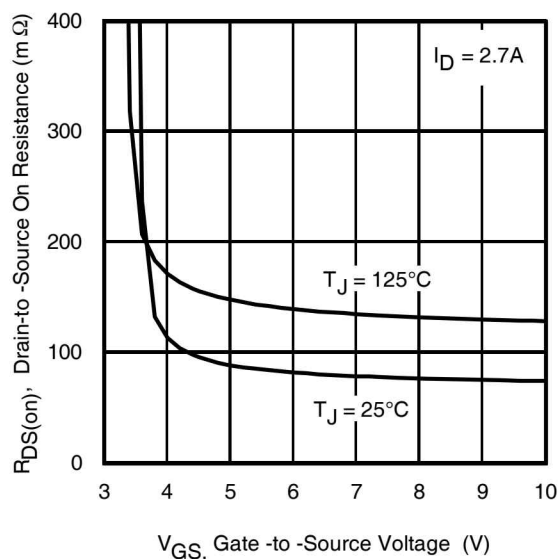


Fig 12. Typical On-Resistance vs. Gate Voltage

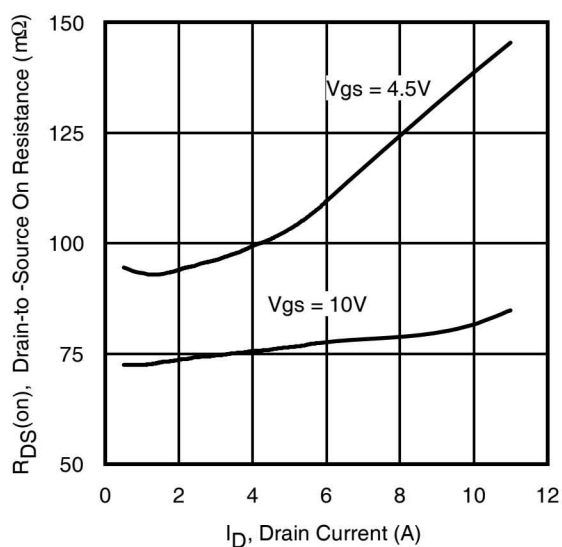


Fig 13. Typical On-Resistance vs. Drain Current

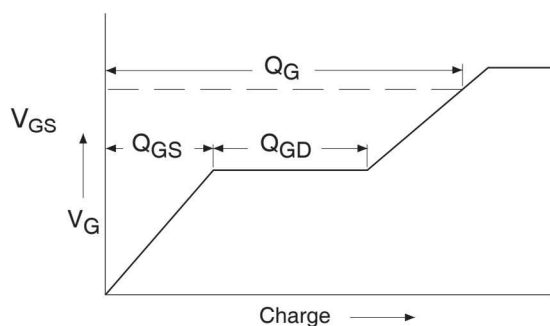


Fig 14a. Basic Gate Charge Waveform

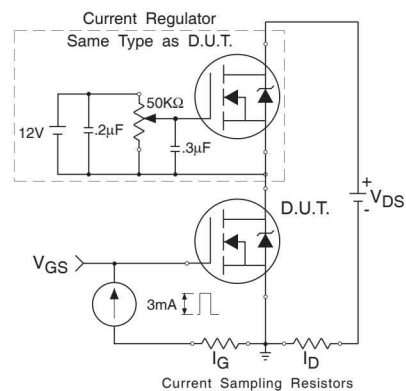


Fig 14b. Gate Charge Test Circuit

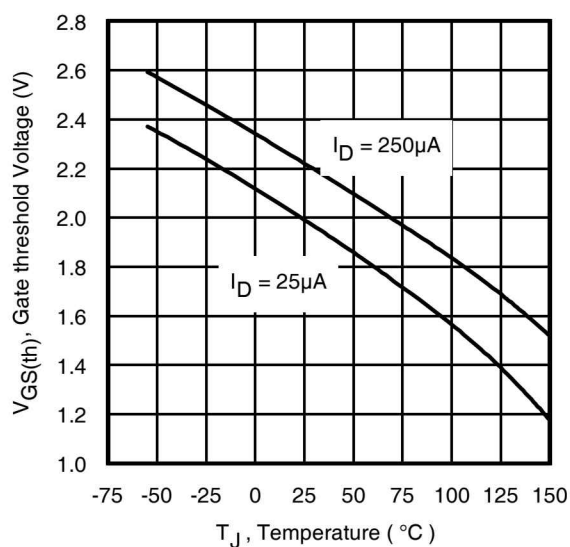


Fig 15. Typical Threshold Voltage vs. Junction Temperature

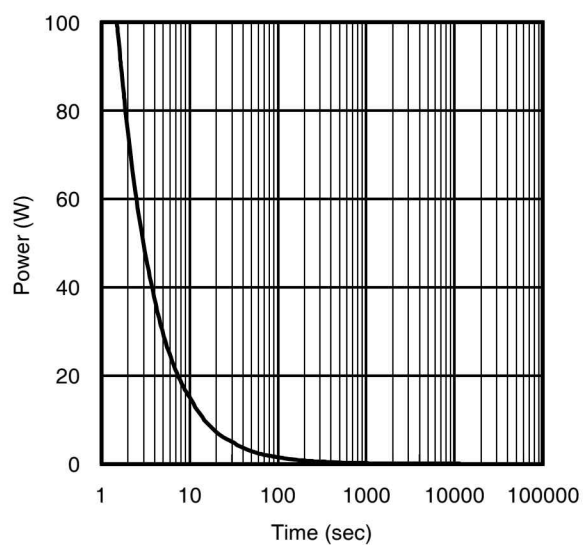
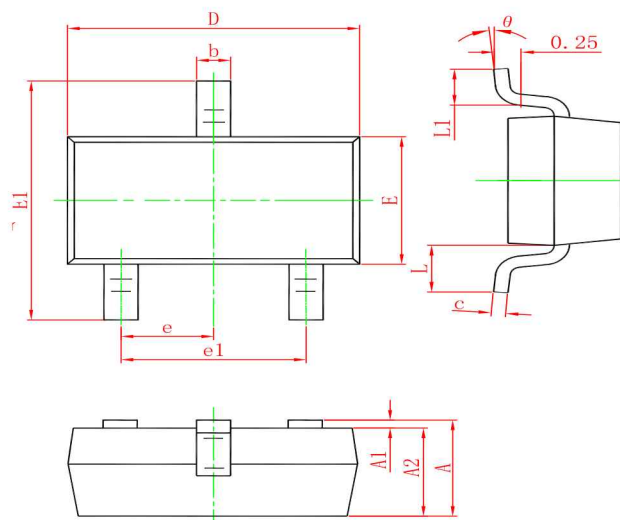


Fig 16. Typical Power vs. Time

SOT-23 PACKAGE OUTLINE DIMENSIONS



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950 TYP.		0.037 TYP.	
e1	1.800	2.000	0.071	0.079
L	0.550 REF.		0.022 REF.	
L1	0.300	0.500	0.012	0.020
θ	0°	8°	0°	8°

Marking



Ordering information

Order code	Package	Baseqty	Deliverymode
UMW IRLML0060	SOT-23	3000	Tape and reel