

Features

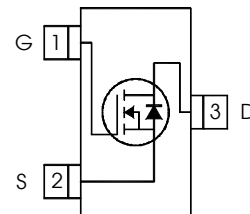
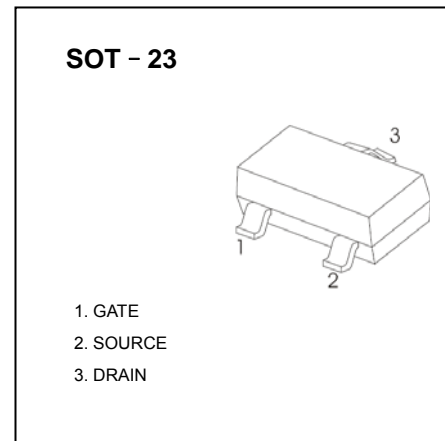
- Industry-standard pinout
- Compatible with existing Surface Mount Techniques

Benefits

- Lower switching losses
- Multi-vendor compatibility
- Easier manufacturing
- Environmentally friendly
- Increased reliability
- $V_{DS}(V) = 40V$
- $R_{DS(ON)} < 56m\Omega$ ($V_{GS} = 10V$)
- $R_{DS(ON)} < 78m\Omega$ ($V_{GS} = 4.5V$)

Application(s)

- Load/ System Switch
- DC Motor Drive



Absolute Maximum Ratings

Symbol	Parameter	Max.	Units
V_{DS}	Drain-Source Voltage	40	V
$I_D @ T_A = 25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$	3.6	A
$I_D @ T_A = 70^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$	2.9	
I_{DM}	Pulsed Drain Current	15	
$P_D @ T_A = 25^\circ C$	Maximum Power Dissipation	1.3	W
$P_D @ T_A = 70^\circ C$	Maximum Power Dissipation	0.8	
	Linear Derating Factor	0.01	
V_{GS}	Gate-to-Source Voltage	± 16	V
T_J, T_{STG}	Junction and Storage Temperature Range	-55 to + 150	$^\circ C$

Thermal Resistance

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

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

Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
V _{(BR)DSS}	Drain-to-Source Breakdown Voltage	40			V	V _{GS} = 0V, I _D = 250μA
ΔV _{(BR)DSS} /ΔT _J	Breakdown Voltage Temp. Coefficient		0.04		V/°C	Reference to 25°C, I _D = 1 mA
R _{DS(on)}	Static Drain-to-Source On-Resistance		40	50	mΩ	V _{GS} = 10V, I _D = 3.6A ②
			58	70		V _{GS} = 4.5V, I _D = 2.9A ②
V _{GS(th)}	Gate Threshold Voltage	1.0	1.8	2.5	V	V _{DS} = V _{GS} , I _D = 25μA
I _{DSS}	Drain-to-Source Leakage Current			20	μA	V _{DS} = 40V, V _{GS} = 0V
				250		V _{DS} = 40V, V _{GS} = 0V, T _J = 125°C
I _{GSS}	Gate-to-Source Forward Leakage			100	nA	V _{GS} = 16V
	Gate-to-Source Reverse Leakage			-100		V _{GS} = -16V
R _G	Internal Gate Resistance		1.1		Ω	
g _{fs}	Forward Transconductance	6.2			S	V _{DS} = 10V, I _D = 3.6A
Q _g	Total Gate Charge		2.6	3.9	nC	I _D = 3.6A
Q _{gs}	Gate-to-Source Charge		0.7			V _{DS} = 20V
Q _{gd}	Gate-to-Drain ("Miller") Charge		1.4			V _{GS} = 4.5V ②
t _{d(on)}	Turn-On Delay Time		5.1		ns	V _{DD} = 20V
t _r	Rise Time		5.4			I _D = 1.0A
t _{d(off)}	Turn-Off Delay Time		6.4			R _G = 6.8 Ω
t _f	Fall Time		4.3			V _{GS} = 4.5V
C _{iss}	Input Capacitance		266		pF	V _{GS} = 0V
C _{oss}	Output Capacitance		49			V _{DS} = 25V
C _{rss}	Reverse Transfer Capacitance		29			f = 1.0MHz
I _S	Continuous Source Current (Body Diode)			1.3	A	MOSFET symbol showing the integral reverse p-n junction diode.
I _{SM}	Pulsed Source Current (Body Diode) ①			15		
V _{SD}	Diode Forward Voltage			1.2	V	T _J = 25°C, I _S = 1.3A, V _{GS} = 0V ②
t _{rr}	Reverse Recovery Time		10		ns	T _J = 25°C, V _R = 32V, I _F = 1.3 A
Q _{rr}	Reverse Recovery Charge		9.3		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

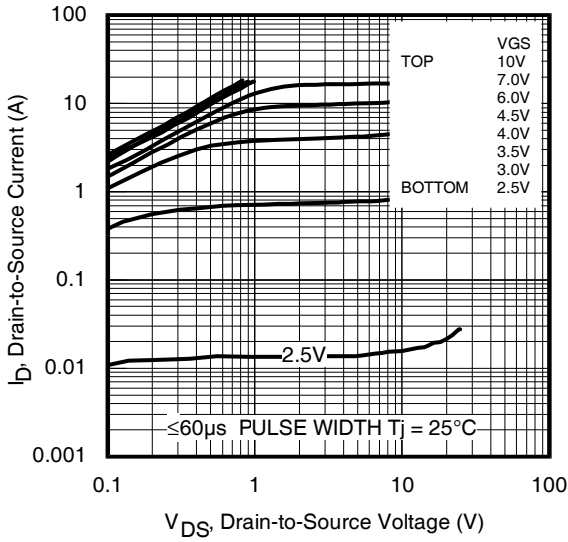


Fig 1. Typical Output Characteristics

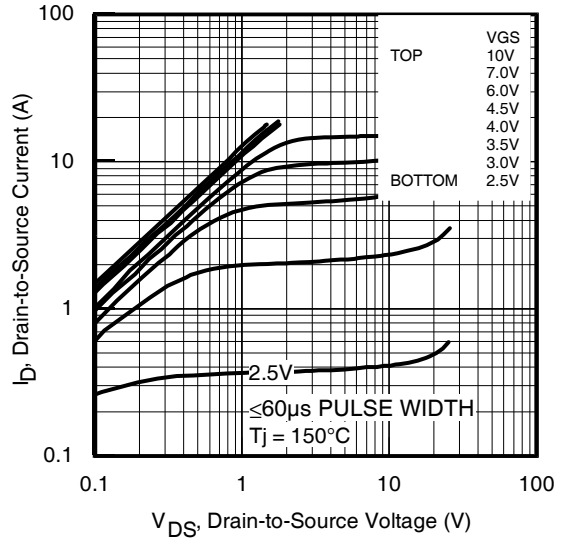


Fig 2. Typical Output Characteristics

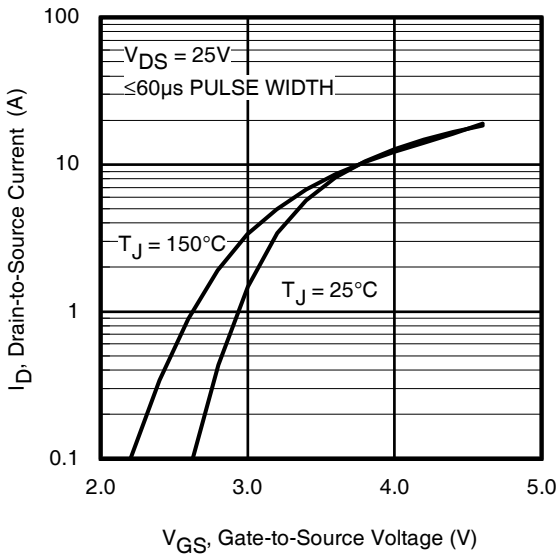


Fig 3. Typical Transfer Characteristics

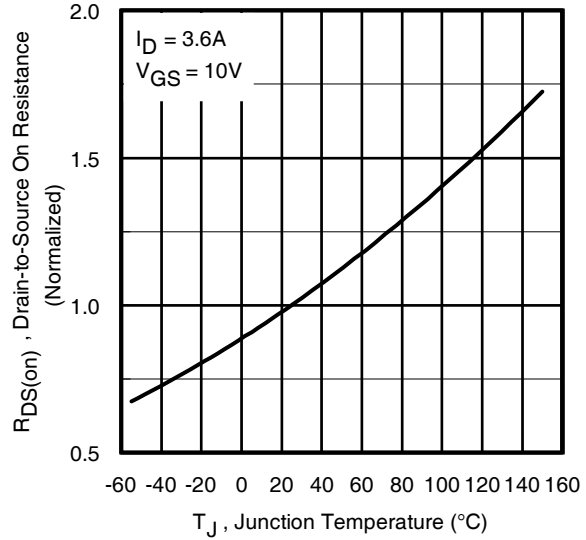


Fig 4. Normalized On-Resistance Vs. Temperature

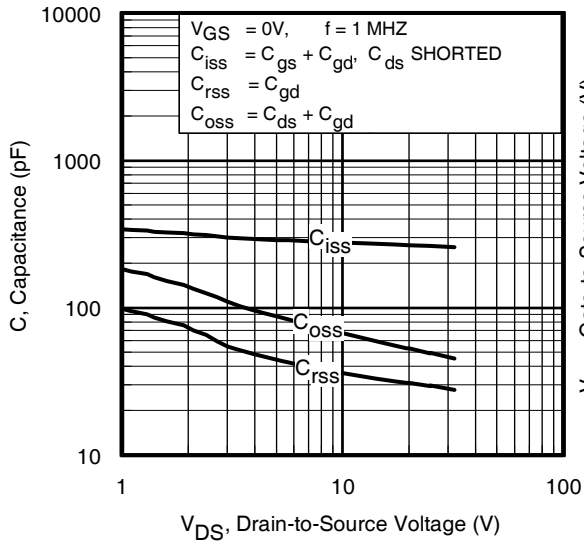


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

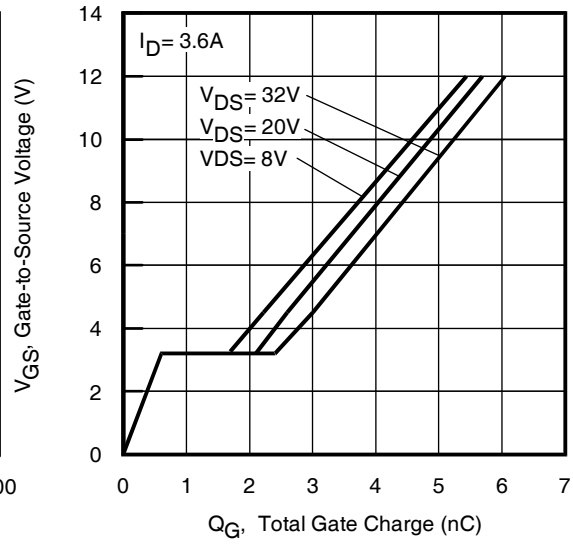


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

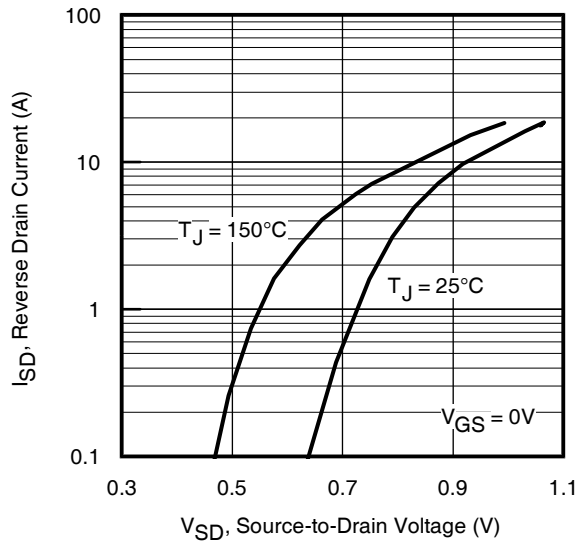


Fig 7. Typical Source-Drain Diode Forward Voltage

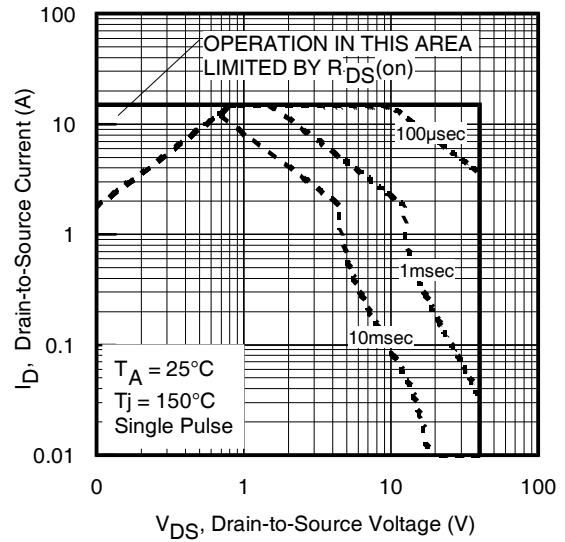


Fig 8. Maximum Safe Operating Area

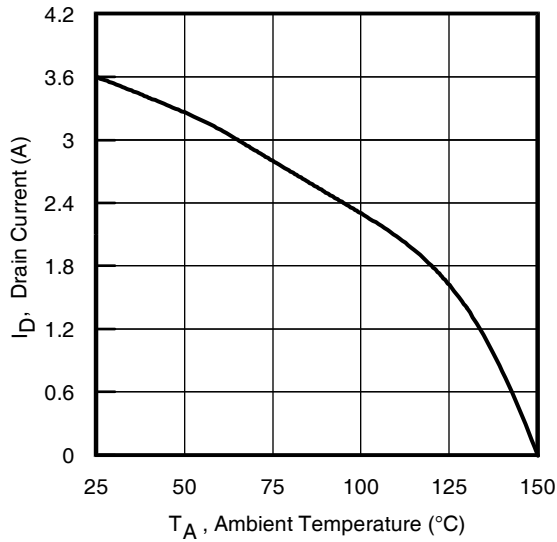


Fig 9. Maximum Drain Current Vs. Ambient Temperature

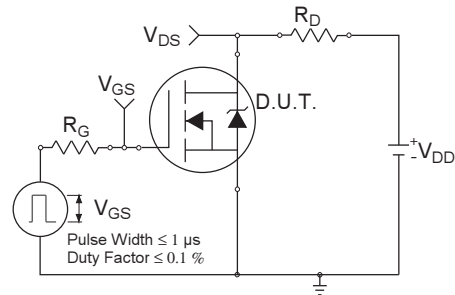


Fig 10a. Switching Time Test Circuit

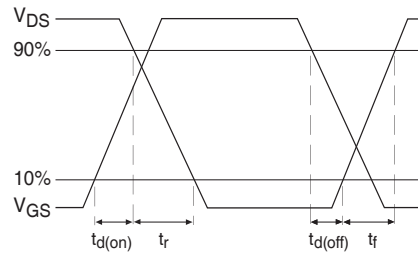


Fig 10b. Switching Time Waveforms

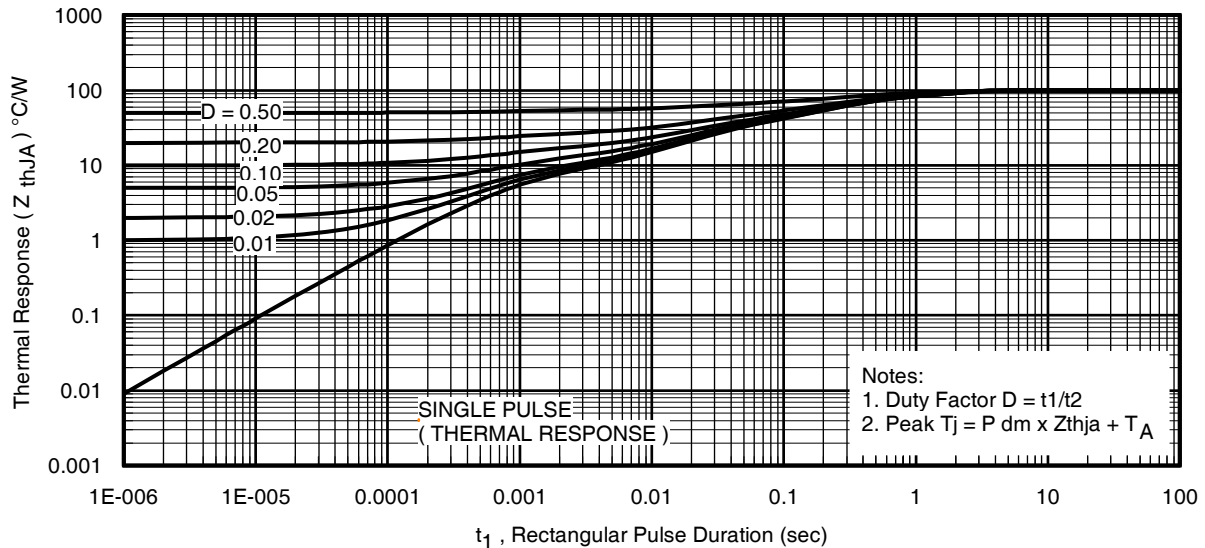


Fig 11. Typical Effective Transient Thermal Impedance, Junction-to-Ambient

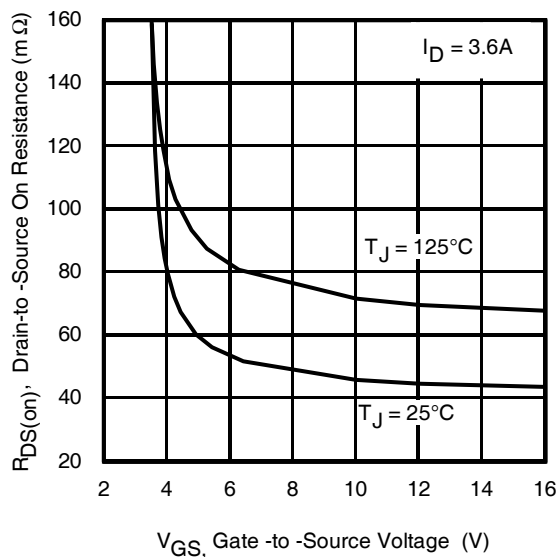


Fig 12. Typical On-Resistance Vs. Gate Voltage

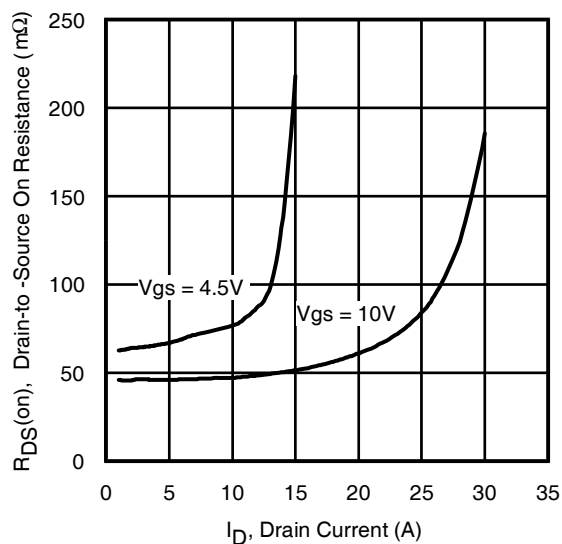


Fig 13. Typical On-Resistance Vs. Drain Current

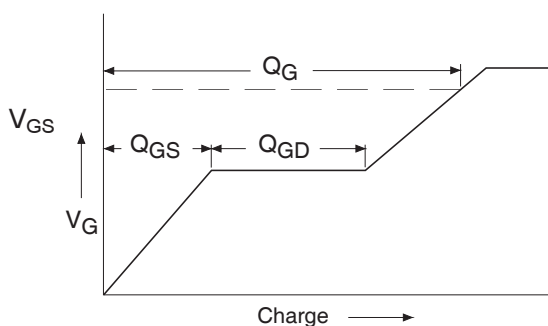


Fig 14a. Basic Gate Charge Waveform

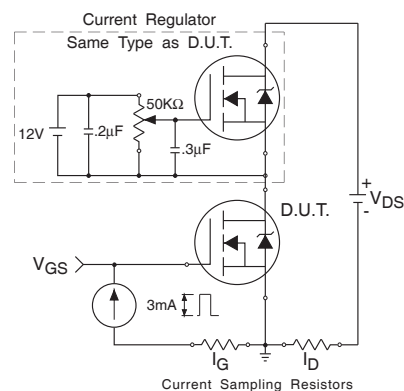


Fig 14b. Gate Charge Test Circuit

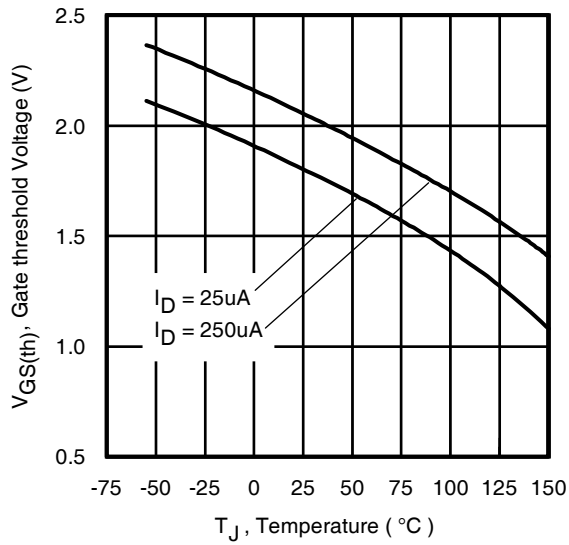


Fig 15. Typical Threshold Voltage Vs. Junction Temperature

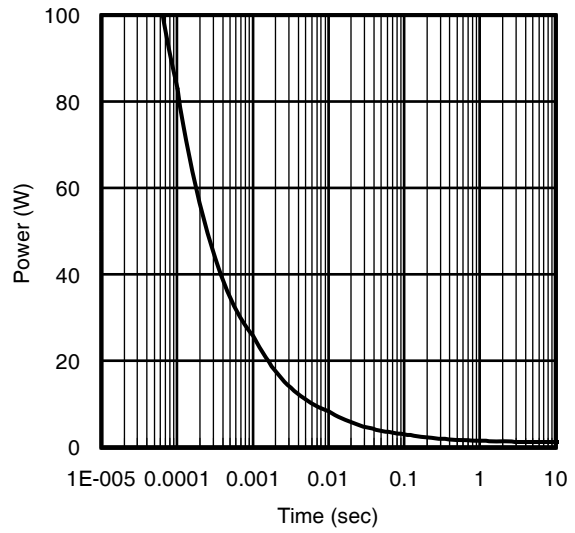
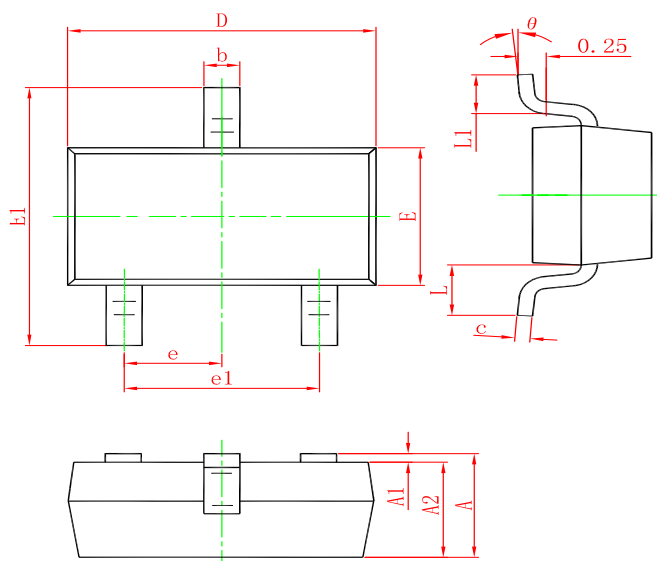


Fig 16. Typical Power Vs. Time

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 IRLML0040TR	SOT-23	3000	Tape and reel

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