

General Description

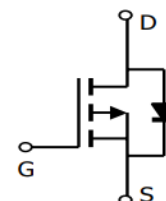
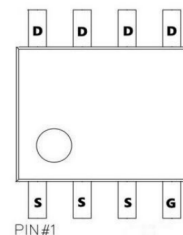
- Trench Power MOSFET technology
- Low $R_{DS(ON)}$
- ESD Protected
- RoHS and Halogen-Free Compliant

Applications

- System/Load Switch
- Battery Switch
- USB-PD Load Switch

Features

- $V_{DS(V)} = -30V$
- $I_D = -18.5A (V_{GS} = -10V)$
- $R_{DS(ON)} < 5.8m\Omega (V_{GS} = -10V)$
- $R_{DS(ON)} < 8.2m\Omega (V_{GS} = -4.5V)$



Absolute Maximum Ratings $T_A = 25^\circ C$ unless otherwise noted

Parameter	Symbol	Maximum	Units
Drain-Source Voltage	V_{DS}	-30	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current	I_D	-18.5	A
		-14.5	
Pulsed Drain Current ^C	I_{DM}	-74	
Avalanche Current ^C	I_{AS}	54	A
Avalanche energy $L=0.1mH$	E_{AS}	146	mJ
Power Dissipation ^B	P_D	3.1	W
		2.0	
Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 150	$^\circ C$

Thermal Characteristics

Parameter	Symbol	Typ	Max	Units
Maximum Junction-to-Ambient	$R_{\theta JA}$	31	40	$^\circ C/W$
Maximum Junction-to-Ambient		59	75	$^\circ C/W$
Maximum Junction-to-Lead	$R_{\theta JL}$	16	24	$^\circ C/W$

Electrical Characteristics ($T_J=25^{\circ}\text{C}$ unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
BV_{DSS}	Drain-Source Breakdown Voltage	$I_D=-250\mu\text{A}$, $V_{GS}=0\text{V}$	-30			V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=-30\text{V}$, $V_{GS}=0\text{V}$ $T_J=55^{\circ}\text{C}$			-1 -5	μA
I_{GSS}	Gate-Body leakage current	$V_{DS}=0\text{V}$, $V_{GS}=\pm 16\text{V}$			± 10	μA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}$, $I_D=-250\mu\text{A}$	-1.2	-1.7	-2.2	V
$R_{DS(on)}$	Static Drain-Source On-Resistance	$V_{GS}=-10\text{V}$, $I_D=-18.5\text{A}$ $V_{GS}=-4.5\text{V}$, $I_D=-16\text{A}$		4.7 6.3	5.8 8.2	$\text{m}\Omega$
g_{FS}	Forward Transconductance	$V_{DS}=-5\text{V}$, $I_D=-18.5\text{A}$		65		S
V_{SD}	Diode Forward Voltage	$I_S=-1\text{A}$, $V_{GS}=0\text{V}$		-0.66	-1	V
I_S	Maximum Body-Diode Continuous Current				-4	A
C_{iss}	Input Capacitance	$V_{GS}=0\text{V}$, $V_{DS}=-15\text{V}$, $f=1\text{MHz}$		5020		pF
C_{oss}	Output Capacitance			815		pF
C_{rss}	Reverse Transfer Capacitance			615		pF
R_g	Gate resistance	$f=1\text{MHz}$		125	250	Ω
$Q_g(10\text{V})$	Total Gate Charge	$V_{GS}=-10\text{V}$, $V_{DS}=-15\text{V}$, $I_D=-18.5\text{A}$		93	130	nC
$Q_g(4.5\text{V})$	Total Gate Charge			46		nC
Q_{gs}	Gate Source Charge			14		nC
Q_{gd}	Gate Drain Charge			21		nC
$t_{D(on)}$	Turn-On DelayTime	$V_{GS}=-10\text{V}$, $V_{DS}=-15\text{V}$, $R_L=0.8\Omega$, $R_{GEN}=3\Omega$		180		ns
t_r	Turn-On Rise Time			280		ns
$t_{D(off)}$	Turn-Off DelayTime			1400		ns
t_{rr}	Body Diode Reverse Recovery Time	$I_F=-18.5\text{A}$, $di/dt=500\text{A}/\mu\text{s}$		17		ns
Q_{rr}	Body Diode Reverse Recovery Charge	$I_F=-18.5\text{A}$, $di/dt=500\text{A}/\mu\text{s}$		53		nC

A. The value of $R_{\theta JA}$ is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, in a still air environment with $T_A=25^{\circ}\text{C}$. The value in any given application depends on the user's specific board design.

B. The power dissipation P_D is based on $T_{J(MAX)}=150^{\circ}\text{C}$, using $\leq 10\text{s}$ junction-to-ambient thermal resistance.

C. Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}=150^{\circ}\text{C}$. Ratings are based on low frequency and duty cycles to keep initial $T_J=25^{\circ}\text{C}$.

D. The $R_{\theta JA}$ is the sum of the thermal impedance from junction to lead $R_{\theta JL}$ and lead to ambient.

E. The static characteristics in Figures 1 to 6 are obtained using $<300\mu\text{s}$ pulses, duty cycle 0.5% max.

F. These curves are based on the junction-to-ambient thermal impedance which is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, assuming a maximum junction temperature of $T_{J(MAX)}=150^{\circ}\text{C}$. The SOA curve provides a single pulse rating.

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

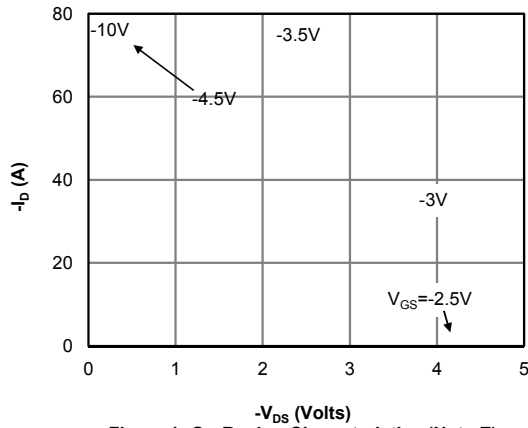


Figure 1: On-Region Characteristics (Note E)

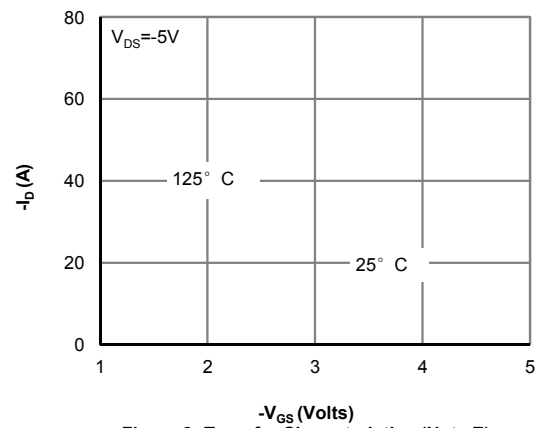
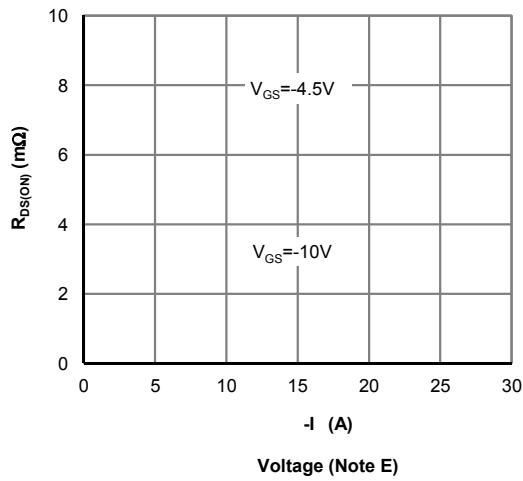
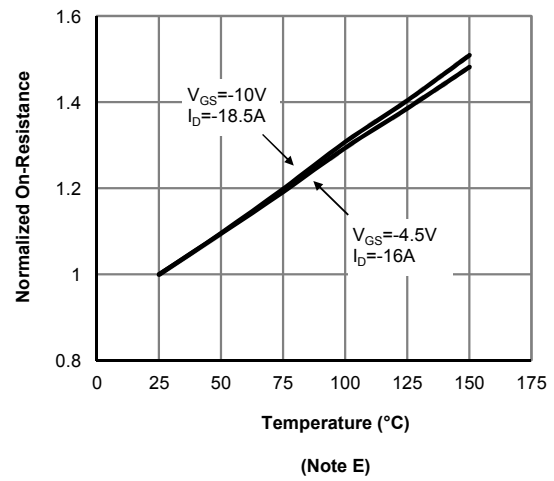


Figure 2: Transfer Characteristics (Note E)



Voltage (Note E)



(Note E)

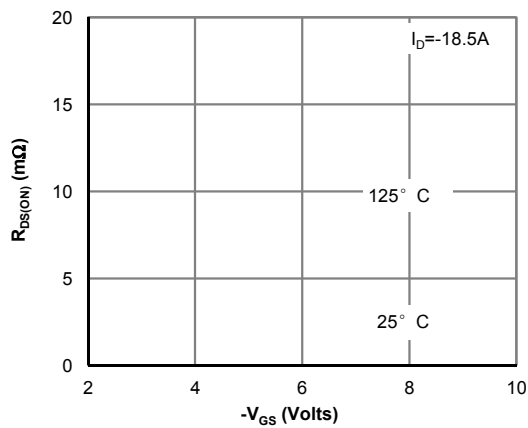


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

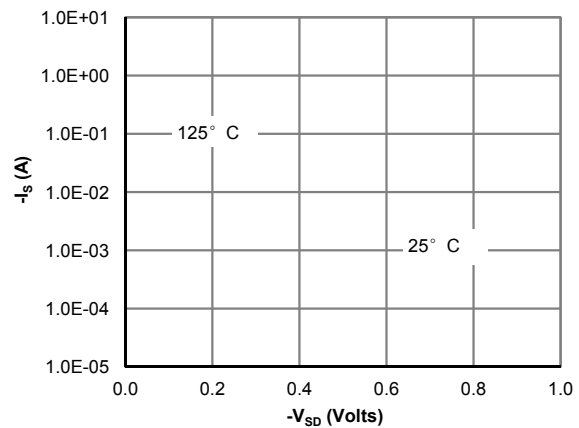


Figure 6: Body-Diode Characteristics (Note E)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

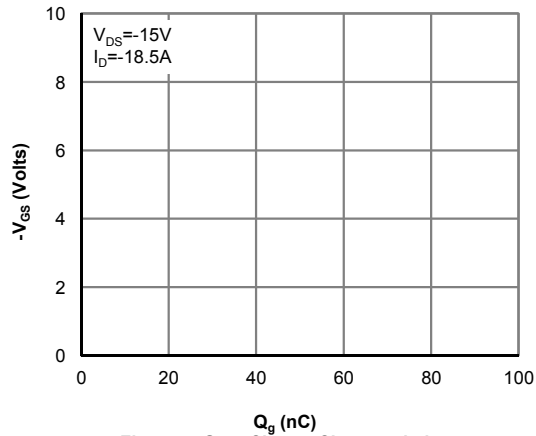


Figure 7: Gate-Charge Characteristics

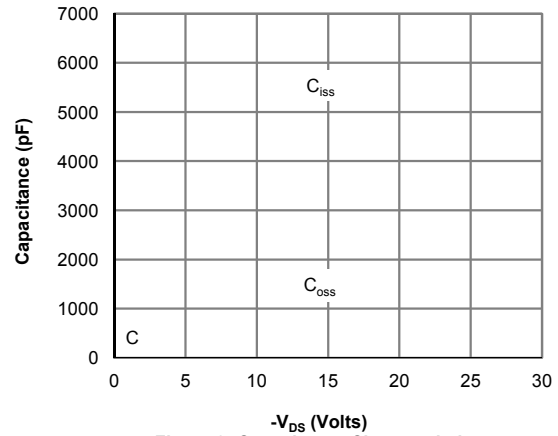


Figure 8: Capacitance Characteristics

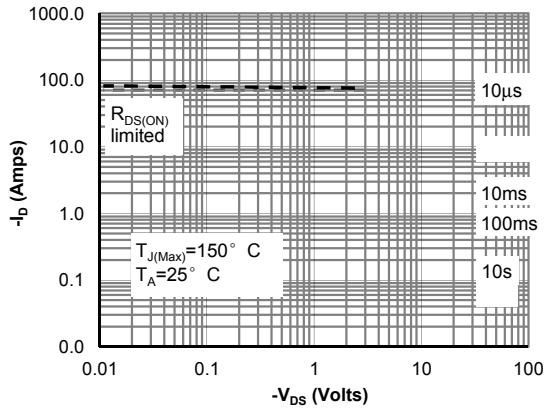


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

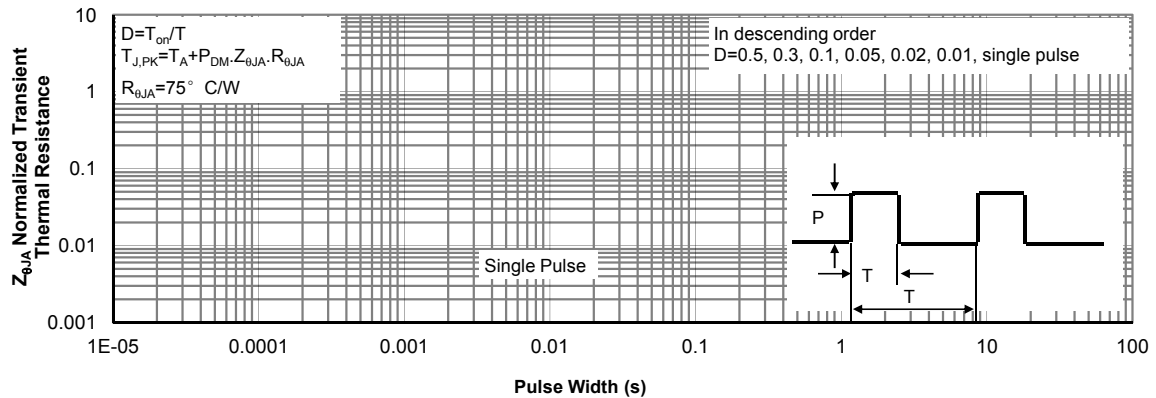
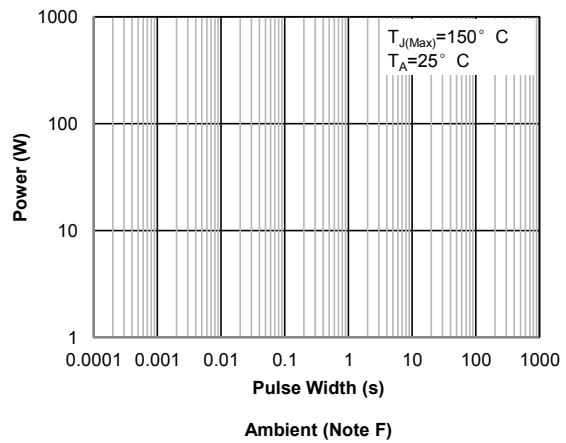
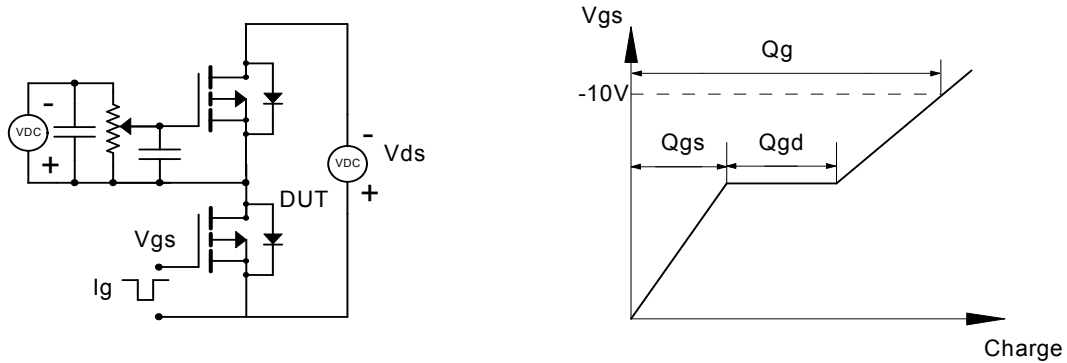
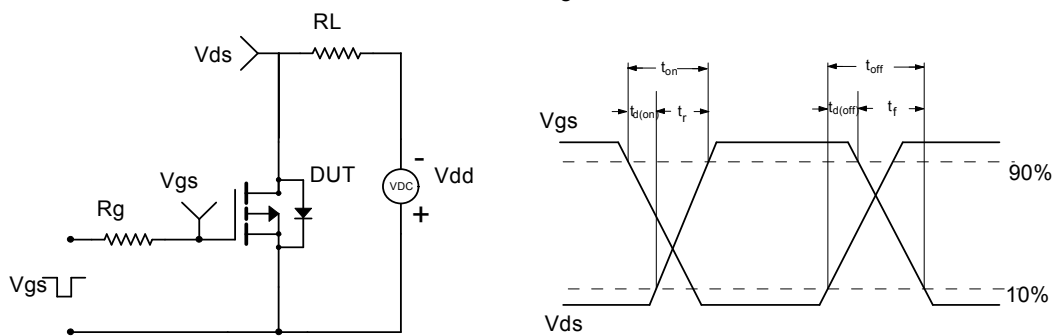


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

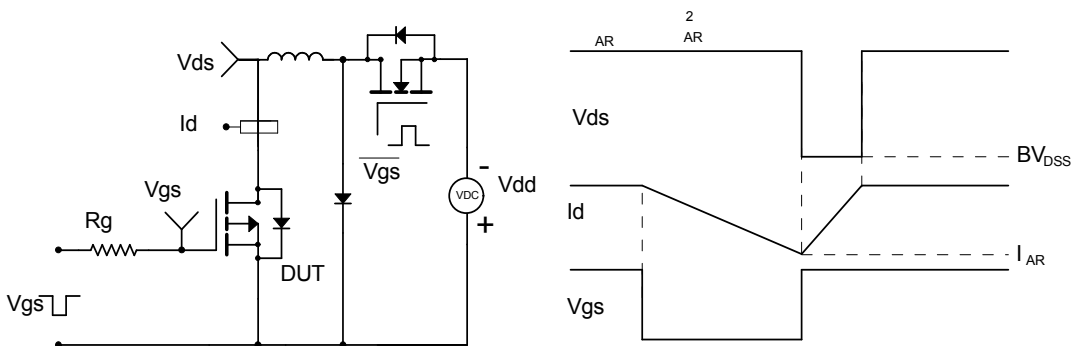
Gate Charge Test Circuit & Waveform



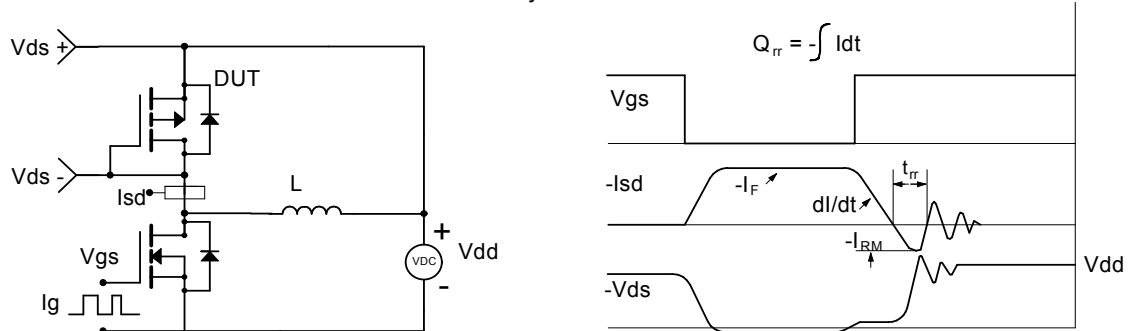
Resistive Switching Test Circuit & Waveforms



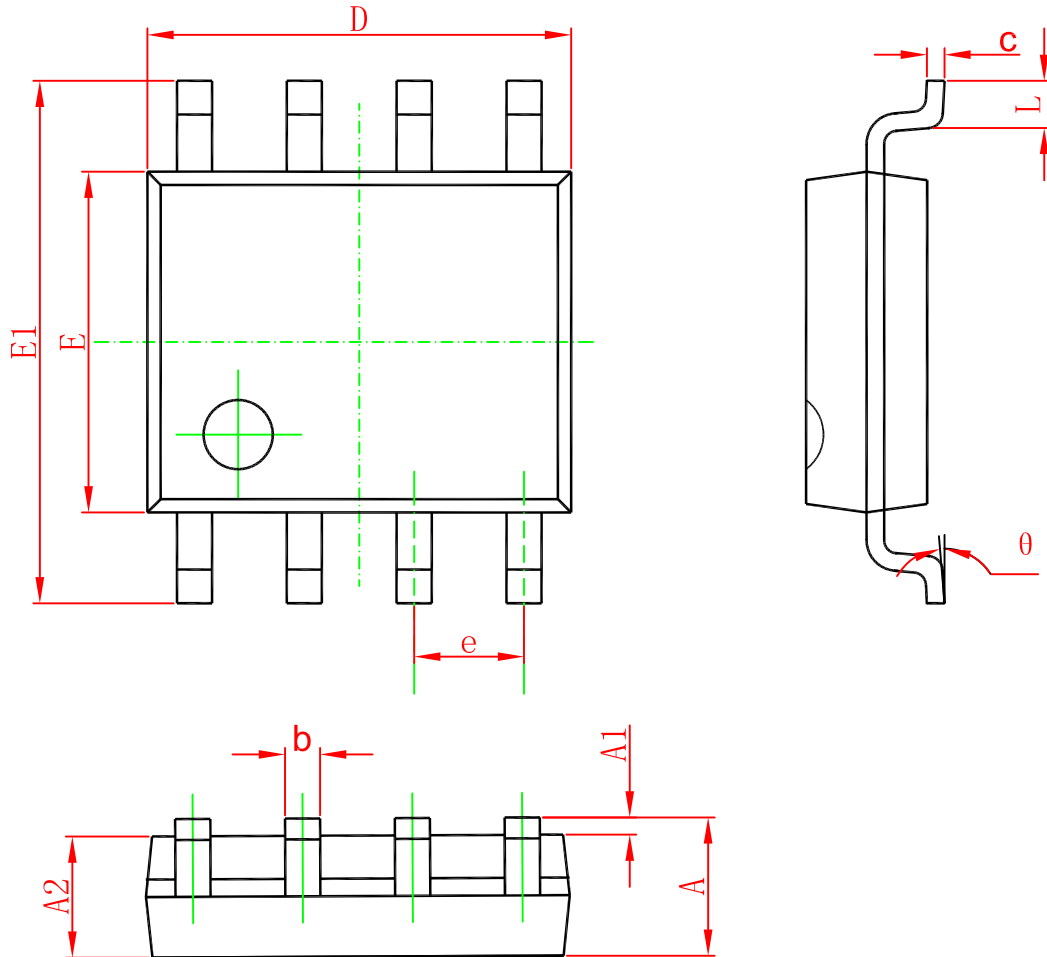
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

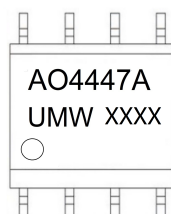


Package Mechanical Data SOP-8



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



Ordering information

Order code	Package	Baseqty	Deliverymode
UMW AO4447A	SOP-8	3000	Tape and reel