UMW BSP315P

-60V P-Channel MOSFET

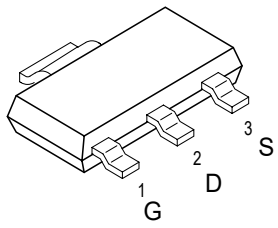
1.Features

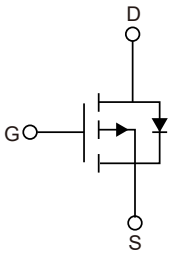
- $V_{DS(V)}$=-60V
- I_D=-1.17A(V_{GS}=-10V)
- $R_{DS(ON)}$ <0.5Ω(V_{GS}=-10V)
- $R_{DS(ON)}$ <0.8Ω(V_{GS}=-4.5V)
- P-Channel
- Enhancement mode
- Avalanche rated
- Logic Level
- dv/dt rated
- Pb-free lead plating; RoHS compliant

2.Pinning information

Pin	Symbol	Description
1	G	GATE
2	D	DRAIN
3	S	SOURCE

SOT-223





3.Absolute Maximum Ratings T_J=25°C unless otherwise noted

Parameter	Symbol	Conditions	Value	Units
Continuous drain current	I_D	T_A=25°C	-1.17	A
		T_A=70°C	-0.94	A
Pulsed drain current	$I_{D,pulse}$	T_A=25°C	-4.68	A
Avalanche energy, single pulse	E_{AS}	I_D=-1.17A,V_{DD}=-25V,R_{GS}=25Ω	24	mJ
Avalanche energy, periodic limited byT_{jmax}	E_{AR}		0.18	mJ
Reverse diode dv /dt	dv/dt	I_S=-1.17A, V_{DS}=-48V, di/dt=200A/μs, T_{jmax}=150°C	-6	kV/μs
Gate source voltage	V_{GS}		±20	V
Power dissipation	P_{tot}	T_A=25°C	1.8	W
Operating and storage temperature	T_J,T_{STG}		-55 to 150	°C
IEC climatic category; DIN IEC 68-1			55/150/56	
ESD Class; JESD22-A114-HBM			Class 0	

4.Thermal Resistance Rating

Parameter	Symbol	min.	typ.	max.	Units
Thermal resistance, junction - soldering point (Pin 4)	R_{thJS}			25	K/W
SMD version, device on PCB: @ min. footprint	R_{thJA}			115	K/W
@ 6 cm^2 cooling area [1)]				70	K/W

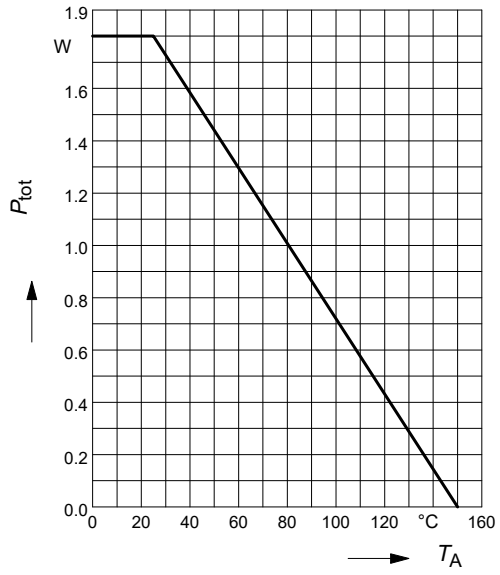
5.Specifications (T_J=25°C unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Static characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	V_{GS}=0V, I_D=-250μA	-60			V
Gate threshold voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=-160μA	-1	-1.5	-2	V
Zero gate voltage drain current	I_{DSS}	V_{DS}=-60V, V_{GS}=0V, T_J=25°C		-0.1	-1	μA
		V_{DS}=-60V, V_{GS}=0V, T_J=125°C		-10	-100	μA
Gate-source leakage current	I_{GSS}	V_{GS}=-20V, V_{DS}=0V		-10	-100	nA
Drain-source on-state resistance	$R_{DS(ON)}$	V_{GS}=-4.5V, I_D=-0.89A		0.8	1.4	Ω
		V_{GS}=-10V, I_D=-1.17A		0.5	0.8	Ω
Dynamic characteristics						
Transconductance	g_{FS}	V_{DS}≤2*I_D*$R_{DS(ON)max}$, I_D=-0.89A	0.7	1.4		S
Input Capacitance	C_{iss}	V_{GS}=0V, V_{DS}=-25V, f =1MHz		130	160	pF
Output Capacitanc	C_{oss}			40	50	pF
Reverse Transfer Capacitance	C_{rss}			17	21	pF
Turn-On DelayTime	$t_{D(on)}$	V_{DD}=-30V, V_{GS}=-4.5V I_D=-0.89A, R_G=18Ω		24	36	ns
Rise Time	t_r			9	14	ns
Turn-Off DelayTime	$t_{D(off)}$			32	48	ns
Fall Time	t_f			19	28	ns
Gate Charge Characteristics						
Gate to source charge	Q_{gs}	V_{DD}=-48V, I_D=-1.17A V_{GS}=0 to -10V		0.7	1.1	nC
Gate to drain charge	Q_{gd}			1.8	2.6	nC
Gate charge total	Q_g			5.2	7.8	nC
Gate plateau voltage	$V_{plateau}$			-3.14		V

Reverse Diode						
Inverse diode continuous forward current	I_S	T_A=25°C			-1.17	A
Inverse diode direct current,pulsed	$I_{S,pulse}$				-4.68	A
Inverse diode forward voltage	V_{SD}	V_{GS}=0 V, IF=-1.17A		-0.97	-1.3	V
Reverse recovery time	t_{rr}	V_R=-30V, I_F=I_S,		30.5	46	ns
Reverse recovery charge	Q_{rr}	di_F/dt =100A/μs		36	54	μC

6.1Typical characteristic

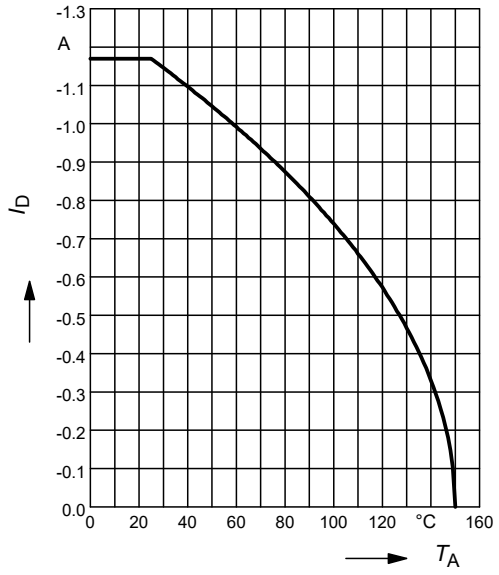
$P_{tot}=f(T_A)$



T_A (°C)

Figure 1: Power dissipation

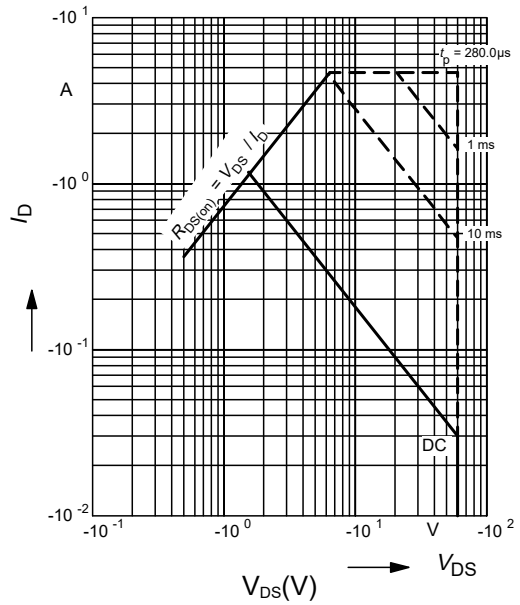
$I_D=f(T_A)$; $|V_{GS}|\geq 10V$



T_A (°C)

Figure 2: Drain current

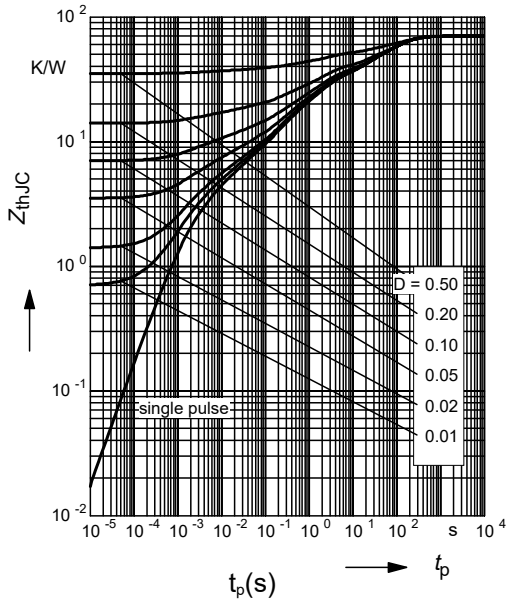
$I_D=f(V_{DS})$; parameter:T_A=25°C; D=0



V_{DS}(V)

Figure 3: Safe Operating Area

$Z_{thJA}=f(t_p)$, parameter: $D=t_p/T$

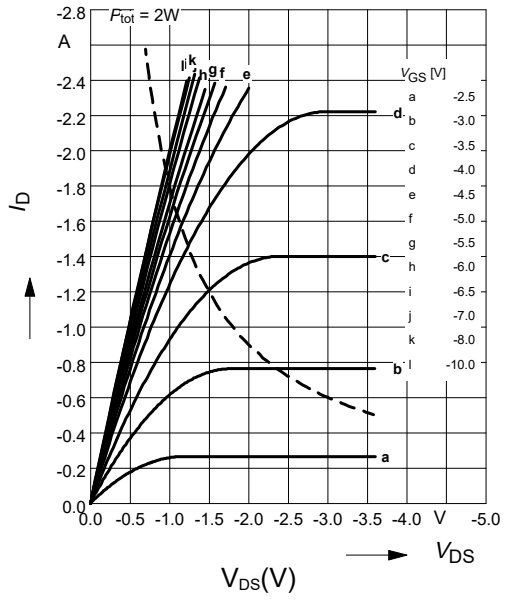


t_p(s)

Figure 4:Max. Transient Thermal Impedance

6.2Typical characteristic

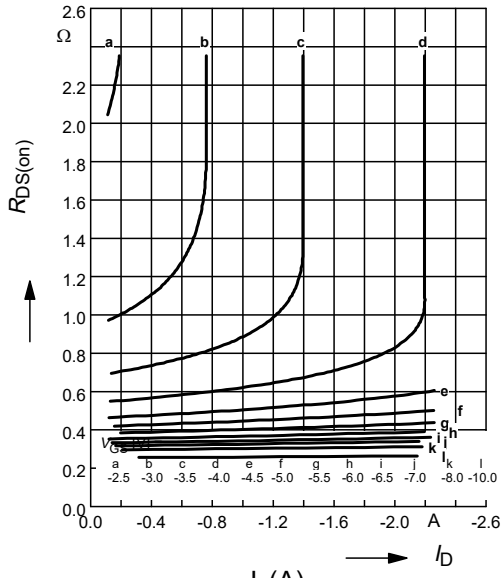
$I_D=f(V_{DS})$; parameter: $T_p=80\mu s$



$V_{DS}(V)$

Figure 5: Output Characteristics

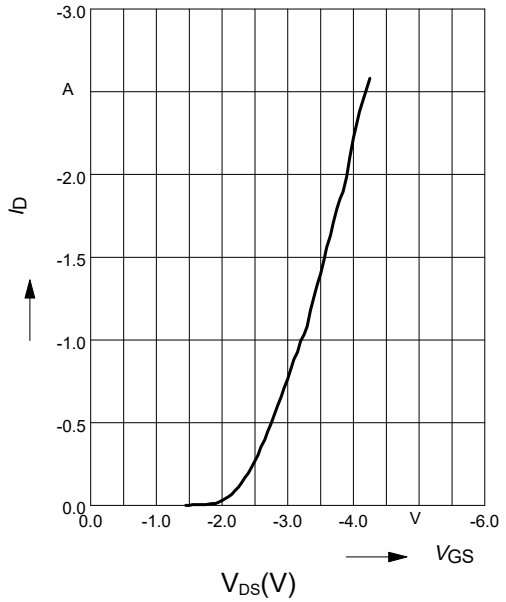
$R_{DS(ON)}=f(I_D)$;parameter: V_{GS}



$I_D(A)$

Figure 6: Drain-source On Resistance

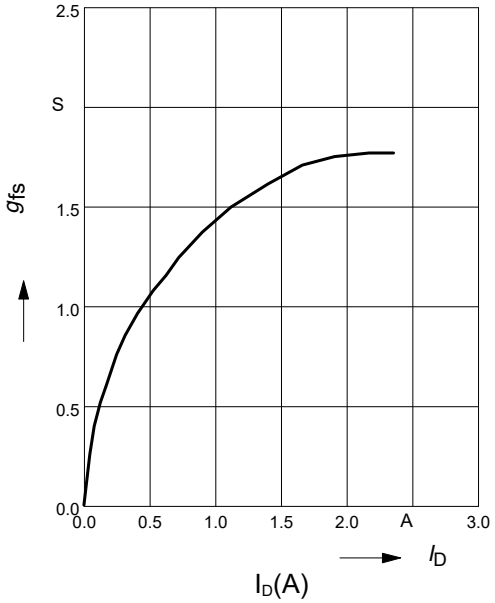
$I_D=f(V_{GS})$; $|V_{DS}|>2|I_D|R_{DS(ON)max}$, parameter:$T_p=80\mu s$



$V_{DS}(V)$

Figure 7: Transfer Characteristics

$g_{fs}=f(I_D)$; $T_J=25°C$, parameter:g_{fs}



$I_D(A)$

Figure 8: Forward Transconductance

6.3Typical characteristic

$R_{DS(ON)}=f(T_J)$; I_D=-1.17A; V_{GS}=-10V

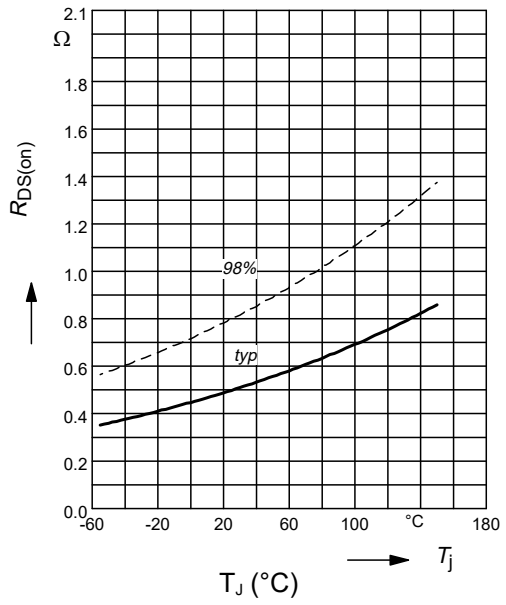


Figure 9: Drain-source On-state Resistance

$V_{GS(th)}=f(T_J)$; $V_{GS}=V_{DS}$; I_D=-160μA

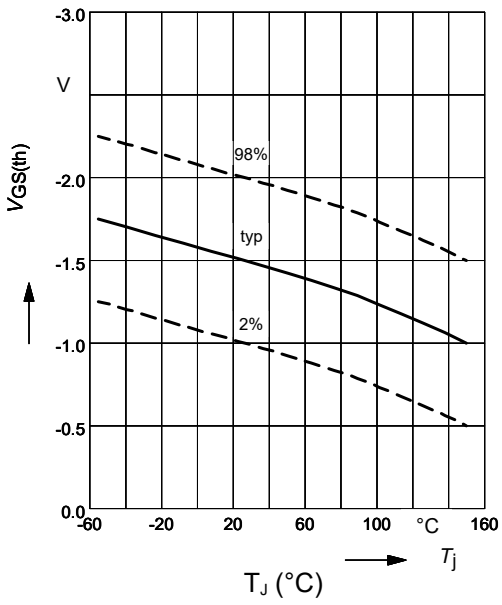


Figure 10: Gate Threshold Voltage

$C=f(V_{DS})$; V_{GS}=0 V; f=1MHZ

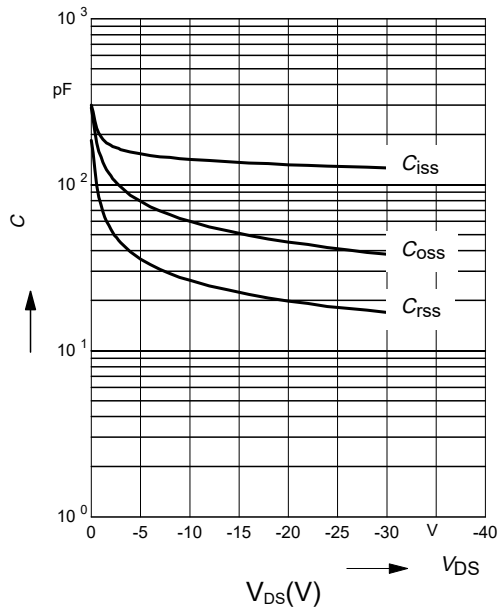


Figure 11: Capacitances

$I_F=f(V_{SD})$, parameter:T_J, T_p=80μs

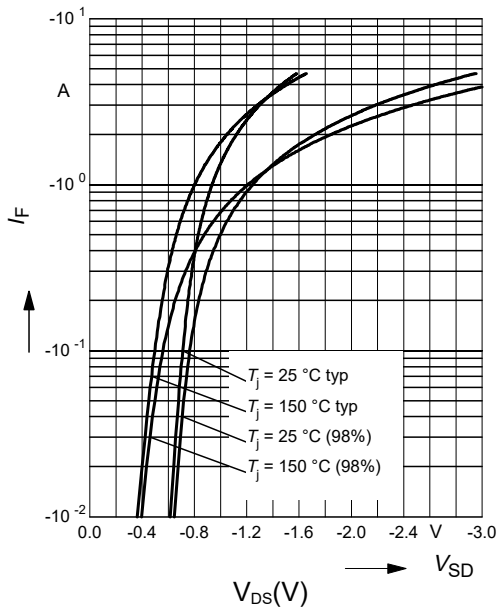


Figure 12: Forward Characteristics Of Reverse Diode

6.4Typical characteristic

$E_{AS}=f(T_J)$; parameter: I_D=-1.17A,V_{DD}=-25 V, R_{GS}=25 Ω

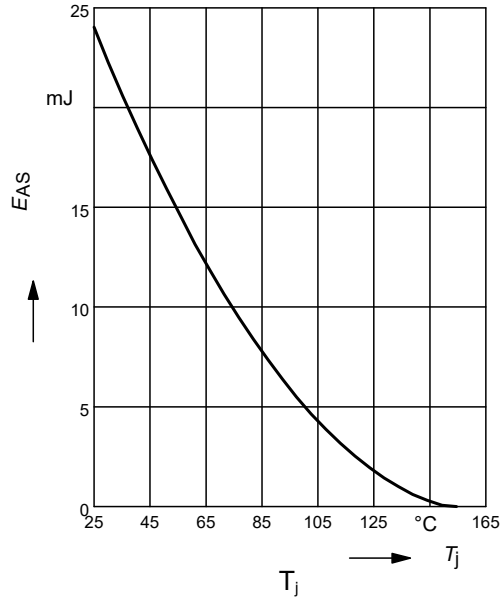


Figure 13: Avalanche Characteristics

$V_{GS}=f(Q_{gate})$; parameter:I_D=-1.17A pulsed

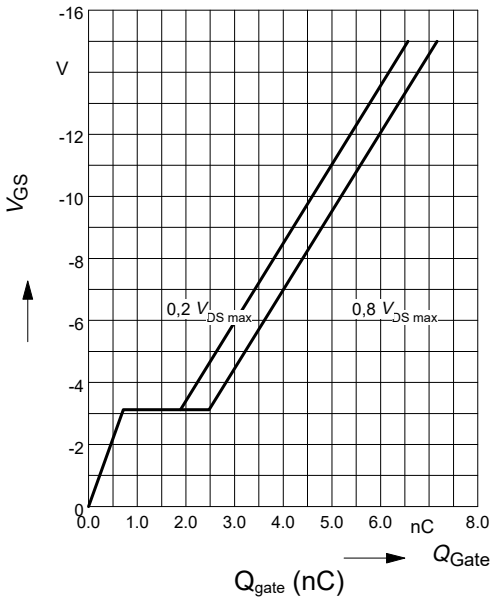


Figure 14: Gate Charge

$V_{BR(DSS)}=f(T_J)$

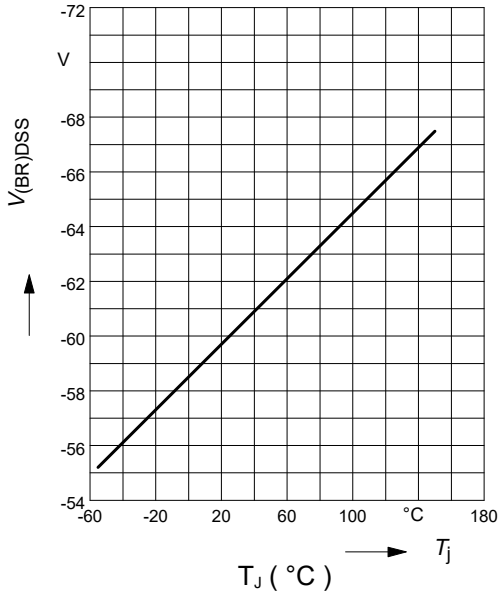
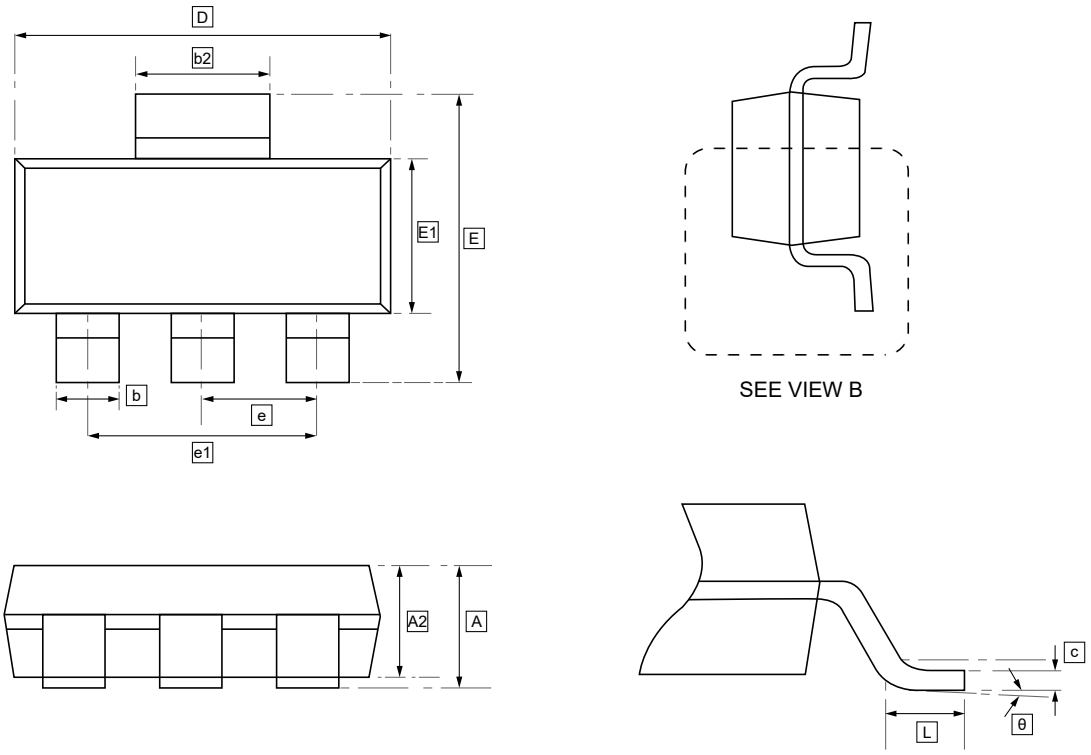


Figure 15: Drain-source Breakdown Voltage

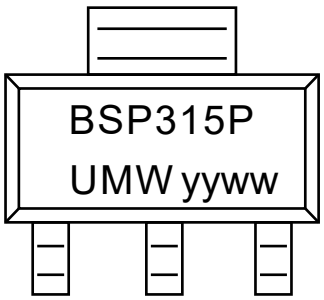
7.SOT-223 Package Outlie Dimensions



DIMENSIONS (mm are the original dimensions)

Symbol	A	A1	A2	b	b2	c	D	E	E1	e	e1	L	θ
Min	1.50	0.02	1.50	0.66	2.90	0.23	6.30	6.70	3.30	2.30	4.60	0.90	0°
Max	1.80	0.10	1.70	0.84	3.10	0.33	6.70	7.30	3.70	BSC	BSC	1.10	8°

8.Ordering Information



yy: Year Code
ww: Week Code

Order Code	Package	Base QTY	Delivery Mode
UMW BSP315P	SOT-223	2500	Tape and reel

9.Disclaimer

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