UMW BSP170P

-60V P-Channel MOSFET

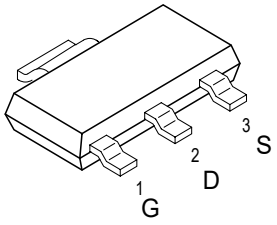
1.Features

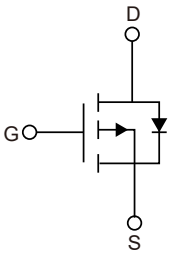
- $V_{DS(V)}$=-60V
- I_D=-1.9A
- $R_{DS(ON)}$ <150mΩ(V_{GS}=-10V)
- Enhancement mode
- Avalanche rated
- dv /dt rated
- Pb-free lead plating; RoHS compliant

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	-1.9	A
		T_A=70°C	-1.5	A
Pulsed drain current	$I_{D,pulse}$	T_A=25°C	-7.6	A
Avalanche energy, single pulse	E_{AS}	I_D=1.9A, R_{GS}=25Ω	70	mJ
Avalanche energy, periodic limited byT_{jmax}	E_{AR}		0.18	mJ
Reverse diode dv /dt	dv/dt	I_D=1.9A, V_{DS}=48V, di/dt=-200A/μs, $T_{j,max}$=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
ESD class		JESD22-C101 (HBM)	1A (250V to 500V)	
Soldering temperature			260°C	
IEC climatic category; DIN IEC 68-1			55/150/56	

4.Thermal Resistance Rating

Parameter	Symbol	Conditions	min.	typ.	max.	Units
Thermal resistance,junction -soldering point	R_{thJS}				20	K/W
SMD version, device on PCB:	R_{thJA}	minimal footprint			110	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=-250μA	-2.1	-3	-4	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}=-10V, I_D=-1.9A		100	150	mΩ
Transconductance	g_{FS}	$\|V_{DS}\|>2\|I_D\|R_{DS(ON)}$max, I_D=-1.9A	1.3	2.6		S
Dynamic characteristics						
Input Capacitance	C_{iss}	V_{GS}=0V, V_{DS}=-25V, f =1MHz		328	410	pF
Output Capacitanc	C_{oss}			105	135	pF
Reverse Transfer Capacitance	C_{rss}			38	48	pF
Turn-On DelayTime	$t_{D(on)}$	V_{DD}=-30V, V_{GS}=-10V I_D=-1.9A, R_G=6Ω		14	21	ns
Rise Time	t_r			28	42	ns
Turn-Off DelayTime	$t_{D(off)}$			92	138	ns
Fall Time	t_f			60	90	ns
Gate Charge Characteristics						
Gate to source charge	Q_{gs}	V_{DD}=-48V, I_D=-1.9A V_{GS}=0 to -10V		-1.4	-1.9	nC
Gate to drain charge	Q_{gd}			-4.9	-7.4	nC
Gate charge total	Q_g			-10	-14	nC
Gate plateau voltage	$V_{plateau}$			-4.34		V

Reverse Diode						
Diode continuous forward current	I_S	T_A=25°C			-1.98	A
Diode pulse current	$I_{S,pulse}$				-7.6	A
Diode forward voltage	V_{SD}	V_{GS}=0 V, IF=-1.9A, T_J=25°C		-0.83	-1.1	V
Reverse recovery time	t_{rr}	V_R=30V, I_F=$\|I_S\|$,		36	54	ns
Reverse recovery charge	Q_{rr}	di_F/dt =100A/μs		41	62	nC

6.1Typical characteristic

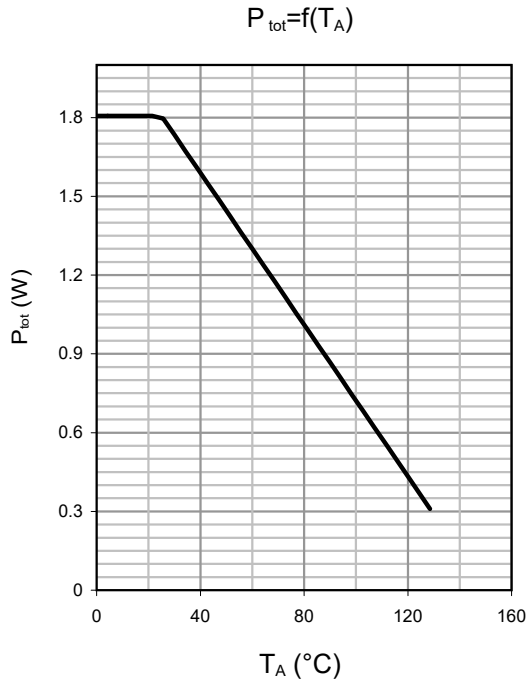


Figure 1: Power dissipation

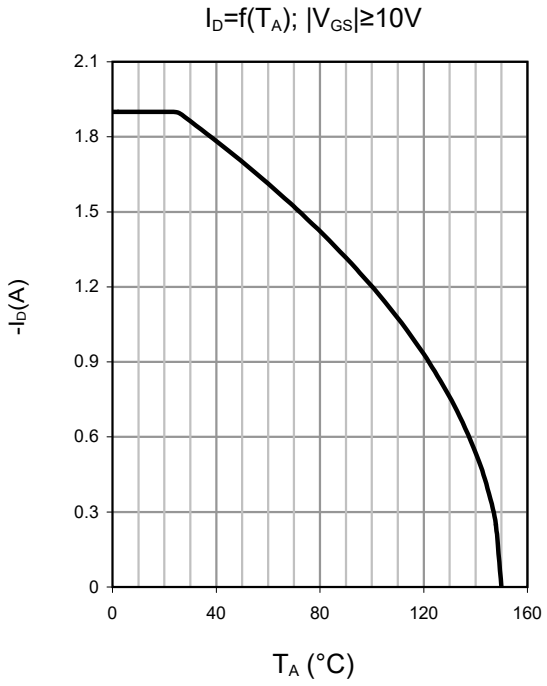


Figure 2: Drain current

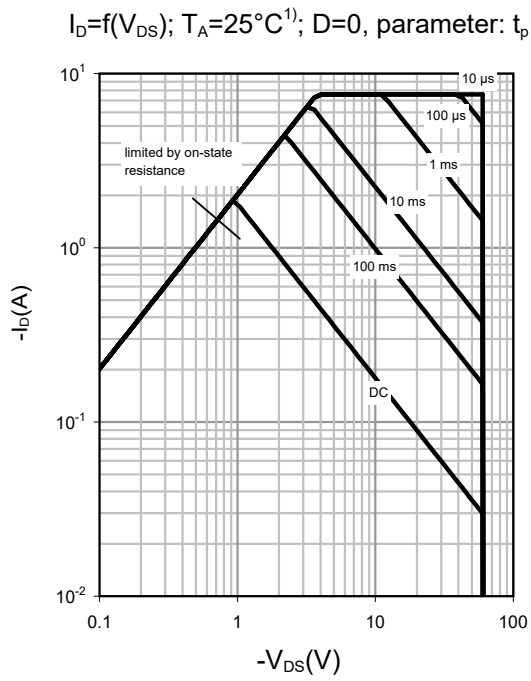


Figure 3: Safe Operating Area

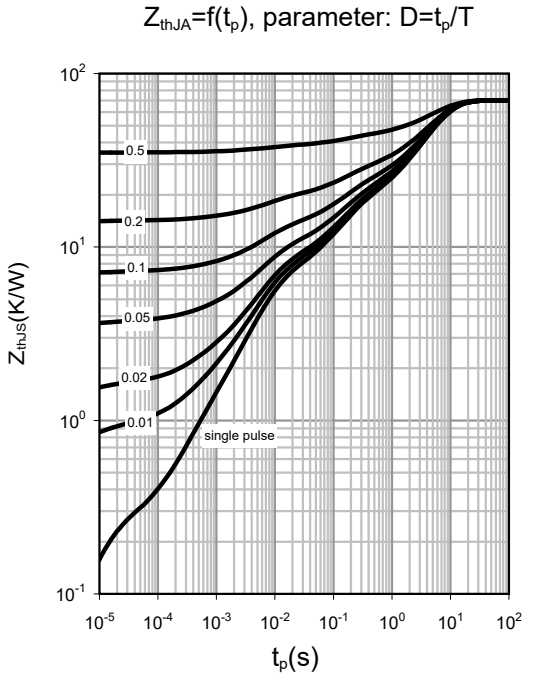


Figure 4:Max. Transient Thermal Impedance

6.2Typical characteristic

$I_D=f(V_{DS})$; $T_J=25°C$, parameter: V_{GS}

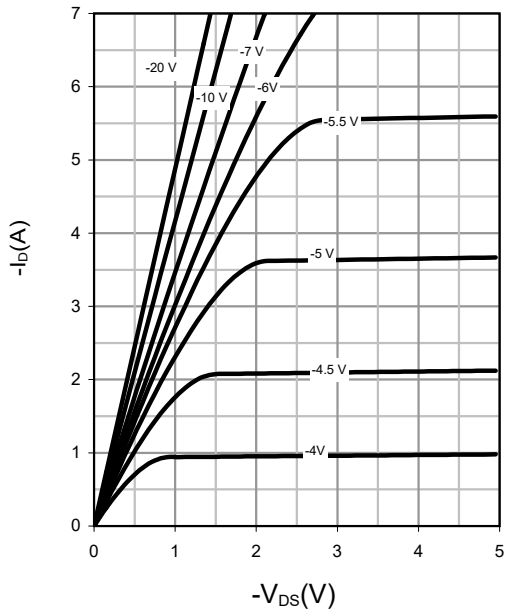


Figure 5: Output Characteristics

$R_{DS(ON)}=f(I_D)$; $T_J=25°C$, parameter: V_{GS}

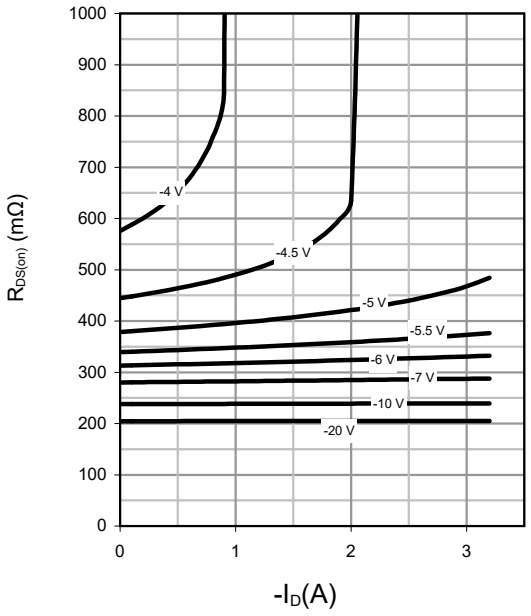


Figure 6: Drain-source On Resistance

$I_D=f(V_{GS})$; $|V_{DS}|>2|I_D|R_{DS(ON)max}$, parameter: T_J

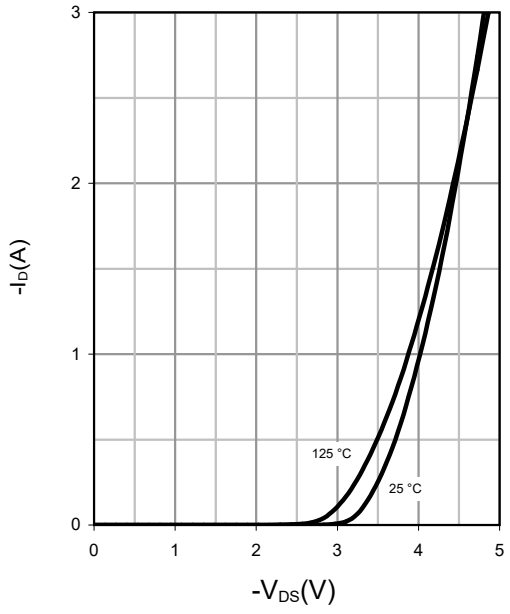


Figure 7: Transfer Characteristics

$g_{fs}=f(I_D)$; $T_J=25°C$

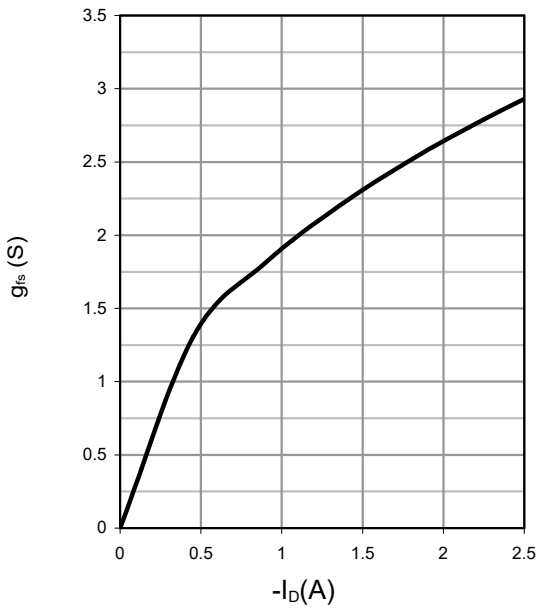


Figure 8: Forward Transconductance

6.3Typical characteristic

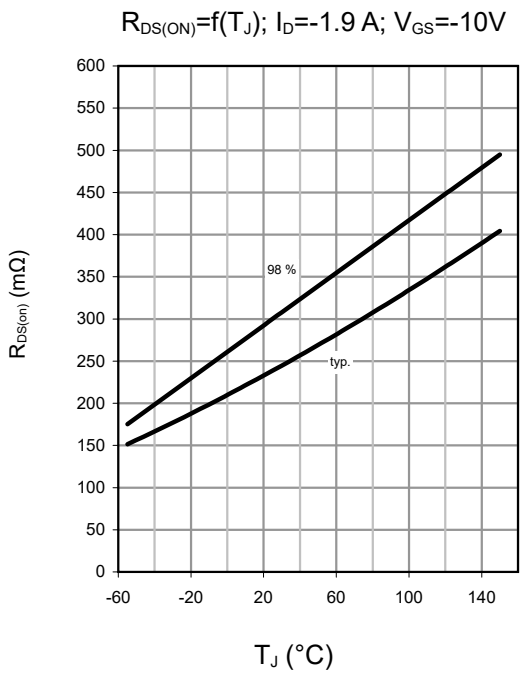


Figure 9: Drain-source On-state Resistance

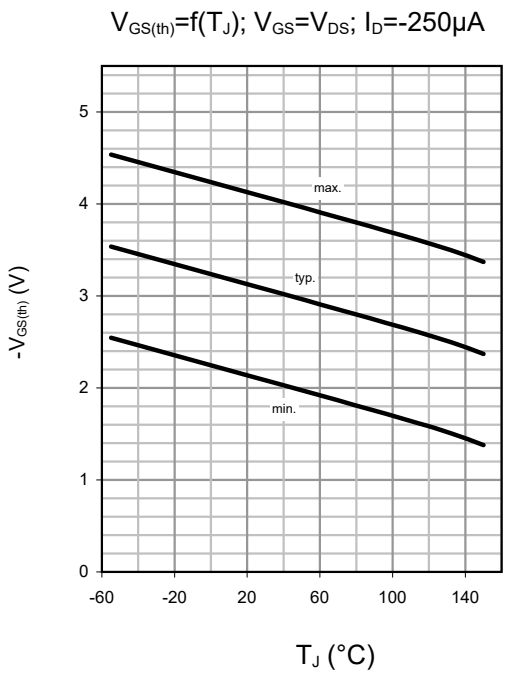


Figure 10: Gate Threshold Voltage

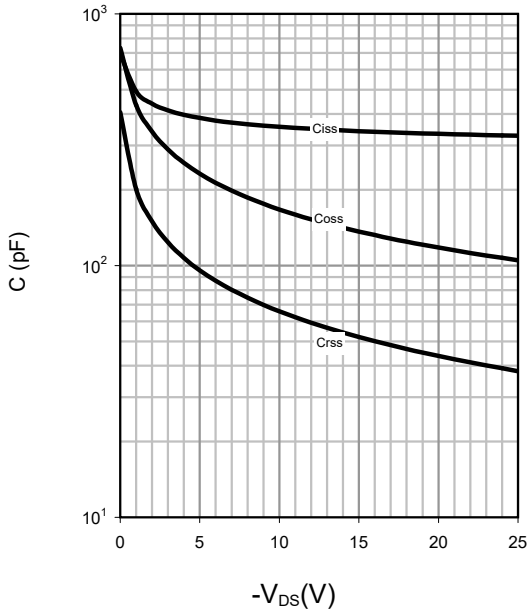


Figure 11: Capacitances

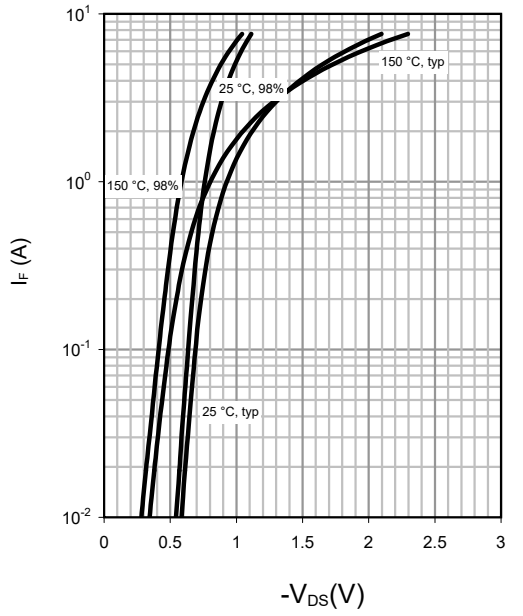


Figure 12: Forward Characteristics Of Reverse Diode

6.4Typical characteristic

$I_{AS}=f(t_{AV})$; $R_{GS}=25\Omega$, parameter: $T_{j(start)}$

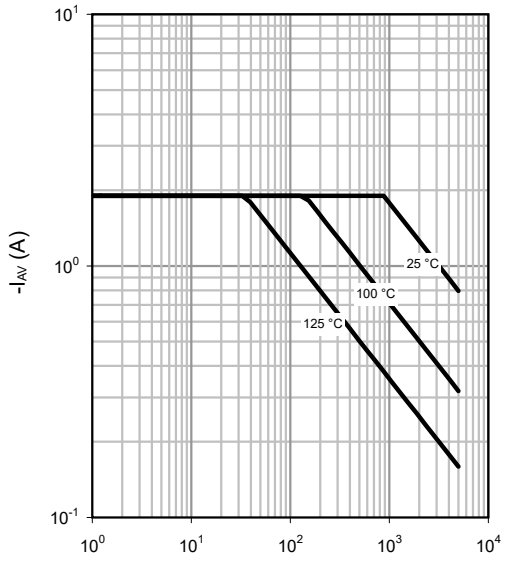


Figure 13: Avalanche Characteristics

$V_{GS}=f(Q_{gate})$; I_D=-1.9A pulsed, parameter: V_{DD}

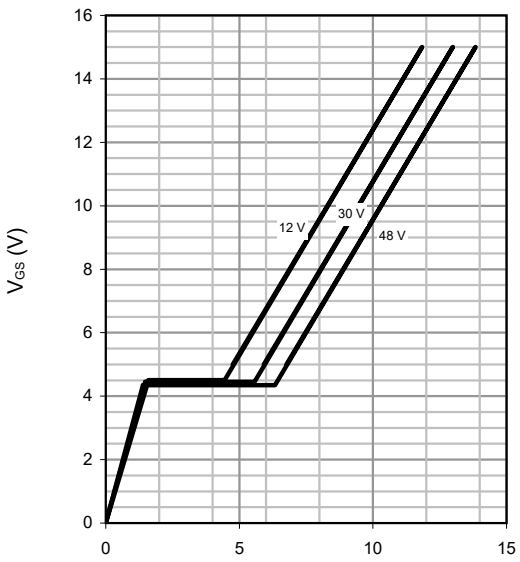


Figure 14: Gate Charge

$V_{BR(DSS)}=f(T_J)$; I_D=-250µA

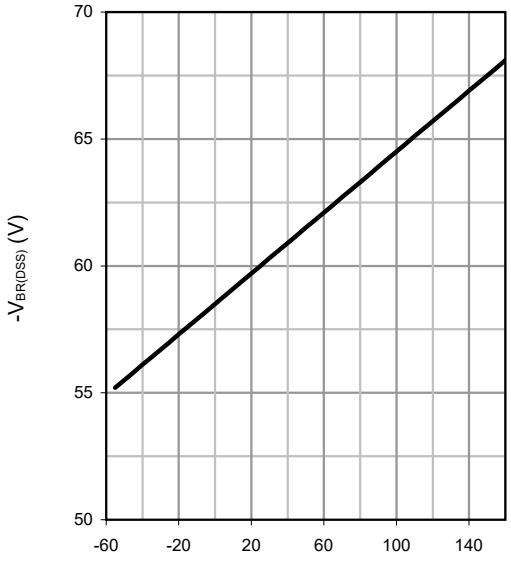
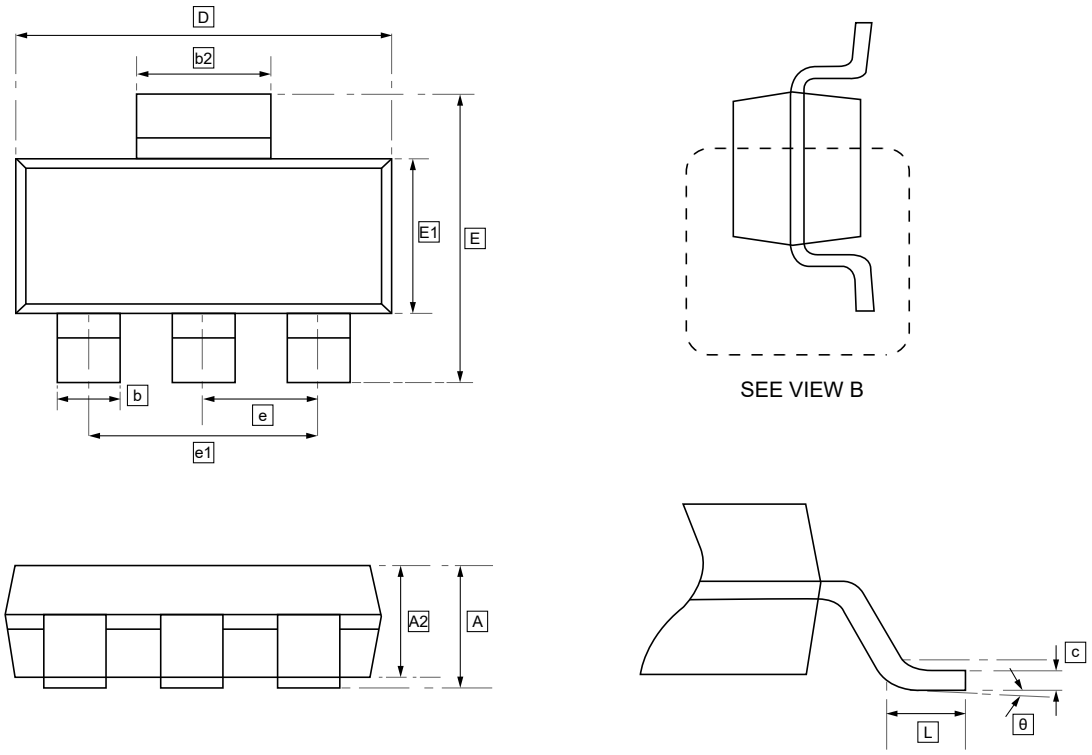


Figure 15: Drain-source Breakdown Voltage

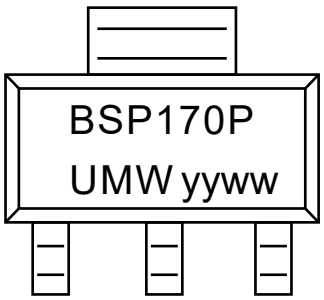
7.SOT-223 Package Outlie Dimensions



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 BSP170P	SOT-223	2500	Tape and reel

9.Disclaimer

UMW reserves the right to make changes to all products, specifications. Customers should obtain the latest version of product documentation and verify the completeness and currency of the information before placing an order.

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