30V/3A PNP Low V_{CESAT} BJT, Integrated with 20V Trench NMOSFET

FEATURES

- Low collector-emitter saturation voltage
- Large current capability
- High current gain
- DFN2mm×2mm-6L Package
- RoHS compliant

APPLICATIONS

Battery Charging

Portable Device Power Management

GENERAL DESCRIPTION

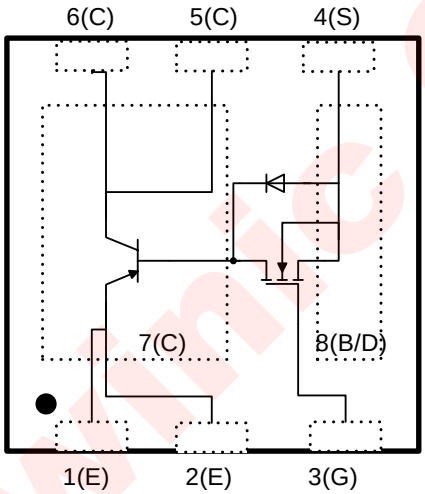
The AW3112 is 30V PNP power bipolar transistor using epitaxial planar technology, integrating with a 20V trench NMOSFET as a switch transistor of base.

The AW3112 has low V_{CESAT} and high current gain. It is suitable for linear regulator in battery charging application.

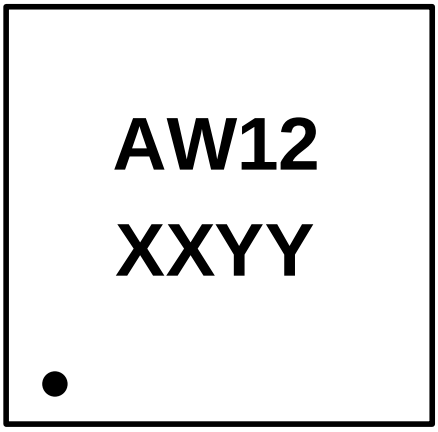
AW3112 is available in DFN2mm×2mm×0.75mm-6L package. It is specified among the industrial temperature range of -40℃ and +85℃

PIN CONFIGURATION AND MARKING

AW3112DNR Top View
(DFN2×2-6L)



AW3112DNR Marking
(DFN2×2-6L)



AW12-AW3112DNR
XXYY- Production Tracing Code

Figure 1 Pin Configuration and Top Mark

PIN DEFINITION

No.	NAME	DESCRIPTION
1	E	Emitter of 30V PNP BJT transistor.
2	E	
3	G	Gate of 20V NMOS transistor.
4	S	Source of 20V NMOS transistor.
5	C	Collector of 30V PNP BJT transistor.
6	C	
7	C	Exposed pad, should be connected to pin5/6 on PCB board.
8	B/D	Exposed pad, the junction of PNP base and NMOS drain, should be floated on PCB board.

TYPICAL APPLICATION CIRCUITS

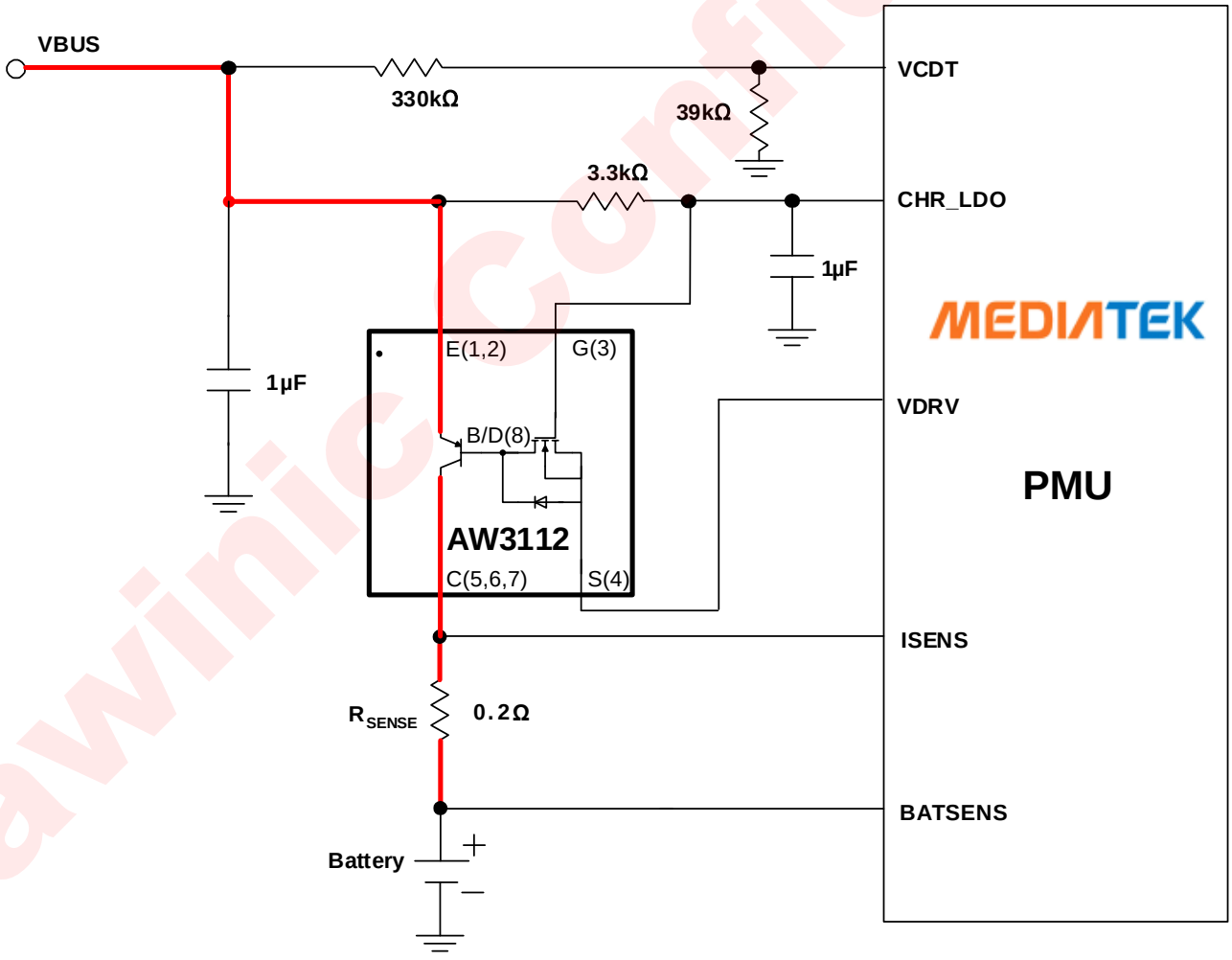
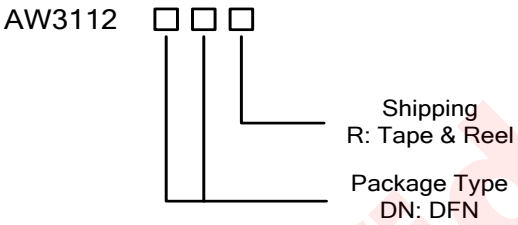


Figure 2 AW3112 Application Circuit with MTK PMU, e.g. MT6323 MT6329[NOTE1]

Note1: The red route in the figure above indicates the large current path, please pay attention to the path width on PCB board. In general, a factor of 40mil/A between path width and current is suitable. For example, the current set is 0.8A, then the path width should not less than 40×0.8=32mil.

ORDERING INFORMATION

Part Number	Temperature	Package	Marking	Moisture Sensitivity Level	Environmental Information	Delivery Form
AW3112 DNR	-40℃ ~ 85℃	DFN2mm ×2mm-6L	AW12	MSL3	RoHS+HF	3000 units/ Tape and Reel



ABSOLUTE MAXIMUM RATINGS(NOTE1)

Symbol	Parameter	Value	Unit
30V PNP BJT			
Vcbo	Collector-Base Voltage	-40	V
Vceo	Collector-Emitter Voltage	-32	V
Vebo	Emitter-base Voltage	-6	V
Ic	Collector Current	-3	A
Icm	Collector Peak Current	-6	A
20V NMOSFET			
Vdss	Drain-source voltage	20	V
Vgss	Gate-source voltage	±8	V
Id	Drain current	180	mA
Idp	Drain peak current	360	mA
Temperature, Dissipation and Thermal Resistance			
Ptot	Total Dissipation	1.5	W
Tj	Junction Temperature	150	℃
Tstg	Storage Temperature	-65~150	℃
T_L	Lead Temperature	260	℃
θ_{JA}	Thermal Resistance	85.6	℃/W

NOTE1: *Conditions out of those ranges listed in "absolute maximum ratings" may cause permanent damages to the device. In spite of the limits above, functional operation conditions of the device should within the ranges listed in "recommended operating conditions". Exposure to absolute-maximum-rated conditions for prolonged periods may affect device reliability.*

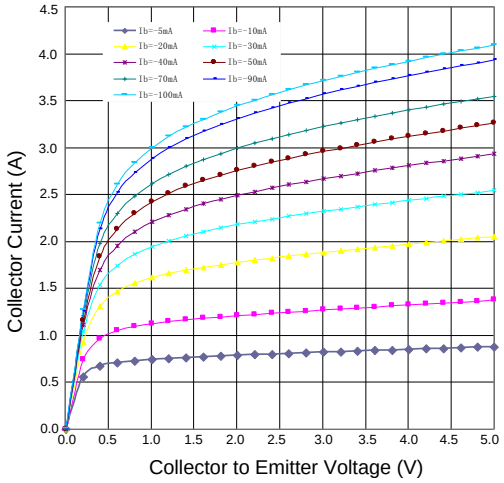
ELECTRICAL CHARACTERISTICS

T=25℃ unless otherwise specified.

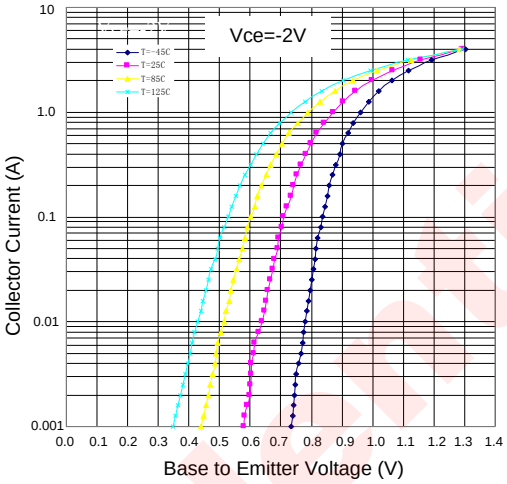
Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
30V PNP BJT						
BVceo	Collector-emitter breakdown voltage	Ic=-10mA, Ib=0mA	-32			V
BVcbo	Collector-base breakdown voltage	Ic=-0.1mA, Ie=0mA	-40			V
BVebo	Emitter-base breakdown voltage	Ie=-1mA, Ic=0mA	-6			V
Icbo	Collector cutoff current	Vcb=-30V			-0.1	μA
Iebo	Emitter cutoff current	Veb=-5V			-0.1	μA
Vce(sat)	Collect-emitter saturation voltage	Ic=-1A, Ib=-20mA			-0.35	V
Vbe(sat)	Base-emitter saturation voltage	Ic=-1A, Ib=-20mA			-1.2	V
HFE1	DC current gain	Ic=-1A, Vce=-2V	100			
HFE2	DC current gain	Ic=-0.1A, Vce=-2V	200			
20V NMOSFET						
BVdss	Drain-source breakdown voltage	Vgs=0V, Ids=250μA	20			V
Vth	Threshold voltage	Vgs=Vds, Ids=250μA	0.4		1.0	V
Igss	Gate leakage current	Vds=0V, Vgs=±8V			±100	nA
Idss	Drain leakage current	Vgs=0V, Vds=20V			1	μA
Rds(on)	Drain-source on-resistance	Vgs=2.5V,Id=50mA			0.5	Ω
		Vgs=1.5V,Id=50mA			1	
Vsd	Body diode forward voltage	Isd=1A, Vgs=0V	0.5		1.2	V

TYPICAL CHARACTERISTICS

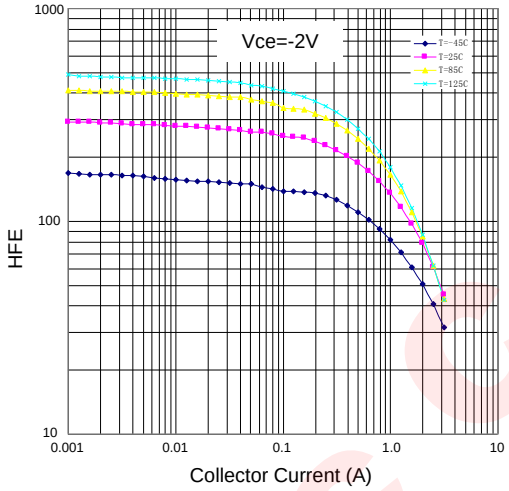
Ice Vs Vce



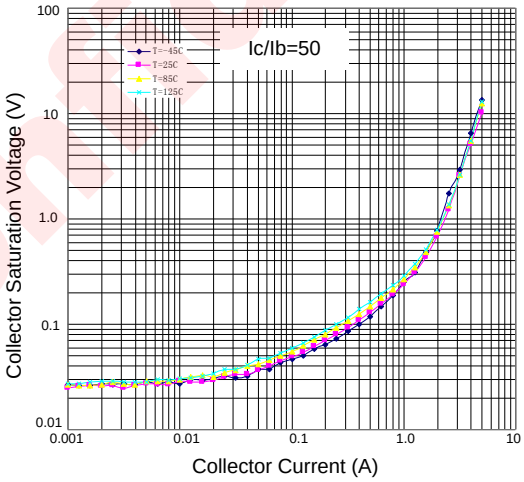
Ice Vs Vbe



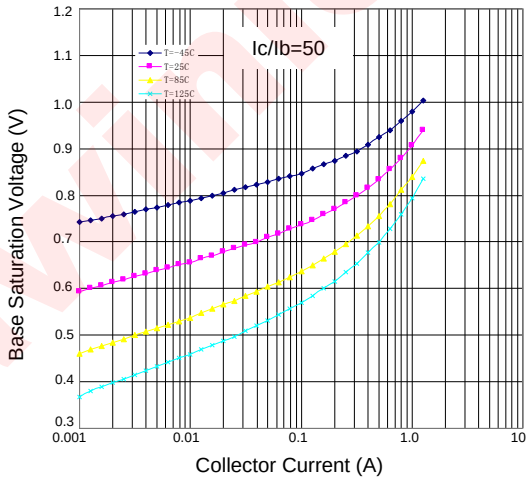
DC Current Gain



Collector-Emitter Saturation Voltage

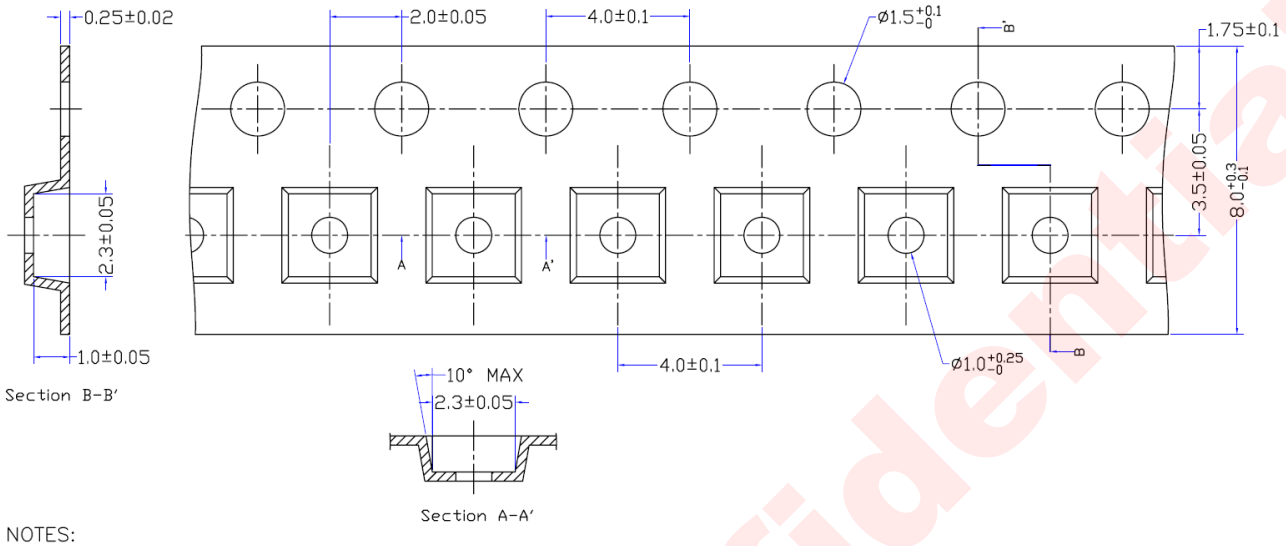


Base-Emitter Saturation Voltage



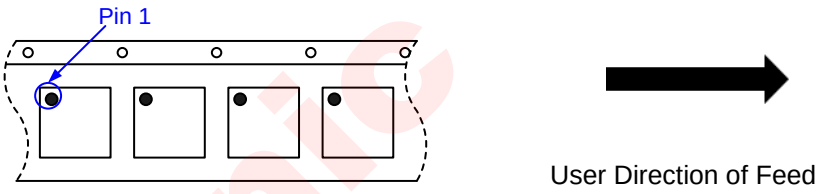
TAPE AND REEL INFORMATION

CARRIER TAPE

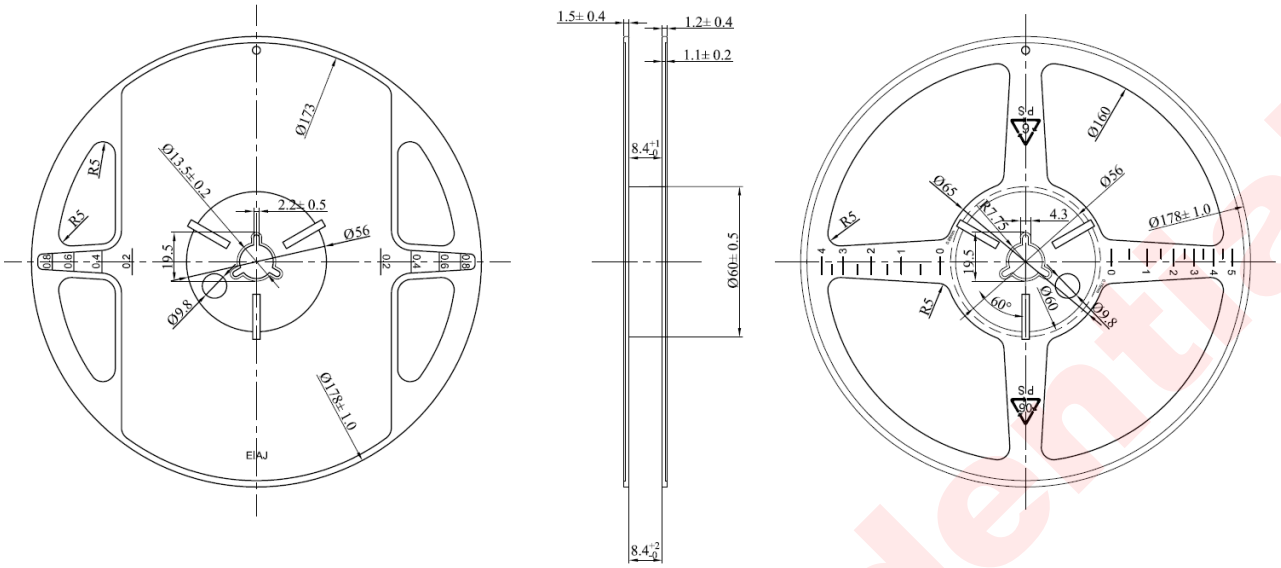


NOTES:
1.10 procket hole pitch cumulative tolerance ±0.2
2.Carrier camber is within 1mm in 100mm
3.MATERIAL:CONDUCTIVE POYSTYRENE
4.ALL DIMS IN MM
5.There must not be foreign body adhesion and the state of the surface must be excellent
6.17" PAPER–Reel, 125000 pockets(500m)
7.Surface resistance 1X10E11(max) OHMS/SQ

PIN1



REEL

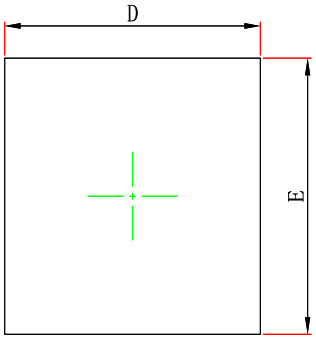


Notes：

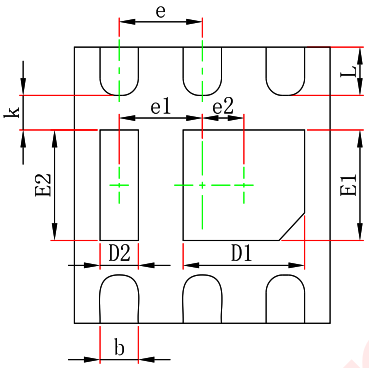
1、 All dimensions are in millimeter（mm）.

2、 All unspecified tolerances are ±0.25mm.

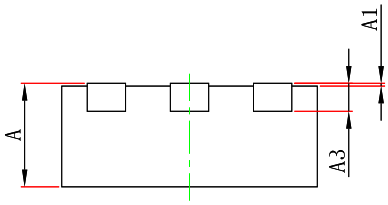
PACKAGE DESCRIPTION



Top View



Bottom View



Side View

Symbol	Dimensions In Millimeters		
	MIN	NOM	MAX
A	0.700	0.750	0.800
A1	0.000	0.025	0.050
A3	0.203REF		
D	1.900	2.000	2.100
E	1.900	2.000	2.100
D1	0.850	0.950	1.050
E1	0.700	0.800	0.900
D2	0.200	0.300	0.400
E2	0.700	0.800	0.900
e1	0.650TYP		
e2	0.325TYP		
k	0.250TYP		
b	0.250	0.300	0.350
e	0.650TYP		
L	0.300	0.350	0.400

REFLOW

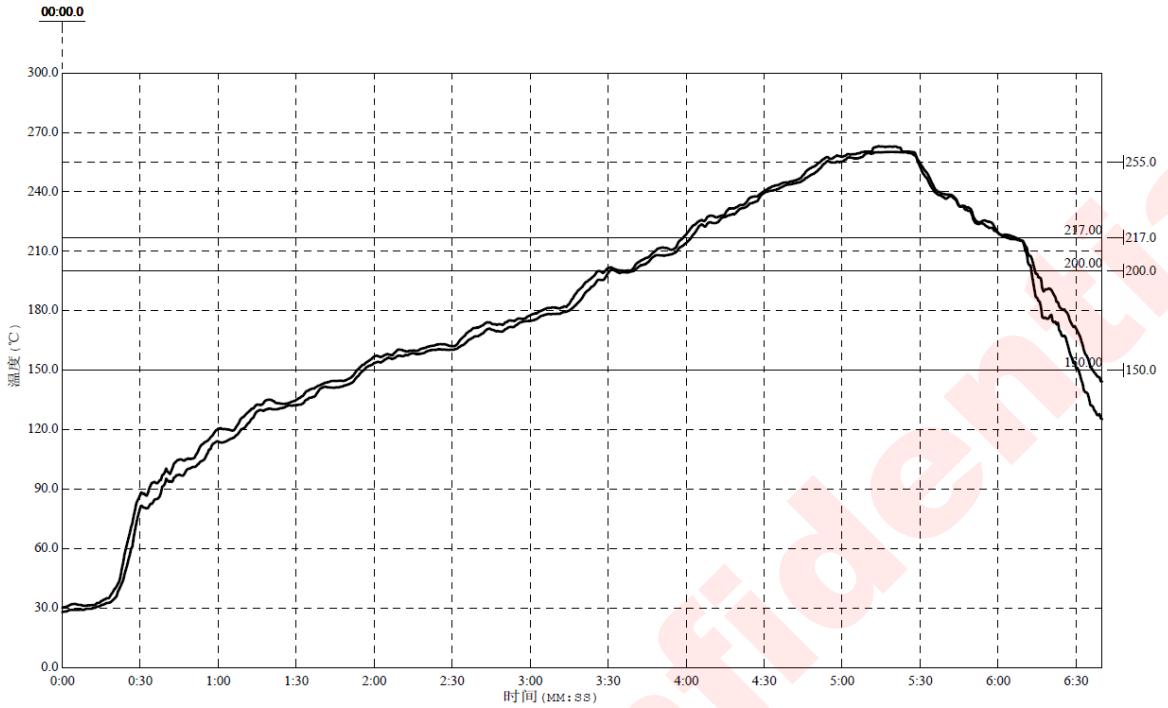


Figure 10 Package Reflow Oven Thermal Profile

Reflow Note	Spec
Average ramp-up rate (217℃c to Peak)	Max. 3℃/sec
Time of Preheat temp.(from 150℃ to 200℃)	60-120sec
Time to be maintained above 217℃	60-150sec
Peak Temperature	250-260℃
Time within 5℃ of actual peak temp	20-40sec.
Ramp-down rate	Max. 6℃/sec
Time from 25℃ to peak temp	Max. 8min.

REVISION HISTORY

Version	Date	Change Record
V1.0	March 2015	Officially Released
V1.1	August 2017	1. Added Tape and Reel & pin1 information; 2. Added RoHS etc. level information; 3. Added Reflow information.
V1.2	February 2019	1. Added MSL and Environmental Information

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