FMBT114DW

List

FMBT114DW

Dual ditital transistor (NPN + PNP)

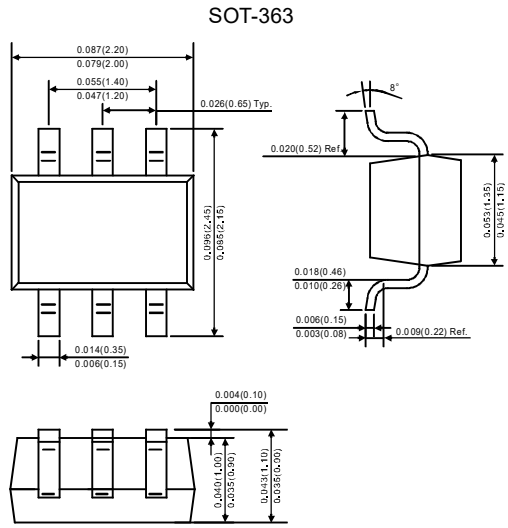
Features

- DTA114E and DTC114E transistors are built in a package.
- Transistor elements are independent, eliminating interference.
- Mounting cost and area can be cut in half.
- Lead-free parts for green partner, exceeds environmental standards of MIL-STD-19500 /228.
- Suffix "-H" indicates Halogen free part, ex.FMBT114DW-H.

Mechanical data

- Epoxy:UL94-V0 rated flame retardant
- Case : Molded plastic, SOT-363
- Terminals : Solder plated, solderable per MIL-STD-750, Method 2026
- Mounting Position : Any
- Weight : Approximated 0.006 gram

Package outline



Dimensions in inches and (millimeters)

Maximum ratings - TR1 (At T_A=25°C unless otherwise noted)

Parameter	Symbol	Value	Unit
Collector to base voltage	V_{CC}	50	V
Collector to Emitter Voltage	V_{IN}	-10 ~ 40	V
Output current	I_O	50	mA
	$I_{C(MAX)}$	100	
Power dissipation	P_D	150	mW
Junction temperature	T_j	+150	℃
Storage temperature	T_{STG}	-55 ~ +150	℃

Maximum ratings - TR2 (At T_A=25°C unless otherwise noted)

Parameter	Symbol	Value	Unit
Collector to base voltage	$-V_{CC}$	50	V
Collector to Emitter Voltage	V_{IN}	-30 ~ +10	V
Output current	$-I_O$	50	mA
	$-I_{C(MAX)}$	100	
Power dissipation	P_D	150	mW
Junction temperature	T_j	+150	℃
Storage temperature	T_{STG}	-55 ~ +150	℃

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Electrical characteristics of TR1 (At T_A=25°C unless otherwise)

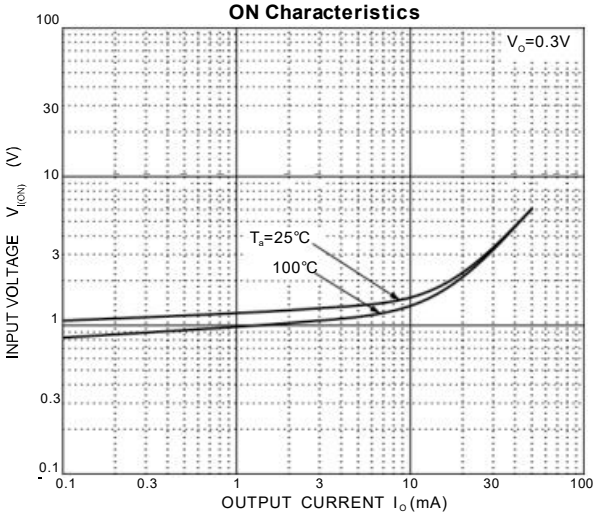
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Input voltage	$V_{IN(off)}$	V_{CC}=5V, I_O=100μA	0.5			V
	$V_{IN(on)}$	V_O=0.3V, I_O=10mA			3	
Output voltage	$V_{O(on)}$	I_O / I_I=10mA / 0.5mA	5			V
Input current	I_I	V_I=5V			0.88	mA
Output current	$I_{O(off)}$	V_{CC}=50V, V_I=0			0.5	μA
DC current gain	G_I	V_O=5V, I_O=5mA	30			
Input resistance	R_1		7	10	13	V
Resistance ratio	R_2 / R_1		0.8	1	1.2	
Transition frequency	f_T	V_{CE}=10V, I_E=5mA, f=100MHz		250		MHz

Electrical characteristics of TR2 (At T_A=25°C unless otherwise)

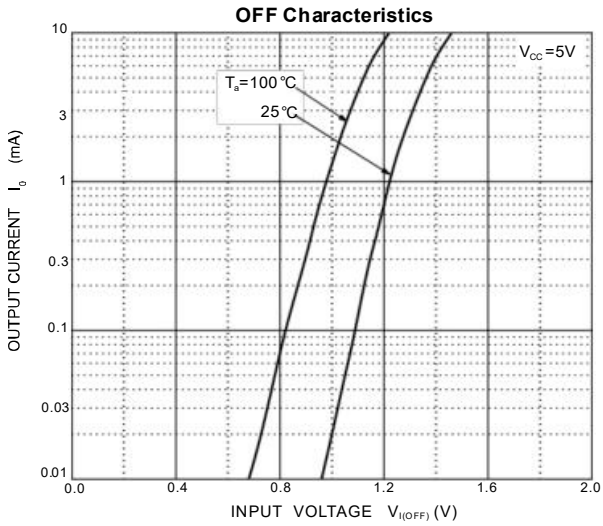
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Input voltage	$-V_{IN(off)}$	$-V_{CC}$=5V, $-I_O$=100μA	0.5			V
	$-V_{IN(on)}$	$-V_O$=0.3V, $-I_O$=10mA			3	
Output voltage	$-V_{O(on)}$	$-I_O$ / $-I_I$=10mA / 0.5mA	5			V
Input current	$-I_I$	$-V_I$=5V			0.88	mA
Output current	$-I_{O(off)}$	$-V_{CC}$=50V, V_I=0			0.5	μA
DC current gain	G_I	$-V_O$=5V, $-I_O$=5mA	30			
Input resistance	R_1		7	10	13	V
Resistance ratio	R_2 / R_1		0.8	1	1.2	
Transition frequency	f_T	$-V_{CE}$=10V, $-I_E$=5mA, f=100MHz		250		MHz

Rating and characteristic curves (FMBT114DW)-TR1

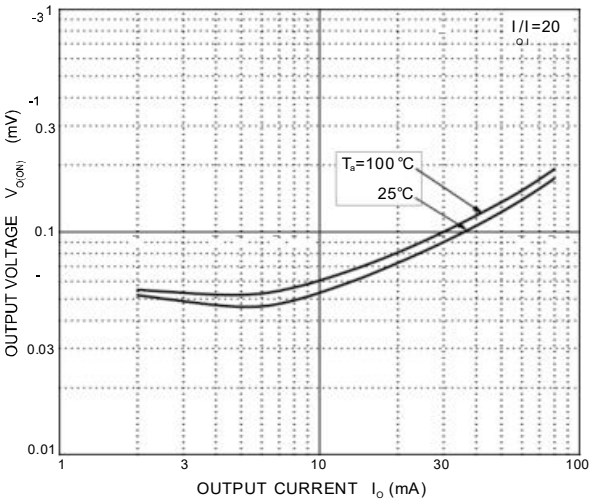
ON Characteristics



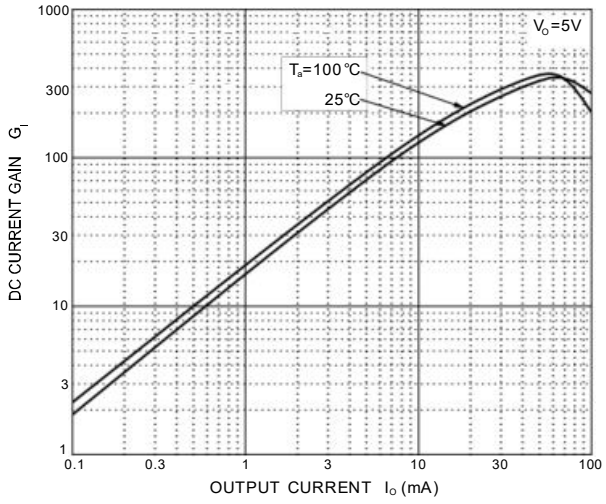
OFF Characteristics



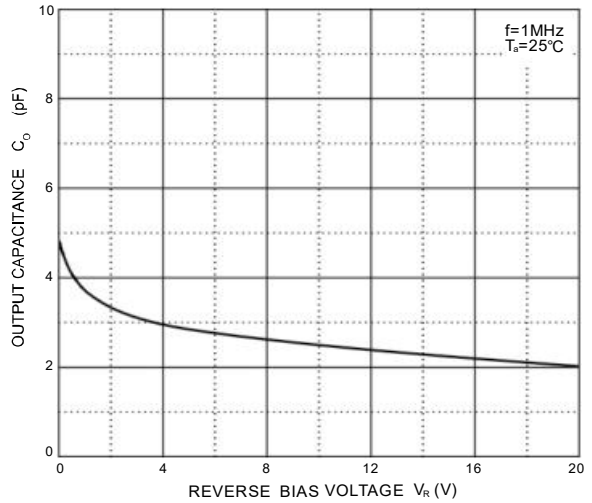
$V_{O(ON)}$ —— I_O



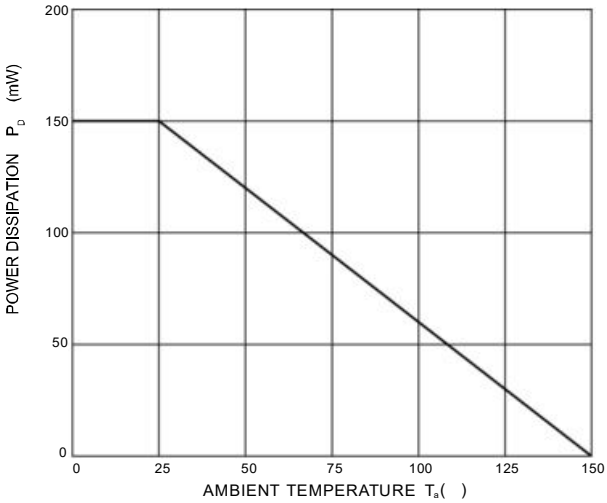
G_I —— I_O



C_O —— V_R

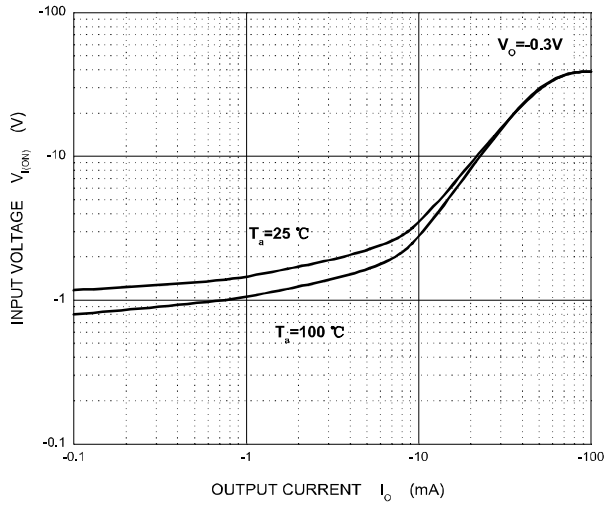


P_D —— T_a

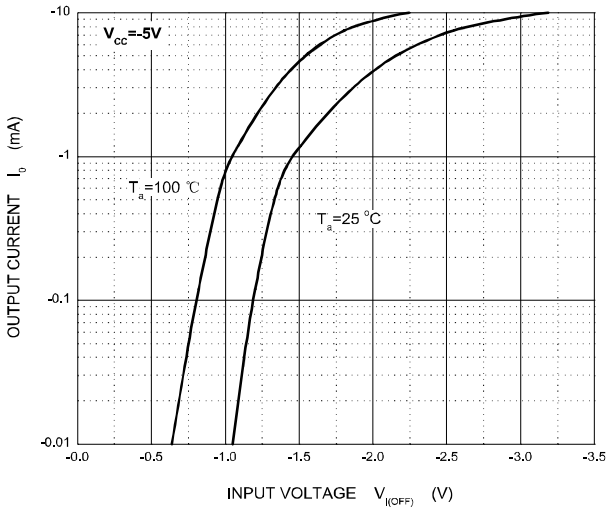


Rating and characteristic curves (FMBT114DW)-TR2

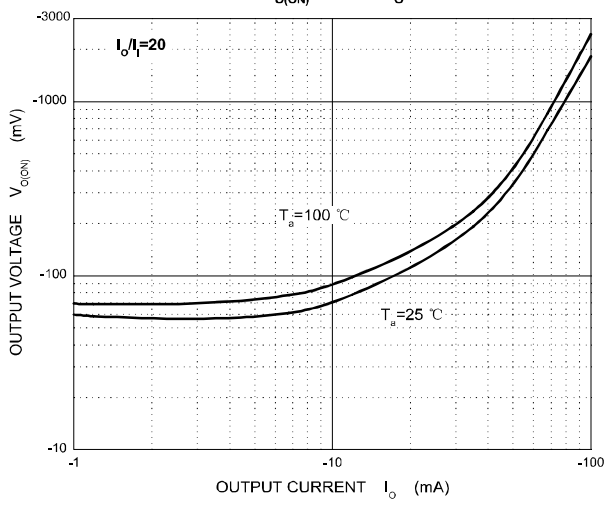
ON Characteristics



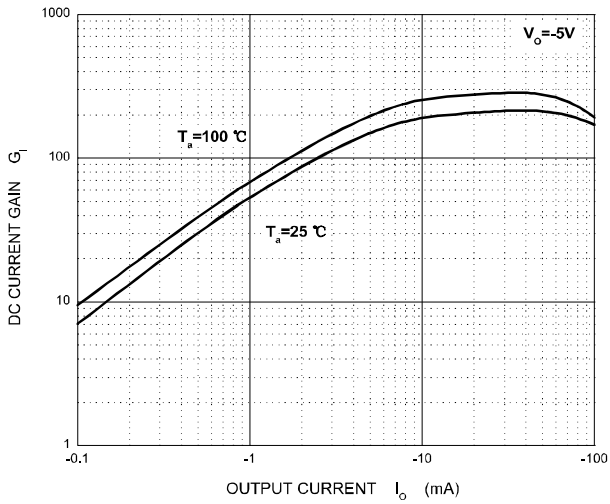
OFF Characteristics



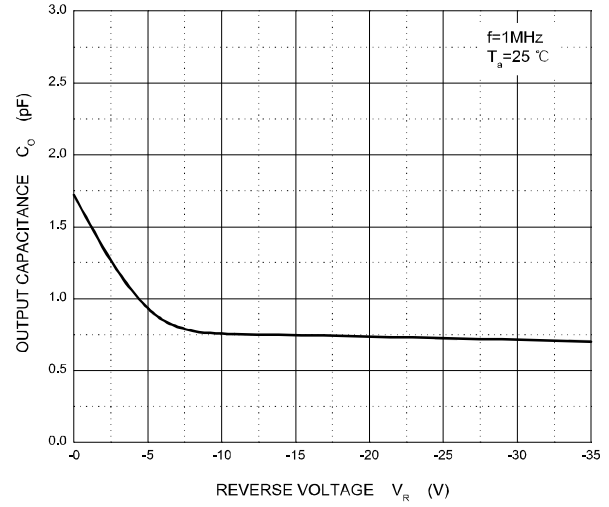
$V_{O(ON)}$ — I_O



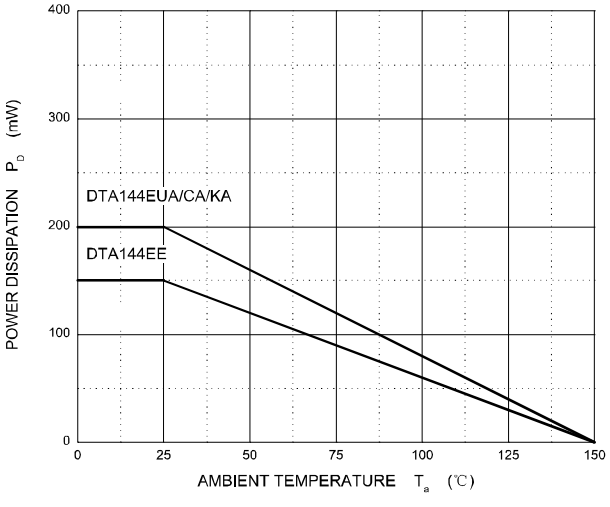
G_I — I_O



C_O — V_R



P_D — T_a



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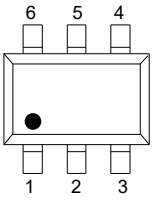
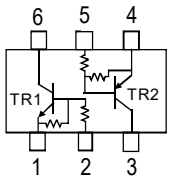
Pinning information

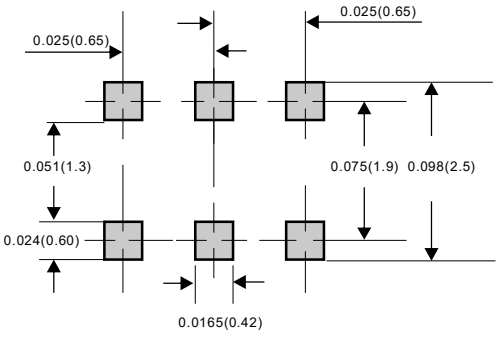
Pin	Simplified outline	Symbol
FMBT114DW		

Marking

Type number	Marking code
FMBT114DW	D3

Suggested solder pad layout

SOT-363



Dimensions in inches and (millimeters)

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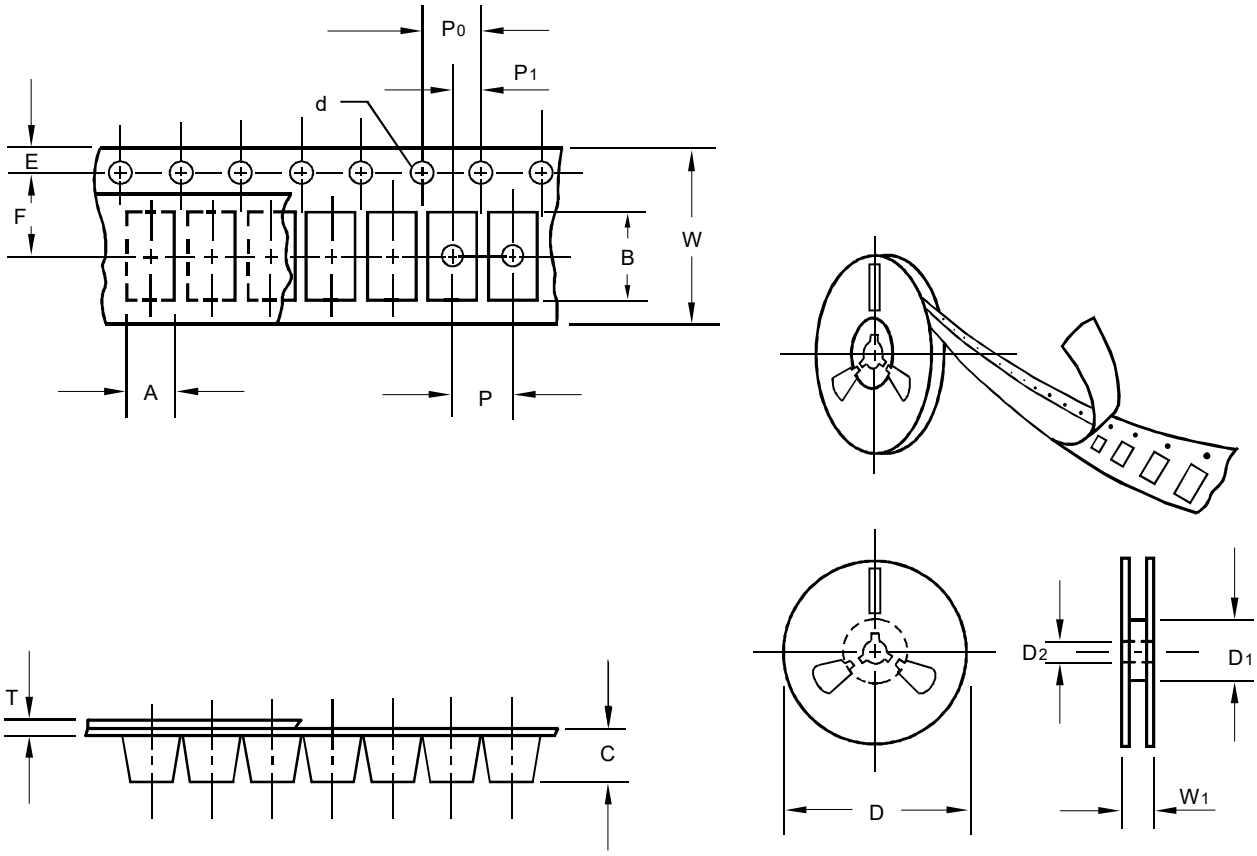
Packing information



unit:mm

Item	Symbol	Tolerance	SOT-363
Carrier width	A	0.1	2.36
Carrier length	B	0.1	2.40
Carrier depth	C	0.1	1.20
Sprocket hole	d	0.1	1.50
13" Reel outside diameter	D	2.0	-
13" Reel inner diameter	D_1	min	-
7" Reel outside diameter	D	2.0	178.00
7" Reel inner diameter	D_1	min	62.00
Feed hole diameter	D_2	0.5	13.00
Sprocket hole position	E	0.1	1.75
Punch hole position	F	0.1	3.50
Punch hole pitch	P	0.1	4.00
Sprocket hole pitch	P_0	0.1	4.00
Embossment center	P_1	0.1	2.00
Overall tape thickness	T	0.1	0.23
Tape width	W	0.3	8.00
Reel width	W_1	1.0	11.40

Note:Devices are packed in accor dance with EIA standar RS-481-A and specifications listed above.

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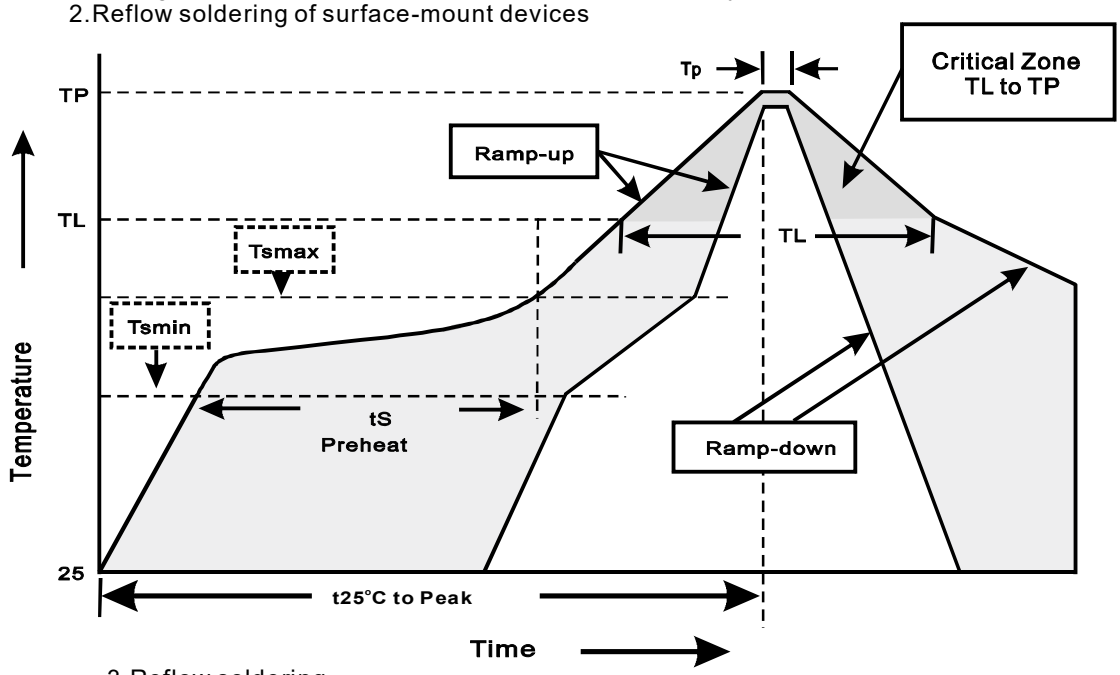
Reel packing

PACKAGE	REEL SIZE	REEL (pcs)	COMPONENT SPACING (m/m)	BOX (pcs)	INNER BOX (m/m)	REEL DIA, (m/m)	CARTON SIZE (m/m)	CARTON (pcs)	APPROX. GROSS WEIGHT (kg)
SOT-363	7"	3,000	4.0	30,000	183*183*123	178	382*262*387	240,000	9.50

Suggested thermal profiles for soldering processes

1.Storage environment: Temperature=5°C~40°C Humidity=55%±25%

2.Reflow soldering of surface-mount devices



3.Reflow soldering

Profile Feature	Soldering Condition
Average ramp-up rate(T_L to T_P)	<3°C/sec
Preheat -Temperature Min(Tsmin) -Temperature Max(Tsmax) -Time(min to max)(t_s)	 150°C 200°C 60~120sec
Tsmax to T_L -Ramp-upRate	 <3°C/sec
Time maintained above: -Temperature(T_L) -Time(t_L)	 217°C 60~260sec
Peak Temperature(T_P)	255°C-0/+5°C
Time within 5°C of actual Peak Temperature(t_P)	10~30sec
Ramp-down Rate	<6°C/sec
Time 25°C to Peak Temperature	<6minutes