SALLTECH

MMDT5451S3

Dual-NPN+PNP Type Bipolar Transistor

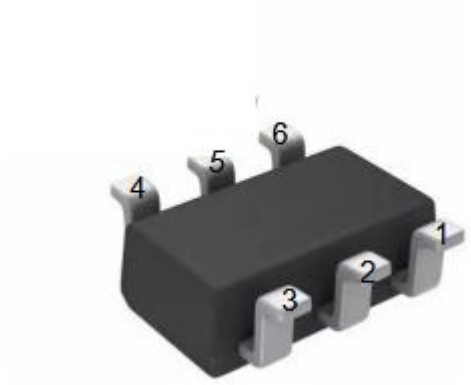
Features

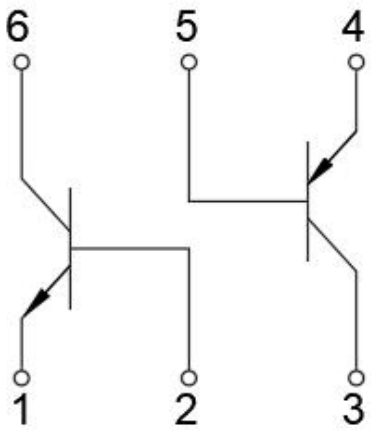
- Low profile package
- Ideal for automated placement
- Power Dissipation of 200mW
- High Stability and High Reliability
- RoHS Compliant

Mechanical Data

- Package:SOT-363
- Lead Finish:Matte Tin
- Case Material: “Green” Molding Compound.
- UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 3 per J-STD-020
- Tape Reel :3000pcs

Appearance & Symbol

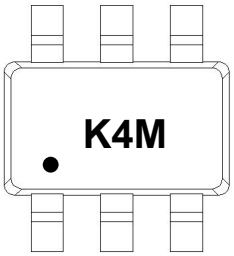




Applications

- amplifying signal
- Electronic switch
- Oscillating circuit
- Variable resistance

Marking Information



Pin1

K4M= Marking Code

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Absolute Maximum Ratings (T=25℃ unless otherwise noted)

Parameter	Symbol	Value		Unit
		TR1	TR2	
Collector-Base Voltage	V_{CBO}	180	-160	V
Collector-Emitter Voltage	V_{CEO}	160	-150	V
Emitter-Base Voltage	V_{EBO}	6	-5	V
Collector Current Continuous	I_C	200	-200	mA
Collector Power Dissipation	P_C	200		mW
Thermal Resistance From Junction to Ambient	$R_{\theta JA}$	625		℃/W
Junction Temperature	T_J	-55 to +150		℃
Junction and Storage Temperature	T_{STG}	-55 to +150		℃

TR1 NPN Electrical Characteristics (T=25℃ unless otherwise noted)

Parameter	Symbol	Test conditions	Min	Typ	Max	Unit
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	I_C=100uA, I_E=0	180			V
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	I_C=1mA, I_B=0	160			V
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	I_E=10uA, I_C=0	6			V
Collector Cut-off Current	I_{CBO}	V_{CB}=120V, I_E=0			0.05	uA
Emitter cut-off current	I_{EBO}	V_{EB}=4V, I_C=0			0.05	uA
DC Current Gai	h_{FE}	V_{CE}=5V, I_C=1mA	80			
		V_{CE}=5V, I_C=10mA	100		300	
		V_{CE}=5V, I_C=50mA	30			
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	I_C=10mA, I_B=1mA			0.15	V
		I_C=50mA, I_B=5mA			0.2	V
Base-Emitter Saturation Voltage	$V_{BE(sat)}$	I_C=10mA, I_B=1mA			1	V
		I_C=50mA, I_B=5mA			1	V
Transition frequency	f_T	V_{CE}=10V, I_C=10mA,f=100MHz	100		300	MHz
output capacitance	C_{ob}	V_{CB}=10V, I_E= 0,f=1MHz			6	pF
Noise Figure	NF	V_{CE}= 5.0V, I_C= 200μA, R_S= 1kΩ,f = 1.0kHz			8	dB

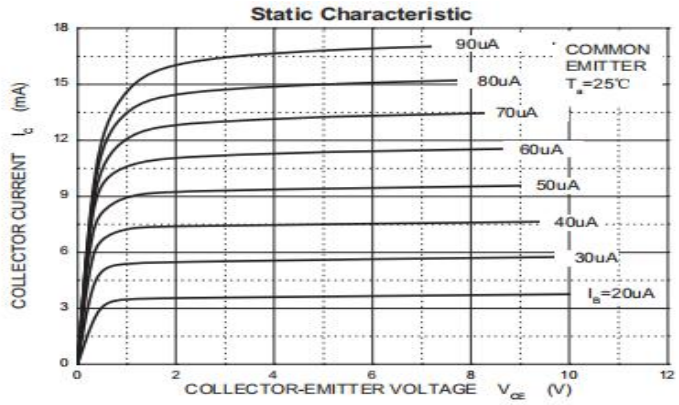
* Pulse test: pulse width ≤300μs, duty cycle≤ 2.0%.

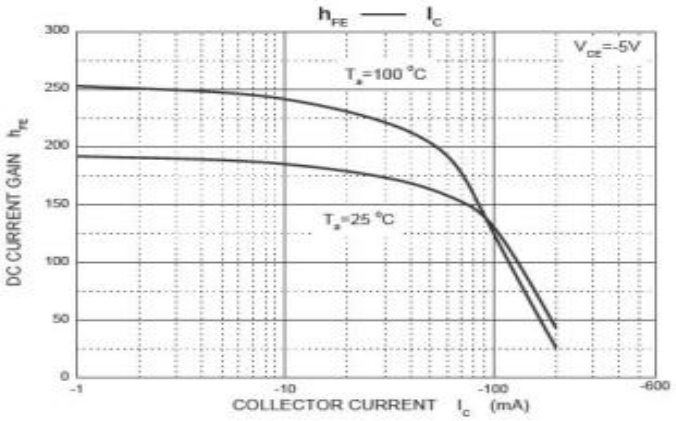
TR2 PNP Electrical Characteristics (T=25℃ unless otherwise noted)

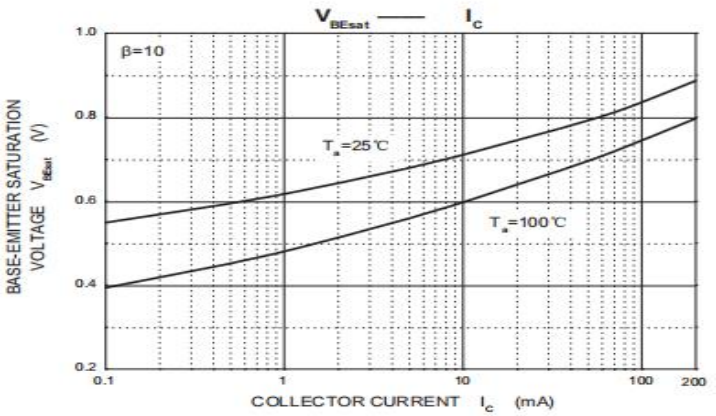
Parameter	Symbol	Test conditions	Min	Max	Unit
Collector-base breakdown voltage	$V_{(BR)CBO}$	I_C=-100uA, I_E=0	-160		V
Collector-emitter breakdown voltage	$V_{(BR)CEO}$	I_C=-1mA, I_B=0	-150		V
Emitter-base breakdown voltage	$V_{(BR)EBO}$	I_E=-10uA, I_C=0	-5		V
Collector cut-off current	I_{CBO}	V_{CB}=-120V, I_E=0		-0.05	μA
Emitter cut-off current	I_{EBO}	V_{EB}=-3V, I_C=0		-0.05	μA
DC current gain	$h_{EF(1)}$	V_{CE}=-5V, I_C=-1mA	50		
	$h_{EF(2)}$	V_{CE}=-5V, I_C=-10mA	100	300	
	$h_{EF(3)}$	V_{CE}=-5V, I_C=-50mA	50		
Collector-emitter saturation voltage	$V_{CE(sat)}$	I_C=-10mA, I_B=-1mA		-0.2	V
		I_C=-50mA, I_B=-5mA		-0.5	V
Base -emitter saturation voltage	$V_{BE(sat)}$	I_C=-10mA, I_B=-1mA		-1	V
		I_C=-50mA, I_B=-5mA		-1	V
Transition frequency	f_T	V_{CE}=-10V, I_C=-10mA,f=100MHz	100	300	MHz
Output Capacitance	Cob	V_{CB}=-10V, I_E= 0,f=1MHz		6	pF
Noise Figure	NF	V_{CE}= -5.0V, I_C= -200μA, R_S= 10Ω,f = 1.0kHz		8	dB

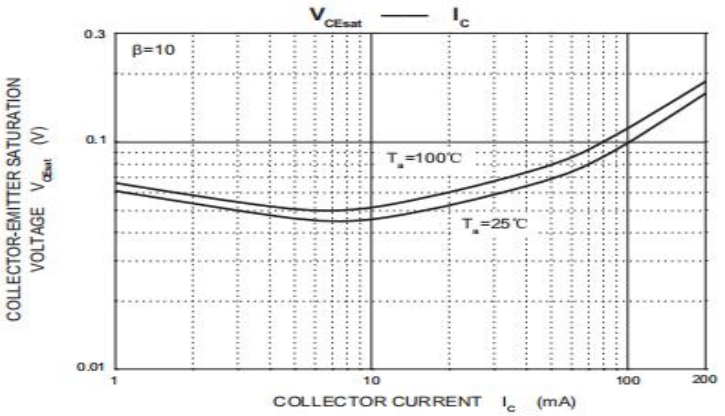
* Pulse test: pulse width ≤300μs, duty cycle≤ 2.0%.

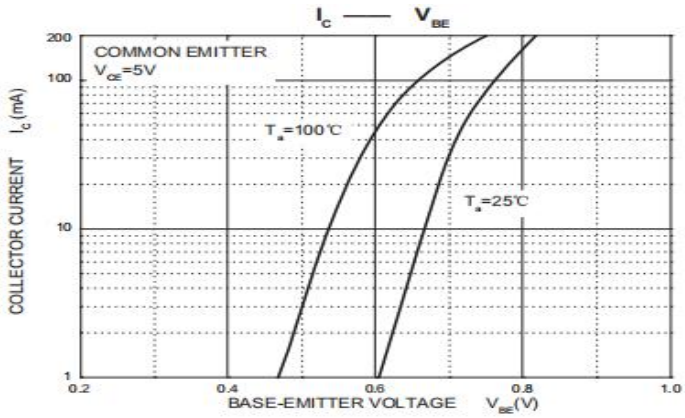
TR1 NPN Typical Characteristics

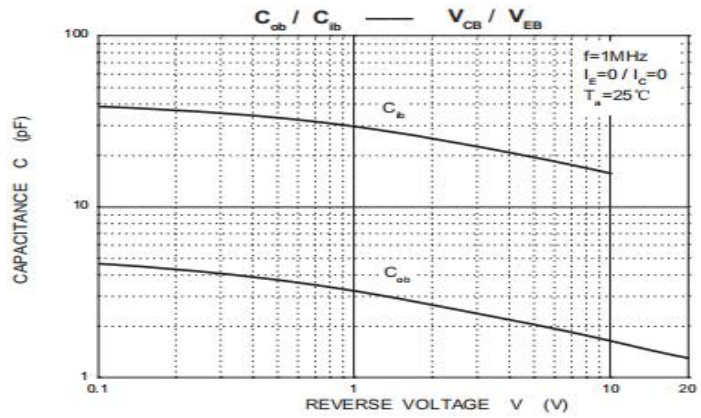


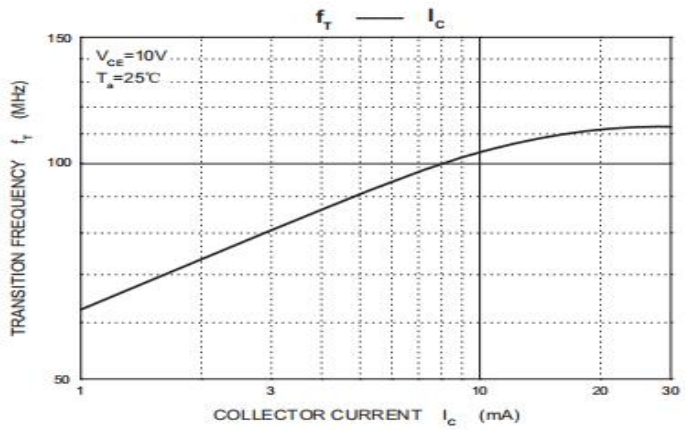


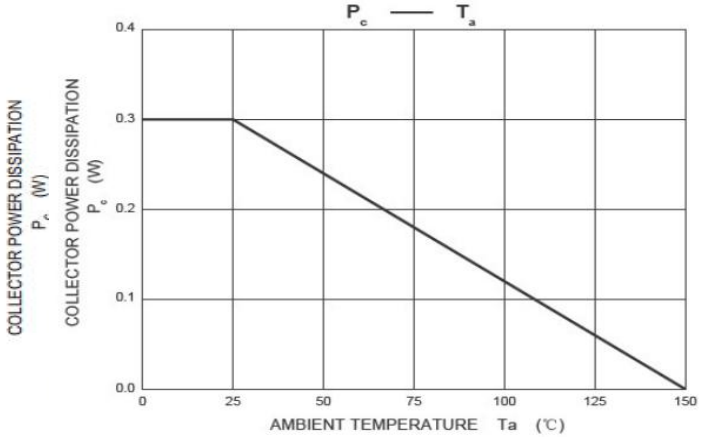






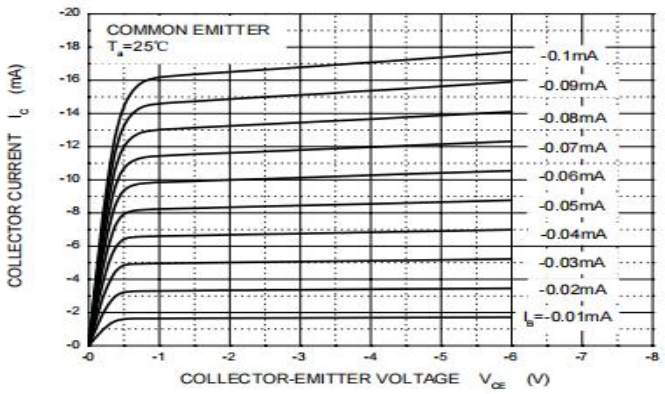




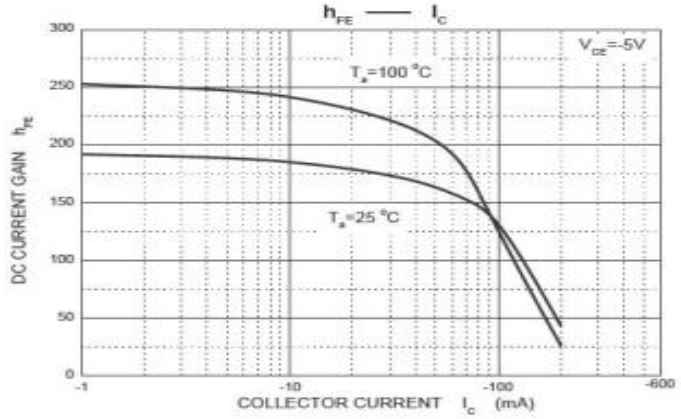


TR2 PNP Typical Characteristics

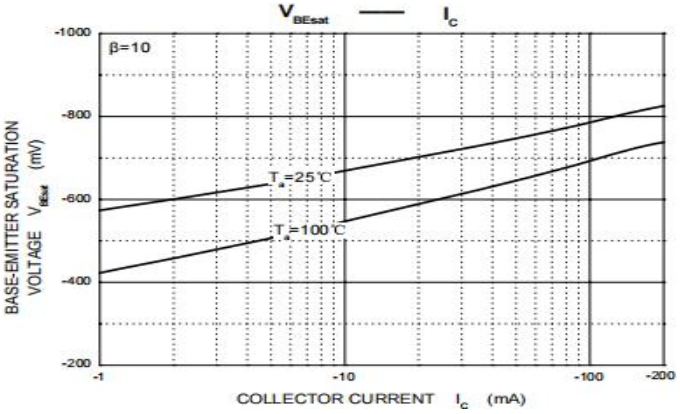
Static Characteristic



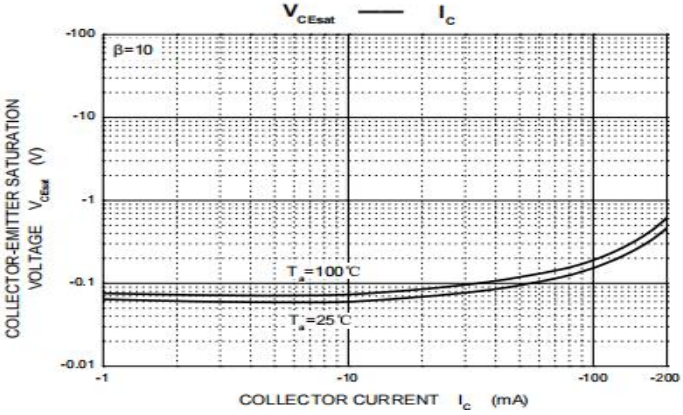
h_{FE} — I_C



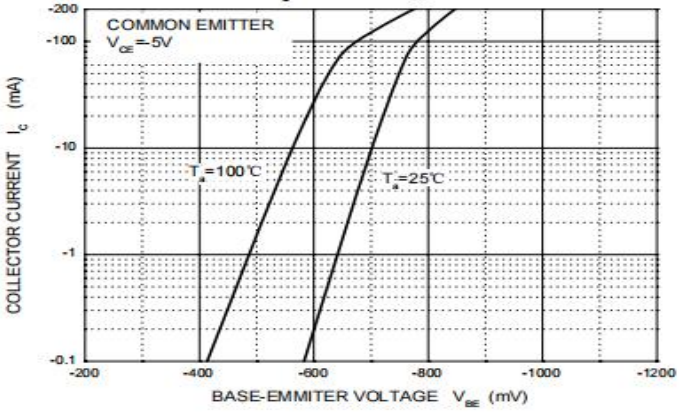
V_{BEsat} — I_C



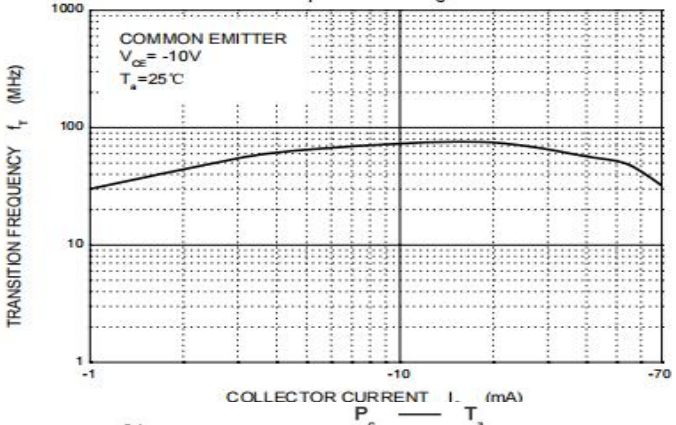
V_{CEsat} — I_C



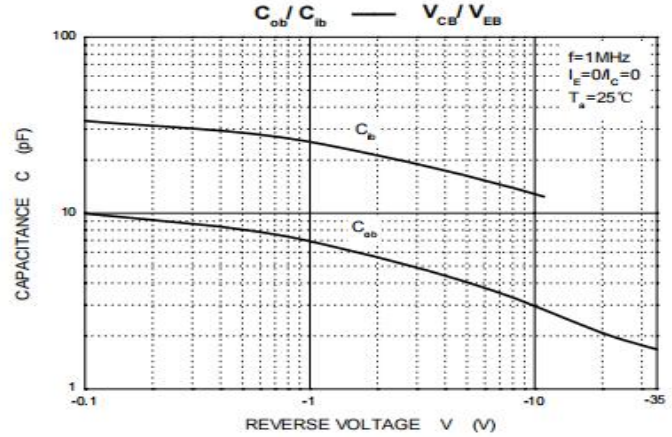
I_C — V_{BE}



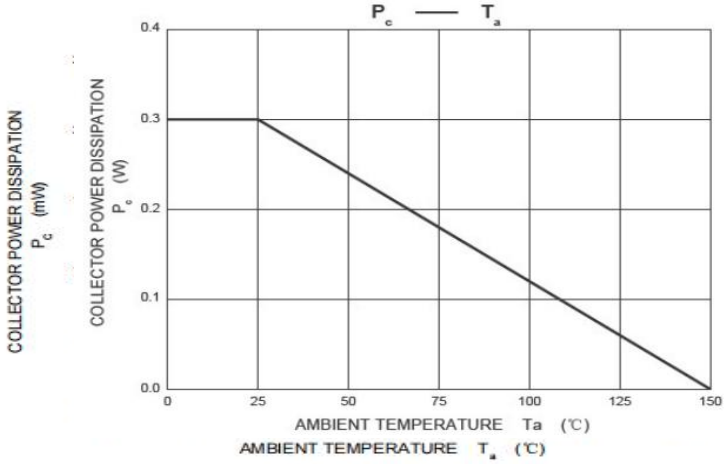
f_T — I_C



C_{ob}/ C_{ib} — V_{CB}/ V_{EB}

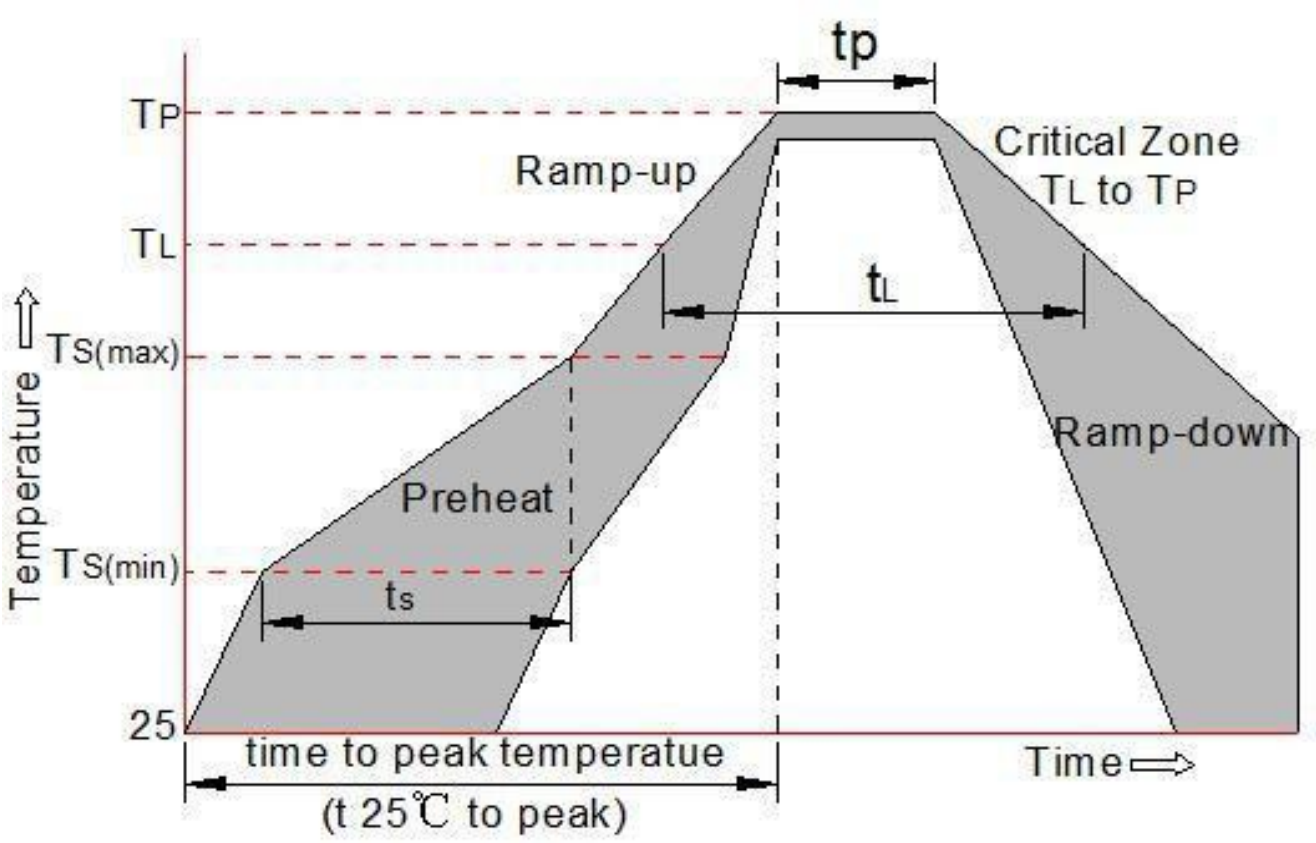


P_c — T_a

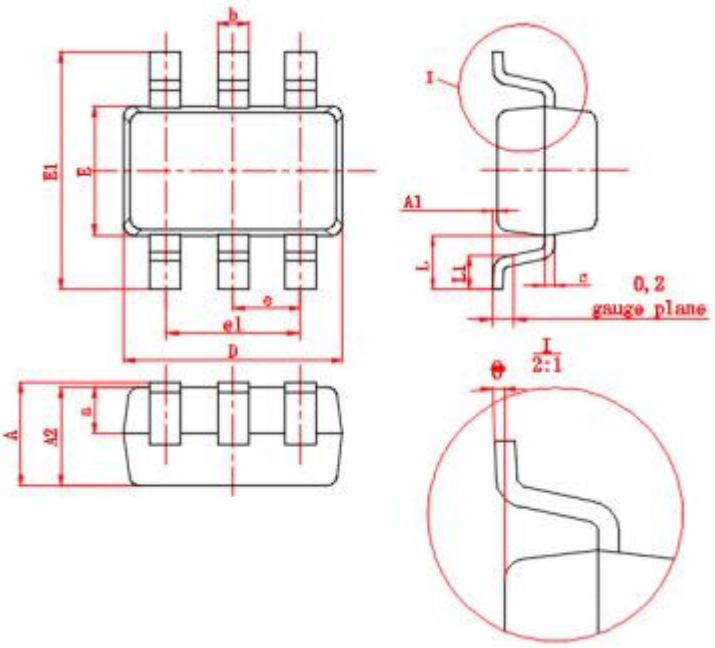


Soldering parameters

Reflow Condition		Pb-Free assembly (see as bellow)
Pre Heat	-Temperature Min ($T_{s(min)}$)	+150℃
	-Temperature Max($T_{s(max)}$)	+200℃
	-Time (Min to Max) (ts)	60-180 secs.
Average ramp up rate (Liquid us Temp (T_L) to peak)		3℃/sec. Max
$T_{s(max)}$ to T_L - Ramp-up Rate		3℃/sec. Max
Reflow	-Temperature(T_L) (Liquid us)	+217℃
	-Temperature(t_L)	60-150 secs.
Peak Temp (T_p)		+260(+0/-5)℃
Time within 5℃ of actual Peak Temp (t_p)		30 secs. Max
Ramp-down Rate		6℃/sec. Max
Time 25℃ to Peak Temp (T_P)		8 min. Max
Do not exceed		+260℃

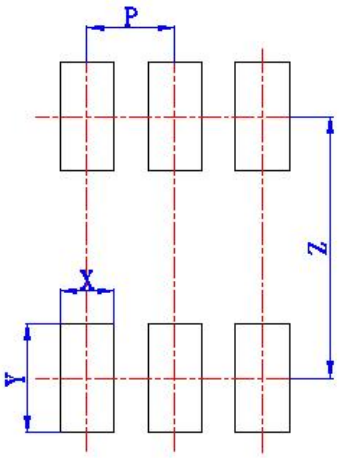


Package mechanical data



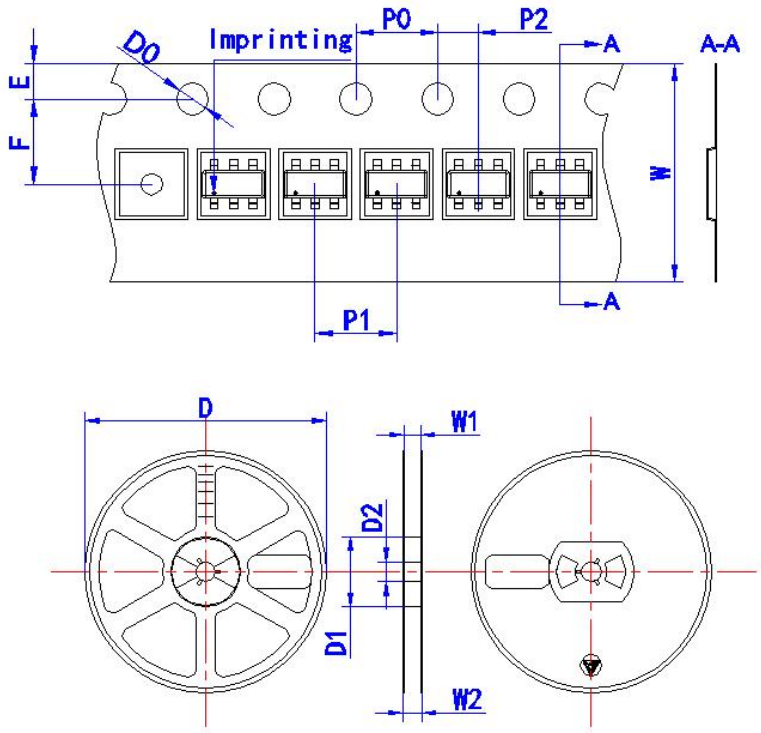
Symbol	Millimeters	
	min	max
A	0.9	1.1
A1	0	0.1
A2	0.9	1.0
a	(0.45)	
D	2.0	2.2
E	1.15	1.35
E1	2.15	2.45
e	(0.65)	
e1	1.2	1.4
b	0.25	0.35
c	0.08	0.15
L	(0.525)	
L1	0.26	0.46
θ	0°	8°

Suggested Land Pattern



Symbol	Dimensional
	Millimeters
X	(0.4)
Y	(0.8)
Z	(1.8)
P	(0.65)

Tape & reel specification - SOT-363



Symbol	Dimension in Millimeters
Tape	
D0	1.50+0.10/-0.00
E	1.75±0.10
F	3.50±0.10
P0	4.00±0.10
P1	4.00±0.10
P2	2.00±0.10
W	8.00+0.3/-0.1
Reel	
D	178.0±2.00
D1	54.40±1.00
D2	13.00±1.00
W1	9.50±1.00
W2	12.30±1.00

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