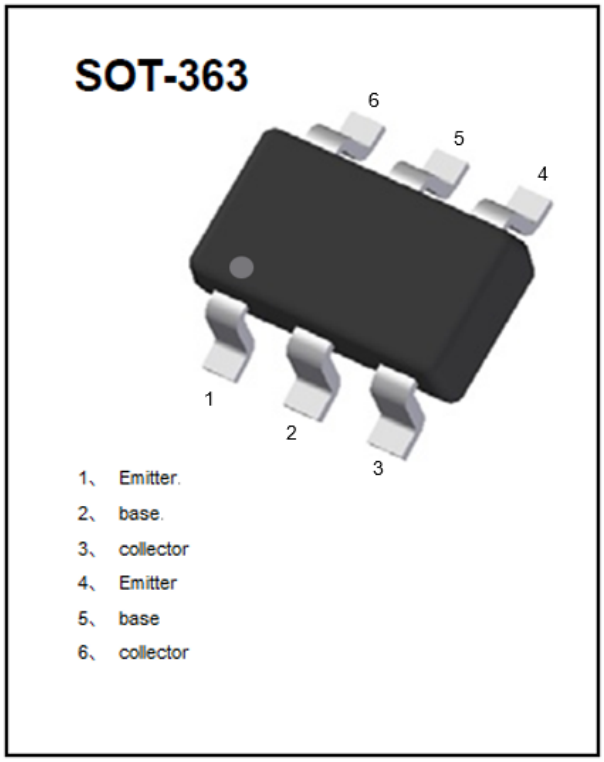
Dual NPN+PNP Small Signal Transistor



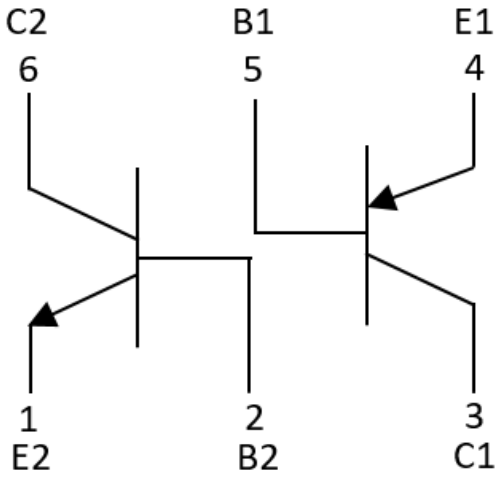
Features

- Epoxy meets UL-94 V-0 flammability rating
- Surface mount package ideally Suited for Automatic Insertion
- NPN/PNP

Mechanical Data

- **Package:** SOT-363
- **Terminals:** Tin plated leads, solderable per J-STD-002 and JESD22-B102
- **Marking:** K13

■Equivalent circuit



■ Ordering Information (Example)

PREFERED P/N	PACKING CODE	UNIT WEIGHT(g)	MINIMUM PACKAGE(pcs)	INNER BOX QUANTITY(pcs)	OUTER CARTON QUANTITY(pcs)	DELIVERY MODE
MMDT4413	F2	Approximate 0.009g	3000	30000	120000	7” reel

■TR1 PNP Pin3、4、5 Maximum Ratings (Ta=25℃ Unless otherwise specified)

Item	Symbol	Unit	Conditions	Value
Collector-Base Voltage	V_{CBO}	V	I_C=-100μA,I_E=0	-40
Collector-Emitter Voltage	V_{CEO}	V	I_C=-1mA,I_B=0	-40
Emitter-Base Voltage	V_{EBO}	V	I_E=-100μA,I_C=0	-5
Collector Current -Continuous	I_C	mA		-200
Total Device Dissipation	P_C	mW		200
Junction Temperature	Tj	℃		150
Storage Temperature	T_{STG}	℃		-55 to +150

■TR1 PNP Pin3、4、5 Electrical Characteristics (Ta=25℃ unless otherwise specified)

Item	Symbol	Unit	Conditions	Min	TYP	Max
Collector-base breakdown voltage	V_{CBO}	V	I_C=-100μA,I_E=0	-40		
Collector-emitter breakdown voltage	V_{CEO}	V	I_C=-1mA,I_B=0	-40		
Emitter-base breakdown voltage	V_{EBO}	V	I_E=-100μA,I_C=0	-5		
Collector cut-off current	I_{CBO}	nA	V_{CB}=-50V,I_E=0			-100
Emmiter cut-off current	I_{EBO}	nA	V_{EB}=-5V, I_C=0			-100
DC current gain	h_{FE}		V_{CE}=-1V,I_C=-0.1mA	30		
	h_{FE}		V_{CE}=-1V,I_C=-1mA	60		
	h_{FE}		V_{CE}=-1V,I_C=-10mA	100		
	h_{FE}		V_{CE}=-2V,I_C=-150mA	100		300
	h_{FE}		V_{CE}=-2V,I_C=-500mA	20		
Collector-emitter saturation voltage	$V_{CE(sat)}$	V	I_C=-150mA,I_B=-15mA			-0.4
Collector-emitter saturation voltage	$V_{CE(sat)}$	V	I_C=-500mA,I_B=-50mA			-0.75
Base-emitter saturation voltage	$V_{BE(sat)}$	V	I_C=-150mA,I_B=-15mA			-0.95
Base-emitter saturation voltage	$V_{BE(sat)}$	V	I_C=-500mA,I_B=-50mA			-1.3
Transition frequency	f_T	MHz	V_{CE}=-10V,I_C=-20mA, f=100MHz	200		
Delay time	td	ns	V_{CC}=-30V,I_C=-150mA, V_{BE}=-2V,I_{B1}=-15mA			15
Rise time	tr	ns				20
Storage time	ts	ns	V_{CC}=-30V,I_C=-150mA, I_{B1}=-I_{B2}=-15mA			225
Fall time	tf	ns				30

■TR2 NPN Pin1、2、6 Maximum Ratings (Ta=25℃ Unless otherwise specified)

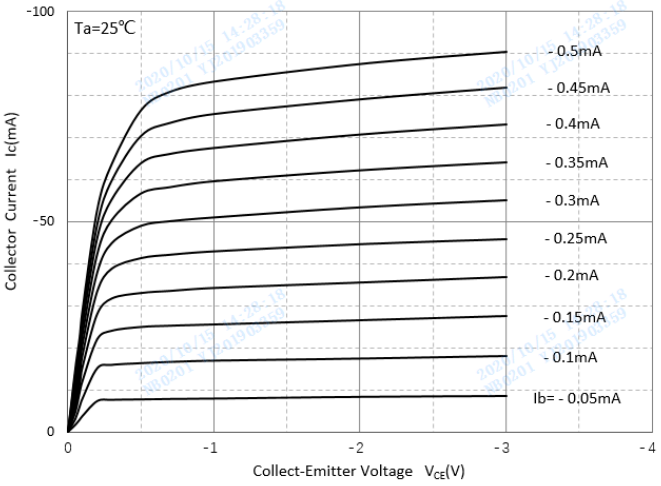
Item	Symbol	Unit	Conditions	Value
Collector-Base Voltage	V_{CBO}	V	I_C=100μA,I_E=0	60
Collector-Emitter Voltage	V_{CEO}	V	I_C=1mA,I_B=0	40
Emitter-Base Voltage	V_{EBO}	V	I_E=100μA,I_C=0	6
Collector Current -Continuous	I_C	mA		200
Total Device Dissipation	P_C	mW		200
Junction Temperature	Tj	℃		150
Storage Temperature	T_{STG}	℃		-55 to +150

■TR2 NPN Pin1、2、6 Electrical Characteristics (Ta=25℃ unless otherwise specified)

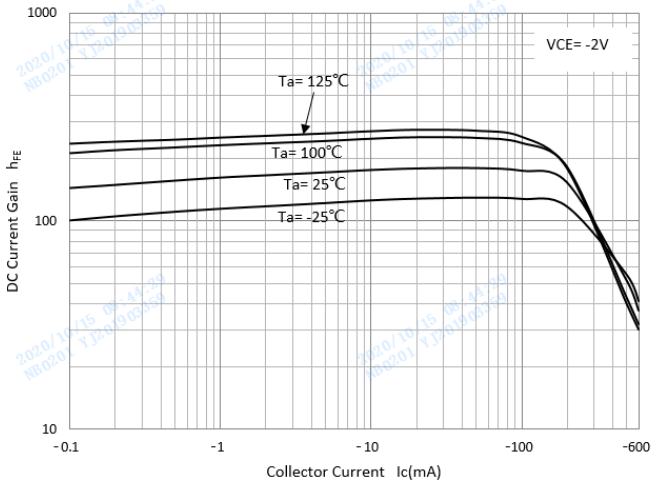
Item	Symbol	Unit	Conditions	Min	TYP	Max
Collector-base breakdown voltage	V_{CBO}	V	I_C=100μA,I_E=0	60		
Collector-emitter breakdown voltage	V_{CEO}	V	I_C=1mA,I_B=0	40		
Emitter-base breakdown voltage	V_{EBO}	V	I_E=100μA,I_C=0	6		
Collector cut-off current	I_{CBO}	nA	V_{CB}=50V,I_E=0			100
Emmiter cut-off current	I_{EBO}	nA	V_{EB}=5V, I_C=0			100
DC current gain	h_{FE}		V_{CE}=1V,I_C=0.1mA	20		
	h_{FE}		V_{CE}=1V,I_C=1mA	40		
	h_{FE}		V_{CE}=1V,I_C=10mA	80		
	h_{FE}		V_{CE}=1V,I_C=150mA	100		300
	h_{FE}		V_{CE}=2V,I_C=500mA	40		
Collector-emitter saturation voltage	$V_{CE(sat)}$	V	I_C=150mA,I_B=15mA			0.4
Collector-emitter saturation voltage	$V_{CE(sat)}$	V	I_C=500mA,I_B=50mA			0.75
Base-emitter saturation voltage	$V_{BE(sat)}$	V	I_C=150mA,I_B=15mA			0.95
Base-emitter saturation voltage	$V_{BE(sat)}$	V	I_C=500mA,I_B=50mA			1.2
Transition frequency	f_T	MHz	V_{CE}=10V,I_C=20mA,f=100MHz	250		
Delay time	td	ns	V_{CC}=30V,I_C=150mA, V_{BE}=2V, I_{B1}=15mA			15
Rise time	tr	ns				20
Storage time	ts	ns	V_{CC}=30V,I_C=150mA, I_{B1}=- I_{B2}=15mA			225
Fall time	tf	ns				30

■ TR1 PNP Pin3、4、5 Characteristics (Typical)

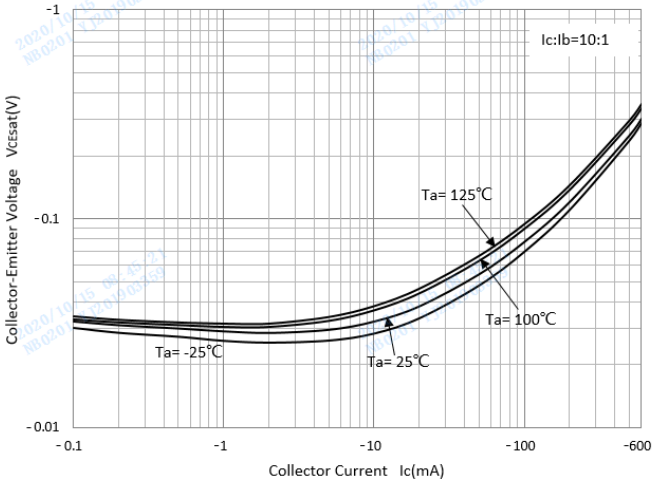
Static Characteristic



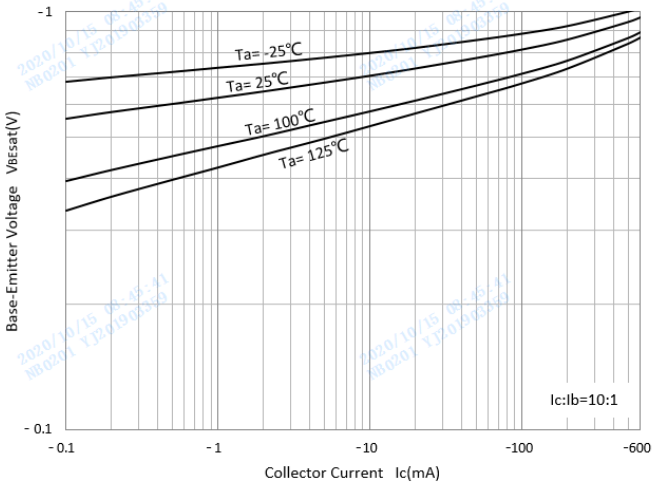
DC Current Gain



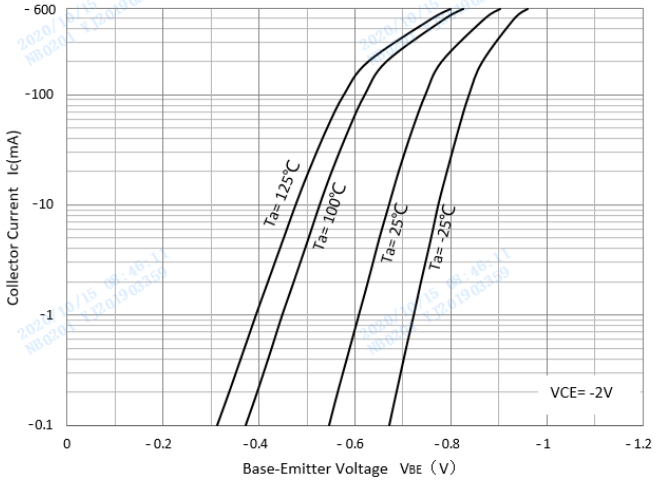
Collector-Emitter Saturation Voltage



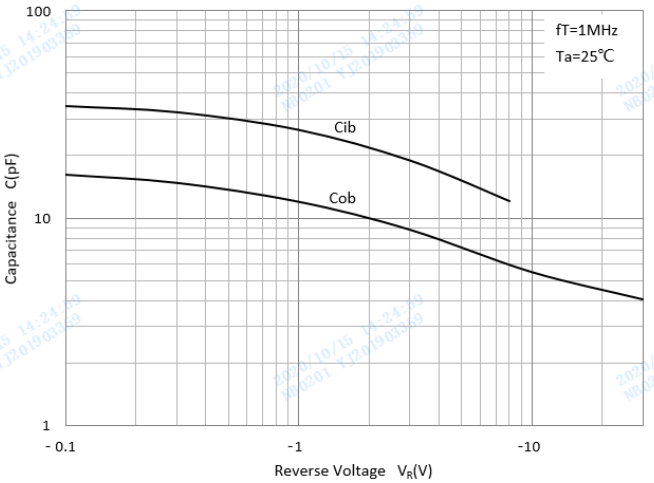
Base-Emitter Saturation Voltage



Base-Emitter On Voltage

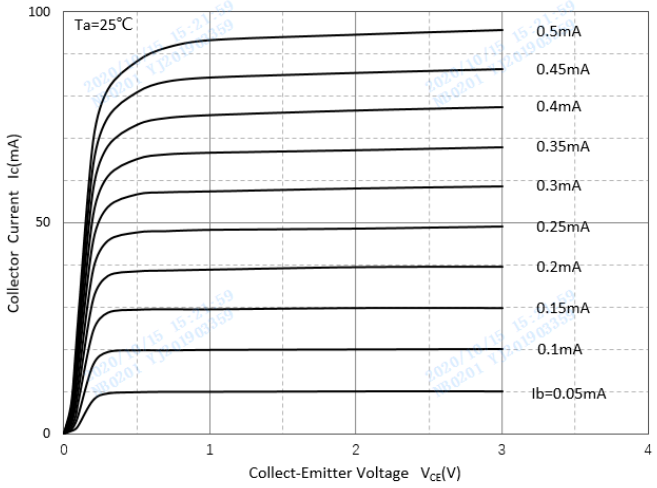


Cob/Cib-V_{CB}/V_{EB}

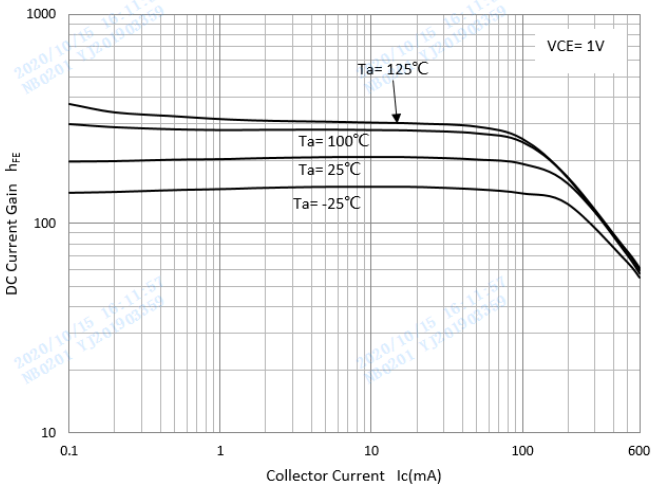


■ TR2 NPN Pin1、2、6 Characteristics (Typical)

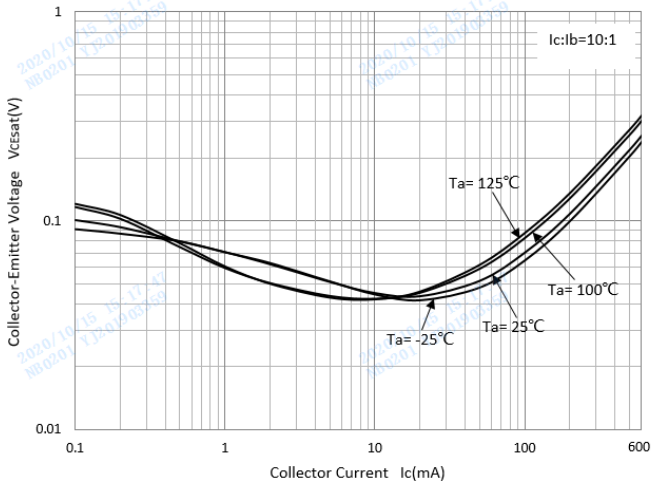
Static Characteristic



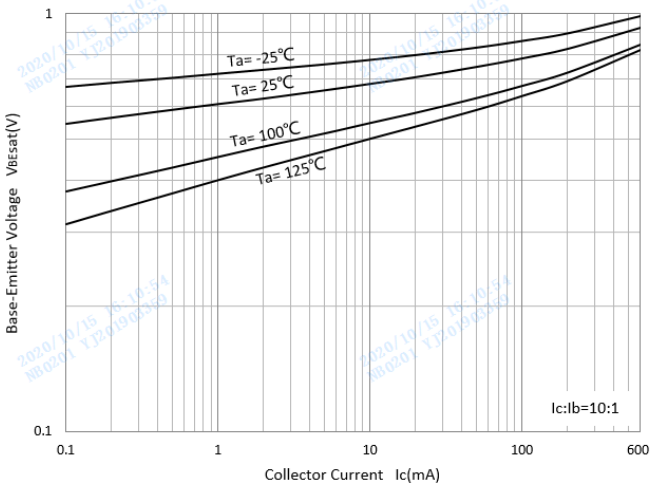
DC Current Gain



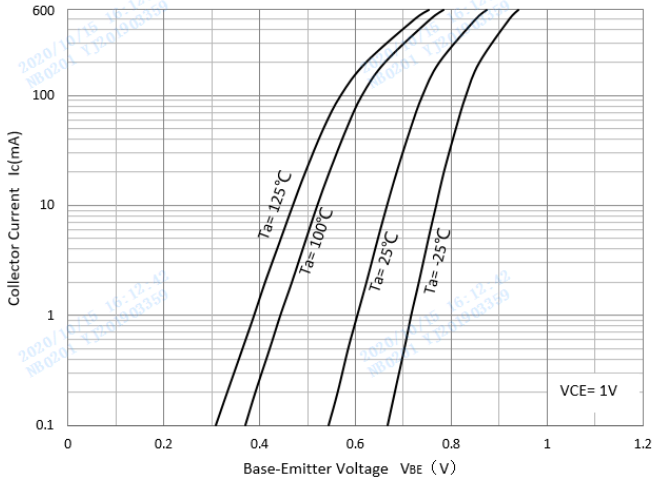
Collector-Emitter Saturation Voltage



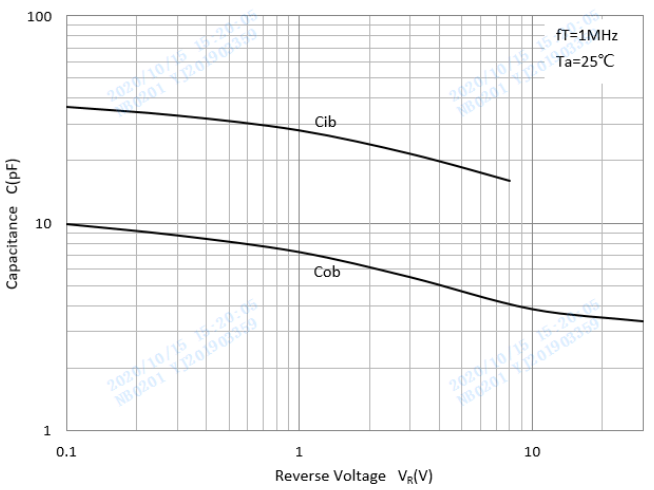
Base-Emitter Saturation Voltage



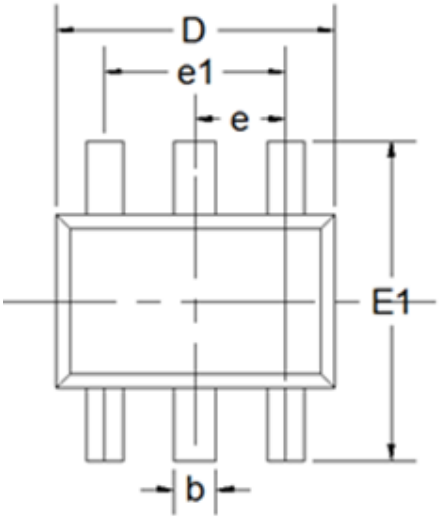
Base-Emitter On Voltage



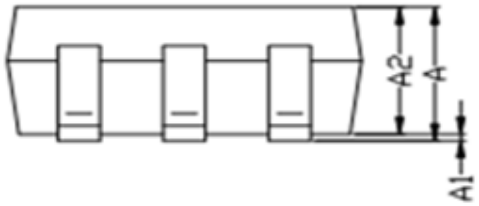
Cob/Cib-V_{CB}/V_{EB}

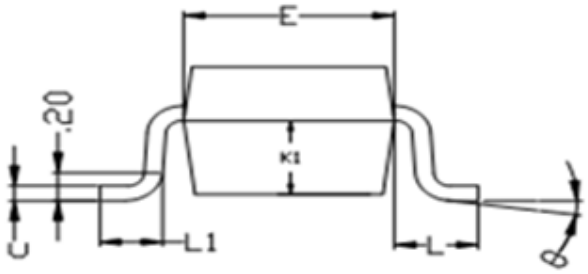


■SOT-363 Package Outline Dimensions

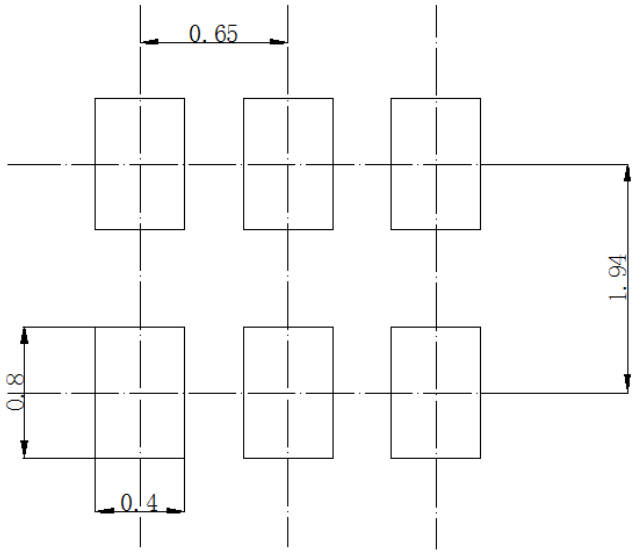


DIMENSIONS				
DIM	INCHES		MM	
	MIN	MAX	MIN	MAX
A	0.035	0.043	0.9	1.1
A1	0	0.004	0	0.1
A2	0.035	0.039	0.9	1
b	0.006	0.014	0.15	0.35
c	0.002	0.01	0.05	0.25
D	0.071	0.087	1.8	2.2
E	0.045	0.053	1.15	1.35
E1	0.085	0.096	2.15	2.45
e	0.026Typ		0.65Typ	
e1	0.047	0.055	1.2	1.4
L	0.021Typ		0.525Typ	
L1	0.01	0.018	0.26	0.46
θ	0°	8°	0°	8°





■SOT-363 Soldering Footprint



Unit：mm

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