NextGen Components,Inc.

PART CODE: MMBT2222AS2S1P

SPECIFICATION SHEET

SPECIFICATION SHEET NO.	R0608- MMBT2222AS2S1P	
DATE	June 8, 2024	
REVISION	A2	Updated With Most Recent Data
DESCRIPTION AND MAIN PARAMETRICS	SMD Plastic-Encapsulate Transistors, 3 Pads, Case SOT-23 MMBT Series, Transistor Type NPN h_{FE} Rank Range 100~300 Collector-Base Voltage 75V Max. Collector Current 600mA Max. Operating Temp. Range -55°C ~+150°C Package in Tape/Reel, 3000pcs/Reel RoHS III/REACH Compliant and Halogen Free (HF)	
CUSTOMER		
CUSTOMER PART NO.		
CROSS REF. PART NO.		
ORIGINAL MFG/PART NO.	MDD Diodes/MMBT2222A	
PART CODE	MMBT2222AS2S1P	

VENDOR APPROVE
Issued/Checked/Approved NextGen Components, Inc. Mandy Xu NextGen Components, Inc. Ruby Zhang NextGen Components, Inc. Jack Zhang
DATE: June 8, 2024

CUSTOMER APPROVE
DATE:

NextGen Components, Inc. sales@NextGenComponent.com www.NextGenComponent.com

PART CODE: MMBT2222AS2S1P

SMD TRANSISTORS MMBT SERIES CASE SOT-23

MAIN FEATURE

- Epoxy Meets UL-94 V-0 Flammability Rating
- Epitaxial Planar Die Construction
- Complementary PNP Type Available (Part Code: MMBT2907AS2S2F)
- Surface Mount Package Ideally Suited for Automatic Insertion
- REACH/RoHS III Complaint and Halogen Free
- Cross Main Competitor Parts in Market

APPLICATION

- For SMD application

ELECTRICAL CHARACTERISTICS

- See Page 4~ Page 5

• HOW TO ORDER

- Please Follow Up Part Code Guide And Indicate Pat Code When You Order Or RFQ For Custom Specification

PART CODE GUIDE

RFQ
Request For Quotation

CODE	NAME	KEY SPECIFICATION OPTION
MMBT	Product Series Code	SMD Plastic-Encapsulate Transistors MMBT series
2222A	Specification Code	For Original Part Number MMBT2222A
S2	Case Code	S2: Case SOT-23
S	Internal Control Code	Custom letter A~Z, a-z or Digits (0-9)
1P	Marking Code	Custom letter A~Z, a-z or Digits (0-9)

SMD TRANSISTORS MMBT SERIES CASE SOT-23

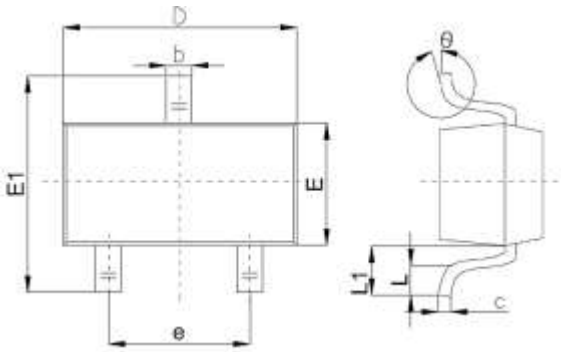
DIMENSION (Unit: Inch/mm)

Image for reference

Marking:

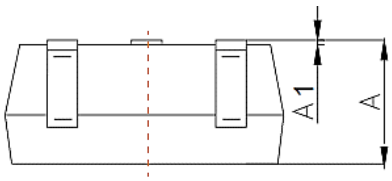
1P

SOT-23



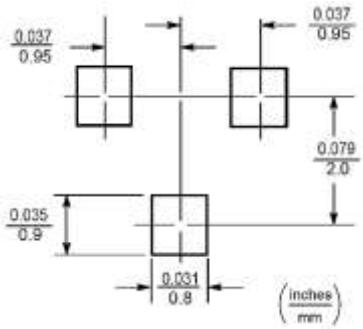
Pin Function

1. Base
2. Emitter
3. Collector



Symbol	Value (mm)		
	Min.	Typ.	Max.
A	0.9		1.4
A1			0.10
b	0.30		0.50
c	0.08		0.20
D	2.80	2.90	3.10
E	1.20		1.60
E1	2.25		2.80
e	1.8	1.9	2.00
L	0.10		0.50
L1	0.40		
θ	0°		10°

Recommend Pad Layout



SMD TRANSISTORS MMBT SERIES CASE SOT-23

CLASSIFICATION OF hFE

PART CODE	RANK CODE	RANK RANG	MARKING
MMBT2222AS2S1P	L	100~ 200	1P
	H	200~ 300	

MAXIMUM RATINGS - @ 25 °C

PARAMETER	SYMBOLS	VALUE	UNITS
Collector-Base Voltage	V_{CBO}	75	Volts
Collector-Emitter Voltage	V_{CEO}	40	Volts
Emitter-Base Voltage	V_{EBO}	6	Volts
Collector Current -Continuous	I_C	600	mA
Collector Power Dissipation	P_C	300	mW
Thermal Resistance From Junction To Ambient	$R_{\Theta JA}$	417	°C/W
Junction Temperature	T_J	+150	°C
Storage Temperature Range	T_{STG}	-55 ~ +150	°C

ELECTRICAL CHARACTERISTICS- @ 25 °C

PARAMETER	SYMBOLS	VALUE			UNIT	TEST CONDITION
		MIN.	TYP.	MAX.		
Collector-base Breakdown Voltage	$V_{(BR)CBO}$	75			V	I_C= 10μA, I_E=0
Collector-emitter Breakdown Voltage, See Note 1 for Symbol *	$V_{(BR)CEO}$ *	40			V	I_C= 10mA, I_B=0
Emitter-base Breakdown Voltage	$V_{(BR)EBO}$	6			V	I_E= 10μA, I_C=0
Collector Base Cut-off Current	I_{CBO}			0.01	μA	V_{CB}=60V, I_E=0
Collector Cut-off Current	I_{CEX}			0.01	μA	V_{CE}= 30V, $V_{BE(off)}$=3V
Emitter Base Cut-off Current	I_{EBO}			0.10	μA	V_{EB}= 3V, I_C=0
DC Current Gain, See Note 1 for Symbol *	$h_{FE(1)}$ *	100		300		V_{CE}=10V, I_C=150mA
	$h_{FE(2)}$	40				V_{CE}=10V, I_C=0.1mA
	$h_{FE(3)}$ *	42				V_{CE}=10V, I_C=500mA
Collector-emitter Saturation Voltage, See Note 1 for Symbol *	$V_{CE(sat)}$*			1	V	I_C=500mA, I_B=50mA
				0.3	V	I_C=150mA, I_B=15mA
Base-emitter Saturation Voltage See Note 1 for Symbol *	$V_{BE(sat)}$*			2.0	V	I_C=500mA, I_B=50mA
				1.2	V	I_C=150mA, I_B=15mA
Transition Frequency	f_T	300			MHz	V_{CE}=20V, I_C= 20mA, f=100MHz
Delay Time	t_d			10	ns	V_{CC}=30V, $V_{BE(off)}$= -0.5V I_C=150mA, I_{B1}= 15mA
Rise Time	t_r			25	ns	
Storage Time	t_s			225	ns	V_{CC}=30V, I_C=150mA I_{B1}=-I_{B2}=15mA
Fall Time	t_f			60	ns	

Note: 1) *pulse test: Pulse Width ≤300μs, Duty Cycle≤ 2.0%.

TYPICAL CHARACTERISTIC CURVES - For Reference Only

Fig.1 Static characteristics

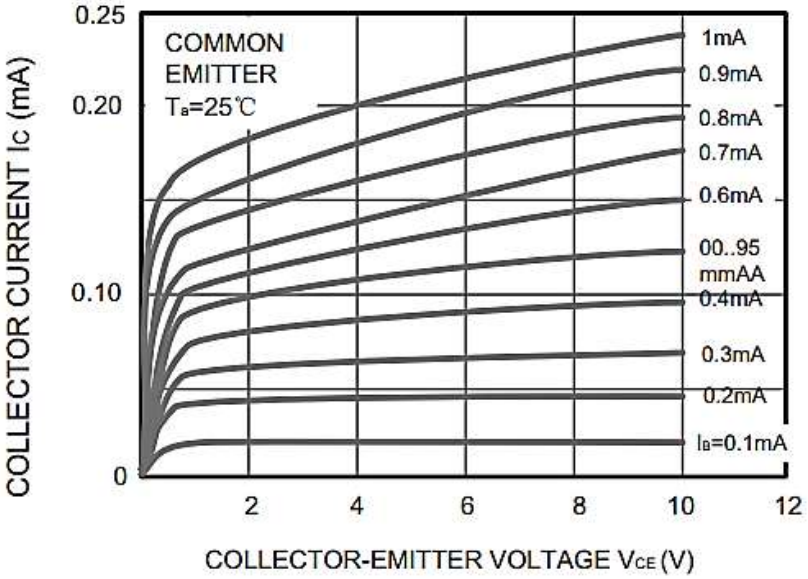
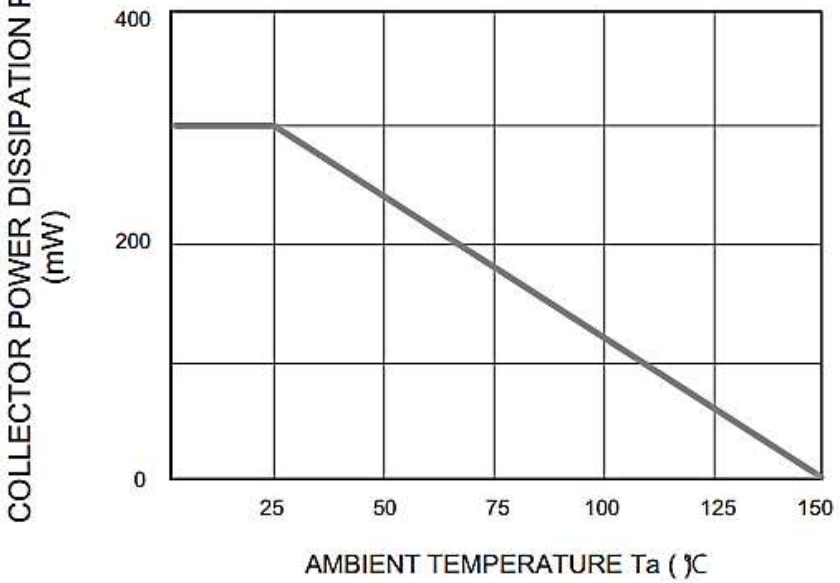


Fig.2 Pc—— Ta



TYPICAL CHARACTERISTIC CURVES - For Reference Only

Fig.3 C_{ob} / C_{ib} —— V_{CB} / V_{EB}

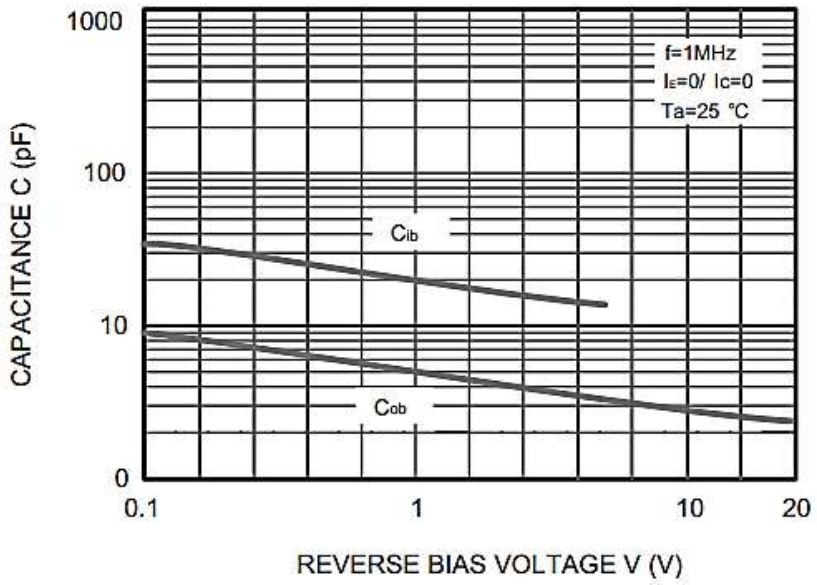
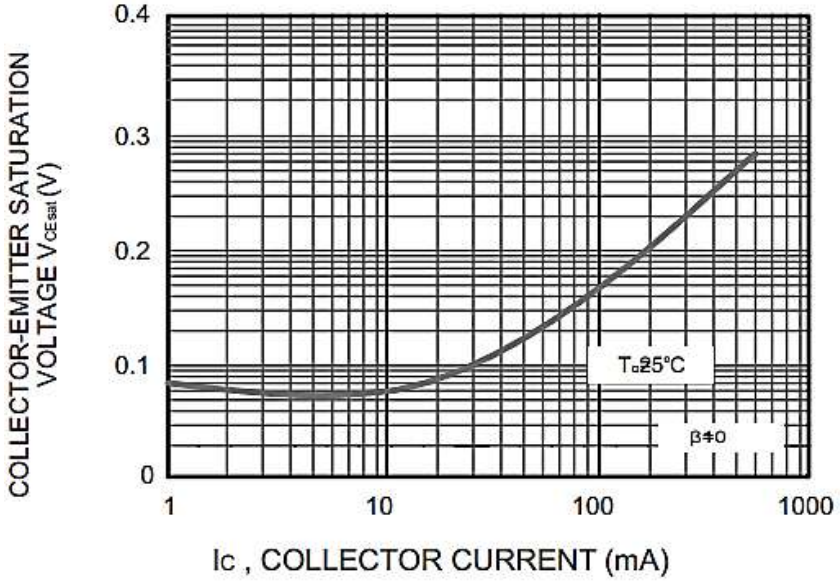


Fig.4 V_{CEsat} —— Ic



TYPICAL CHARACTERISTIC CURVES - For Reference Only

Fig.5 h_{FE}–Ic

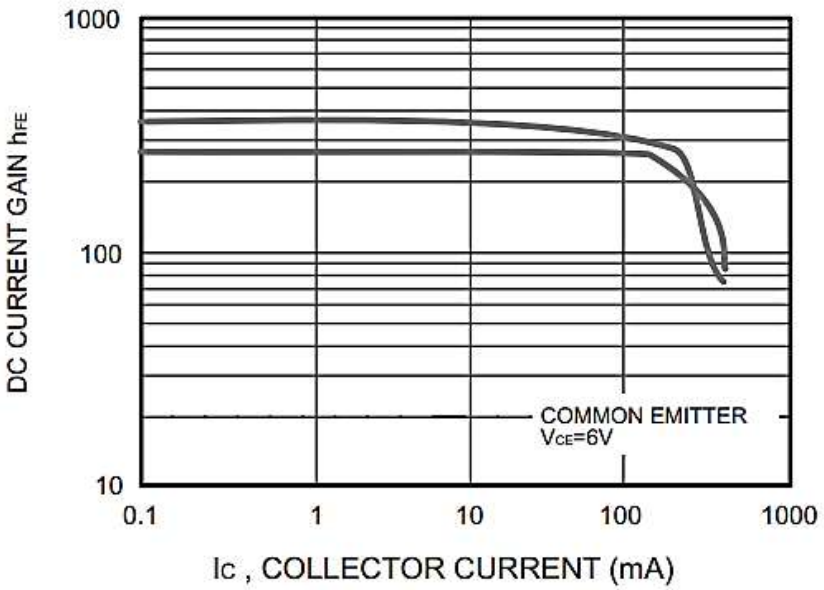
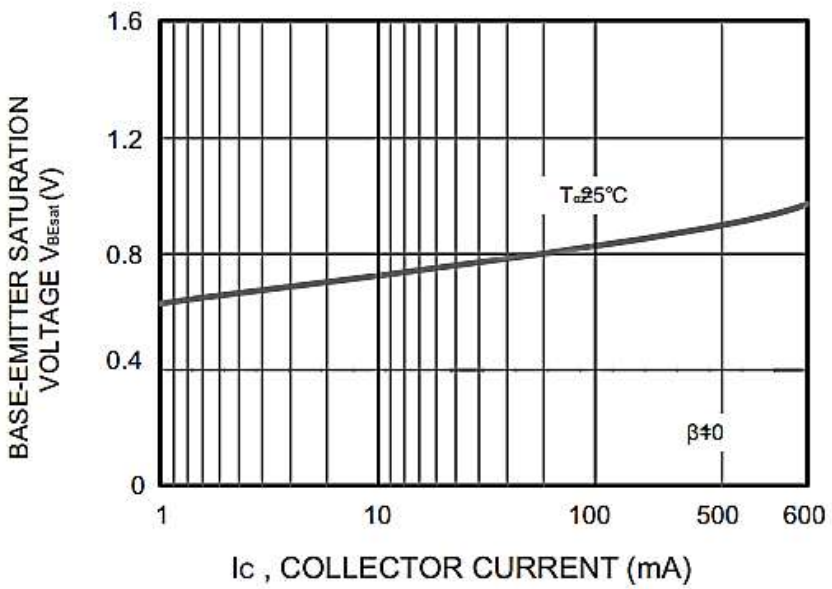


Fig.6 V_{BEsat}—— Ic



TYPICAL CHARACTERISTIC CURVES - For Reference Only

Fig.7 I_C—— V_{BE}

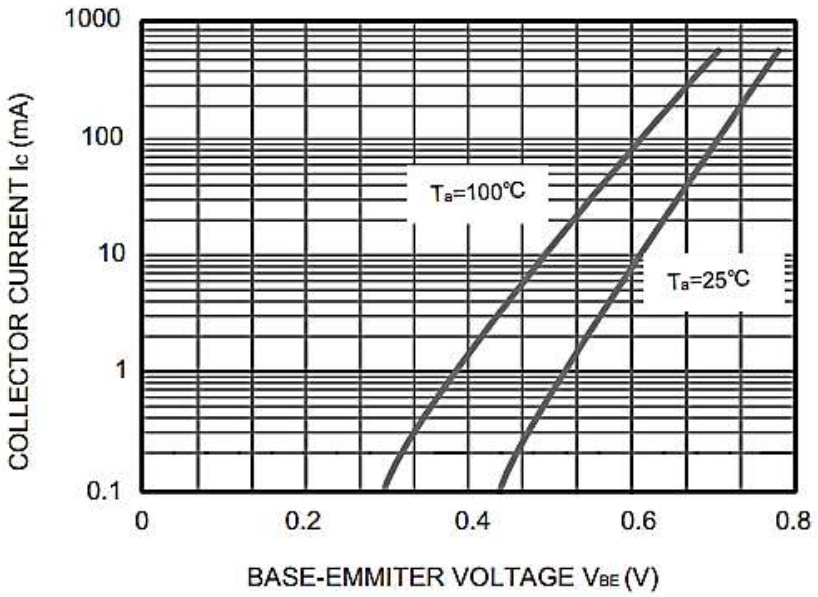
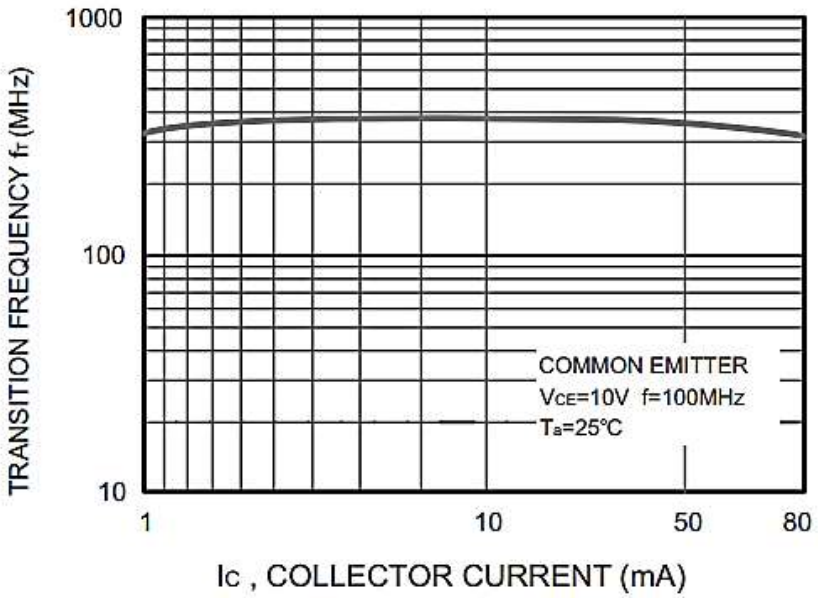


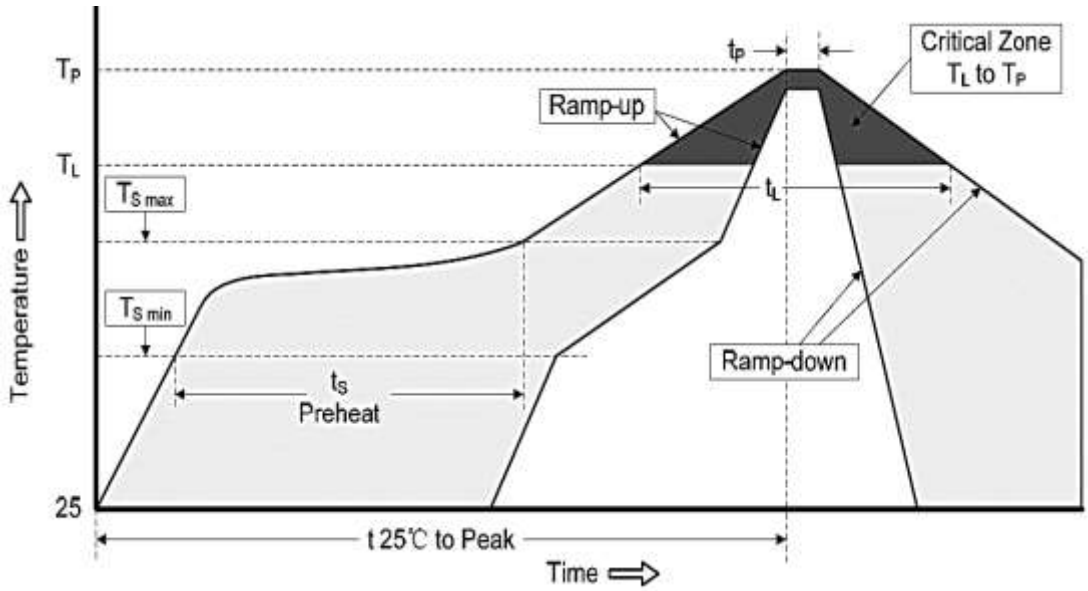
Fig.8 f_T——I_C



RELIABILITY

Number	Experiment Items	Experiment Method And Conditions	Reference Documents
1	Solder Resistance Test	Test 260°C± 5°C for 10 ± 2 sec. Immerse body into solder 1/16" ± 1/32"	MIL-STD-750D METHOD-2031.2
2	Solderability Test	230°C ±5°C for 5 sec.	MIL-STD-750D METHOD-2026.1 0
3	Pull Test	1 kg in axial lead direction for 10 sec.	MIL-STD-750D METHOD-2036.4
4	Bend Test	0.5Kg Weight Applied To Each Lead, Bending Arcs 90 °C ± 5 °C For 3 Times	MIL-STD-750D METHOD-2036.4
5	High Temperature Reverse Bias Test	T_A=100°C for 1000 Hours at V_R=80% Rated V_R	MIL-STD-750D METHOD-1038.4
6	Forward Operation Life Test	TA=25°C Rated Average Rectified Current	MIL-STD-750D METHOD-1027.3
7	Intermittent Operation Life Test	On state: 5 min with rated IRMS Power Off state: 5 min with Cool Forced Air. On and off for 1000 cycles.	MIL-STD-750D METHOD-1036.3
8	Pressure Cooker Test	15 PSIG, T_A=121°C, 4 hours	MIL-S-19500 APPENOIXC
9	Temperature Cycling Test	-55°C~+125°C; 30 Minutes For Dwelled Time 5 minutes for transferred time. Total: 10 cycles.	MIL-STD-750D METHOD-1051.7
10	Thermal Shock Test	0°C for 5 minutes., 100°C for 5minutes, Total: 10 cycles	MIL-STD-750D METHOD-1056.7
11	Forward Surge Test	8.3ms Single Sale Sine-wave One Surge.	MIL-STD-750D METHOD-4066.4
12	Humidity Test	T_A=65°C, RH=98% for 1000 hours.	MIL-STD-750D METHOD-1021.3
13	High Temperature Storage life Test	150°C for 1000 Hours	MIL-STD-750D METHOD-1031.5

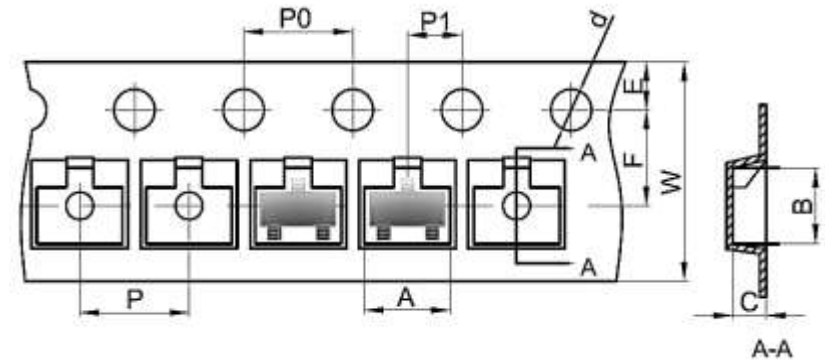
SUGGESTED REFLOW PROFILE - For Reference Only

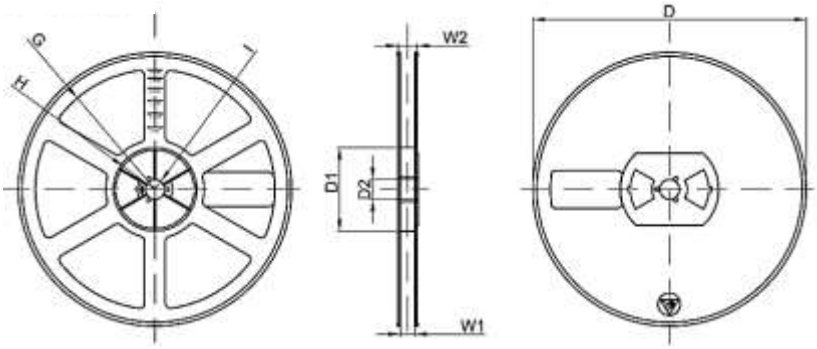


PROFILE FEATURE		PB-FREE ASSEMBLY
Average Ramp-up Rate (Ts Max to Tp)		3℃/second Max
Preheat	Temperature Min (Ts Min.)	150℃
	Temperature Max (Ts Max.)	200℃
	Time (ts Min. to ts Max.)	60～180 seconds
Time maintained above	Temperature (T_L)	217℃
	Time (t_L)	60～150 seconds
Peak/Classification Temperature (Tp)		260 ℃
Time within 5℃ of actual Peak Temperature (tp)		20～40 seconds
Ramp-down rate		6 ℃ /Second Max.
Time 25 ℃ to Peak Temperature		8 minutes Max.
Suggest reflow times		3 Times Max.

TAPE/REEL - Unit: mm

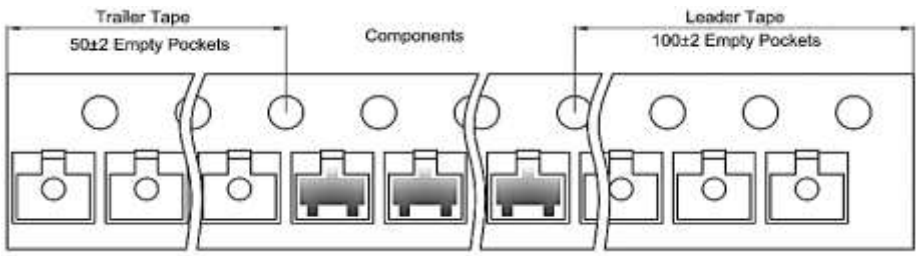
All Devices are packed in accordance with EIA standard RS-481-A and specifications. SOT-23 parts are shipped in tape. The carrier tape is made from a dissipative (carbon filled) polycarbonate resin. The cover tape is a multilayer film (Heat Activated Adhesive in nature) primarily composed of polyester film, adhesive layer, sealant, and anti-static sprayed agent. These reeled parts In standard option are shipped with 3,000 units per 7" or 17.8cm diameter reel. The reels are clear in color and is made of polystyrene plastic (anti-static coated).





Symbol	Dimension (mm)
A	3.15±0.1
B	2.77±0.1
C	1.22±0.1
d	ϕ1.50±0.1
E	1.75±0.1
F	3.50±0.1
P0	4.00±0.1
P	4.00±0.1
P1	2.00±0.1
W	8.00±0.1
D	ϕ178±2
D1	54.4±1
D2	13.0±1
G	R78±1
H	R25.6±1
I	R6.5±1
W1	9.5±1
W2	12.3±1

TAPE LEADER AND TRAILER



IMPORTANT NOTES AND DISCLAIMER

1. ROHS COMPLIANCE: The levels of RoHS restricted materials in this product are below the maximum concentration values (also referred to as the threshold limits) permitted for such substances, or are used in an exempted application, in accordance with EU RoHS Directive (EU) 2015/863 EC (RoHS3). RoHS Test Report for this product can be obtained can be obtained at Download Center.
2. REACH COMPLIANCE: REACH substances of high concern (SVHCs) information is available for this product. Since the European Chemical Agency (ECHA) has published notice of their intent to frequently revise the SVHC listing for the foreseeable future, REACH Test Report for this product can be obtained can be obtained at Download Center.
3. All Product parametric performance is indicated in the Electrical Characteristics for the listed herein test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.
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