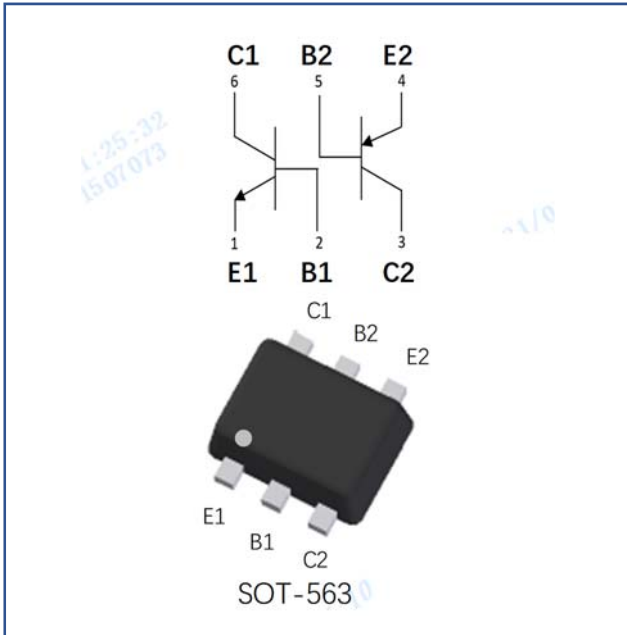


Dual NPN+PNP Small Signal Transistor



Features

- Moisture sensitivity level 1
- Halogen free and RoHS compliant
- Surface mount package ideally suited for automatic Insertion

Application

- Signal amplification
- Switching circuit

Mechanical data

- **Package:** SOT-563
- **Terminals:** Tin plated leads, solderable per J-STD-002 and JESD22-B102

■ Maximum Ratings ($T_a=25^\circ\text{C}$ Unless otherwise specified)

TR1-NPN

Item	Symbol	Unit	Conditions	Value
Device marking code				Z1
Collector-base voltage	V_{CBO}	V	$I_C=50\mu\text{A}, I_E=0$	60
Collector-emitter voltage	V_{CEO}	V	$I_C=1\text{mA}, I_B=0$	50
Emitter-base voltage	V_{EBO}	V	$I_E=50\mu\text{A}, I_C=0$	7
Collector current	I_C	mA		150
Power dissipation	P_D	mW		150
Junction temperature	T_J	$^\circ\text{C}$		-55 to +150
Storage temperature	T_{STG}	$^\circ\text{C}$		-55 to +150



TR2-PNP

Item	Symbol	Unit	Conditions	Value
Collector-base voltage	V_{CBO}	V	$I_C=-50\mu A, I_E=0$	-60
Collector-emitter voltage	V_{CEO}	V	$I_C=-1mA, I_B=0$	-50
Emitter-base voltage	V_{EBO}	V	$I_E=-50\mu A, I_C=0$	-6
Collector current	I_C	mA		-150
Power dissipation	P_D	mW		150
Junction temperature	T_J	°C		-55 to +150
Storage temperature	T_{STG}	°C		-55 to +150

■ **Electrical Characteristics** ($T_a=25^\circ C$ Unless otherwise specified)

TR1-NPN

Item	Symbol	Unit	Conditions	Min	Typ	Max
Collector-base breakdown voltage	$V_{(BR)CBO}$	V	$I_C=50\mu A, I_E=0$	60		
Collector-emitter breakdown voltage	$V_{(BR)CEO}$	V	$I_C=1mA, I_B=0$	50		
Emitter-base breakdown voltage	$V_{(BR)EBO}$	V	$I_E=50\mu A, I_C=0$	7		
Collector cut-off current	I_{CBO}	nA	$V_{CB}=60V, I_B=0$			100
Emitter-base cutoff current	I_{EBO}	nA	$V_{EB}=7V, I_C=0$			100
DC current gain	h_{FE}		$V_{CE}=6V, I_C=1mA$	120		560
Collector-emitter saturation voltage	$V_{CE(sat)}$	V	$I_C=50mA, I_B=5mA$			0.4
Transition frequency	f_T	MHz	$V_{CE}=12V, I_C=-2mA, f=100MHz$		180	
Output capacitance	C_{ob}	pF	$V_{CB}=12V, I_E=0A, f=1MHz$		2	3.5



TR2-PNP

Item	Symbol	Unit	Conditions	Min	Typ	Max
Collector-base breakdown voltage	$V_{(BR)CBO}$	V	$I_C=-50\mu A, I_E=0$	-60		
Collector-emitter breakdown voltage	$V_{(BR)CEO}$	V	$I_C=-1mA, I_B=0$	-50		
Emitter-base breakdown voltage	$V_{(BR)EBO}$	V	$I_E=-50\mu A, I_C=0$	-6		
Collector-base cut-off current	I_{CBO}	nA	$V_{CB}=-60V, I_E=0$			-100
Emitter-base cut-off current	I_{EBO}	nA	$V_{EB}=-6V, I_C=0$			-100
Dc current gain	h_{FE}		$V_{CE}=-6V, I_C=-1mA$	120		560
Collector-emitter saturation voltage	$V_{CE(sat)}$	V	$I_C=-50mA, I_B=-5mA$			-0.5
Transition frequency	f_T	MHz	$V_{CE}=-12V, I_E=2mA, f=100MHz$		140	
Output capacitance	C_{ob}	pF	$V_{CB}=-12V, I_E=0A, f=1MHz$			5

■ Thermal Characteristics

Parameter	Symbol	Unit	Value
Thermal resistance, junction-to-ambient	$R_{\theta J-A}^{(1)}$	$^{\circ}C/W$	833
Thermal resistance, junction-to-case	$R_{\theta J-C}^{(1)}$	$^{\circ}C/W$	667

Note:

(1) Thermal resistance from junction to ambient and from junction to lead mounted on P.C.B. with 25.4mm*25.4mm copper pad areas



■ Characteristics

TR1-NPN

Fig 1: Static Characteristics

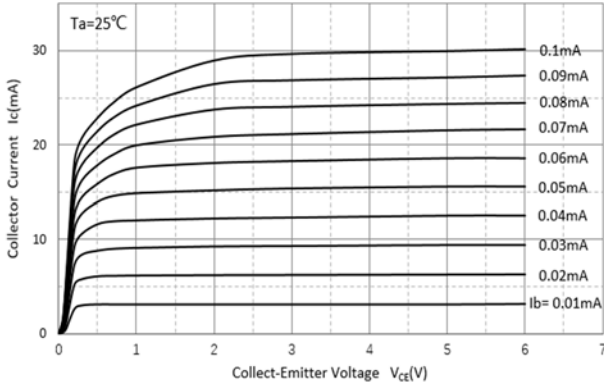


Fig 2: DC Current Gain Characteristics

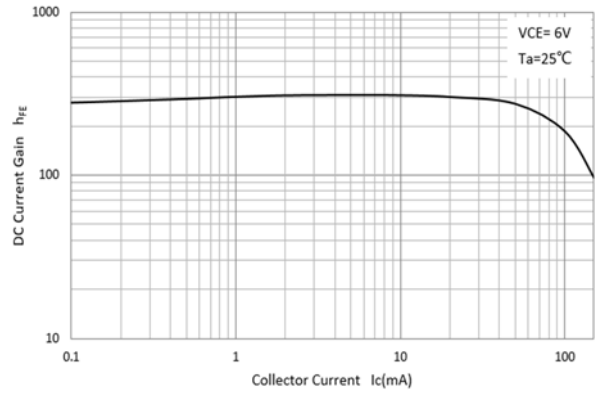


Fig 3: Collector-Emittor Saturation Voltage

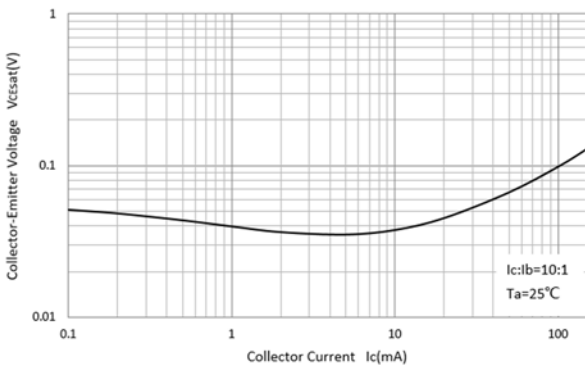


Fig 4: Base-Emittor Saturation Voltage

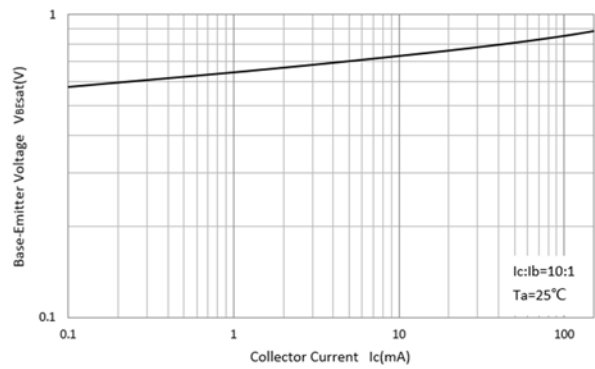


Fig 5: Base-Emittor On Voltage

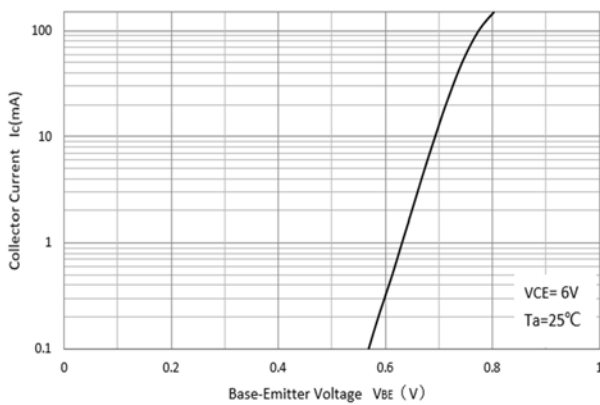


Fig 6: Cob/Cib-Vcb/Veb

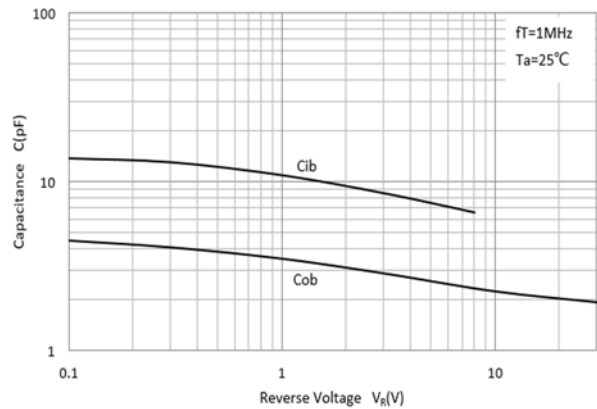
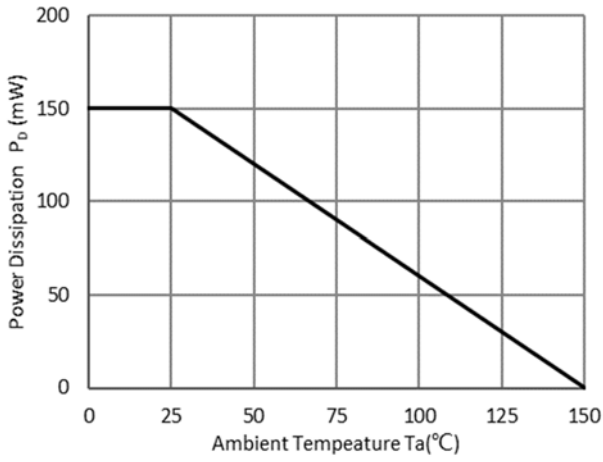




Fig 7: P_D - T_a Curve



TR2-PNP

Fig 1: Static Characteristics

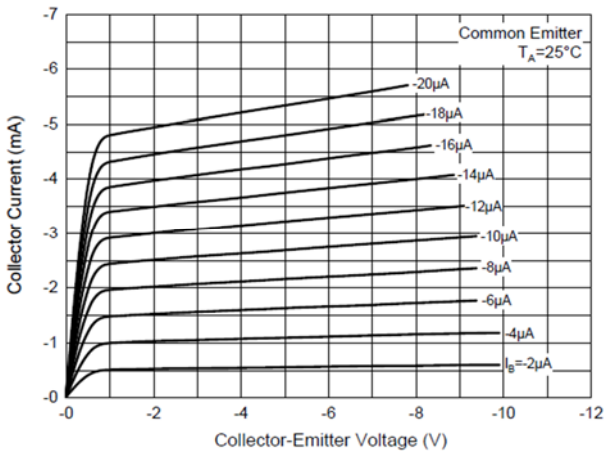


Fig 2: DC Current Gain Characteristics

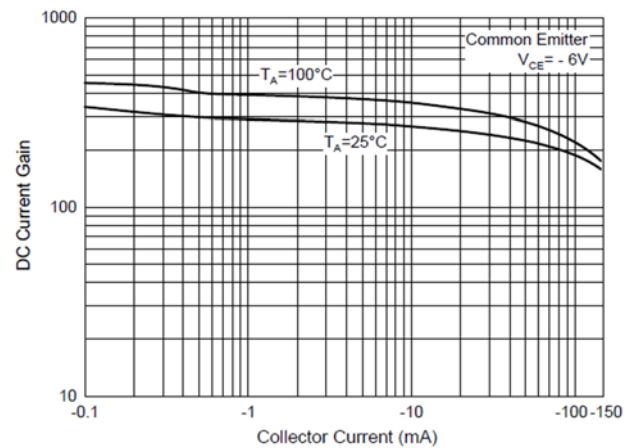


Fig 3: Collector-Emitter Saturation Voltage

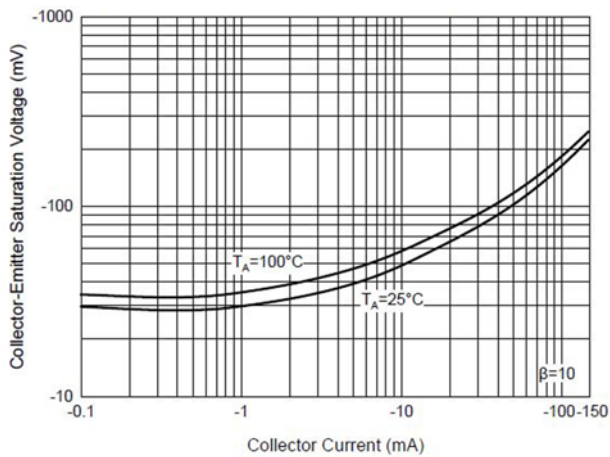


Fig 4: Base-Emitter Saturation Voltage

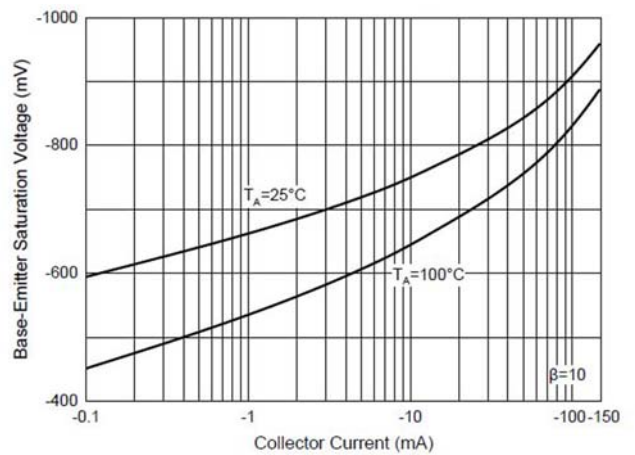




Fig 5: Base-Emitter Voltage

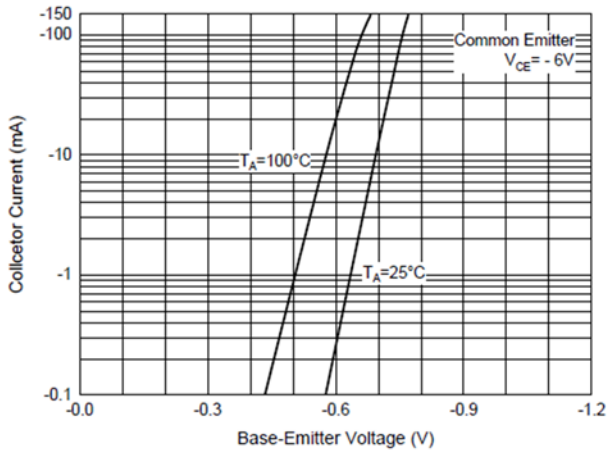
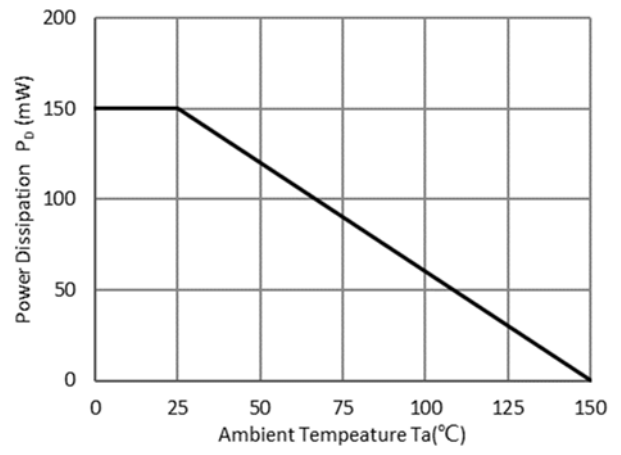


Fig 6: P_D - T_a Curve



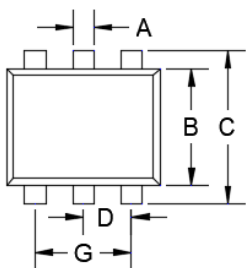


Ordering Information

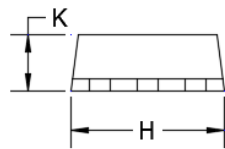
Preferred P/N	Packing code	Unit weight(g)	Minimum package(pcs)	Inner box quantity(pcs)	Outer carton quantity(pcs)	Delivery mode
EMZ1	F2	Approximate 0.0035	3000	30000	120000	7" reel

Outline Dimensions

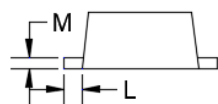
SOT-563



TOP VIEW



SIDE VIEW

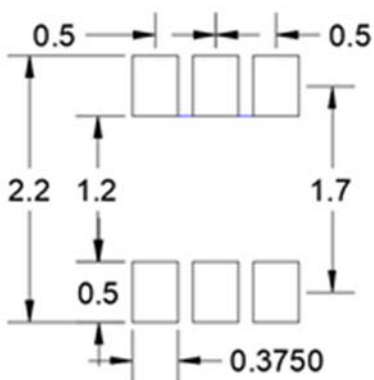


SIDE VIEW

DIMENSIONS

DIM	INCHES		MM	
	MIN	MAX	MIN	MAX
A	0.006	0.011	0.150	0.300
B	0.043	0.051	1.100	1.300
C	0.059	0.067	1.500	1.700
D	0.016	0.024	0.400	0.600
G	0.035	0.043	0.900	1.100
H	0.059	0.067	1.500	1.700
K	0.021	0.026	0.550	0.650
L	0.004	0.011	0.100	0.300
M	0.004	0.007	0.100	0.180

Suggested Pad Layout



UNIT:mm



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