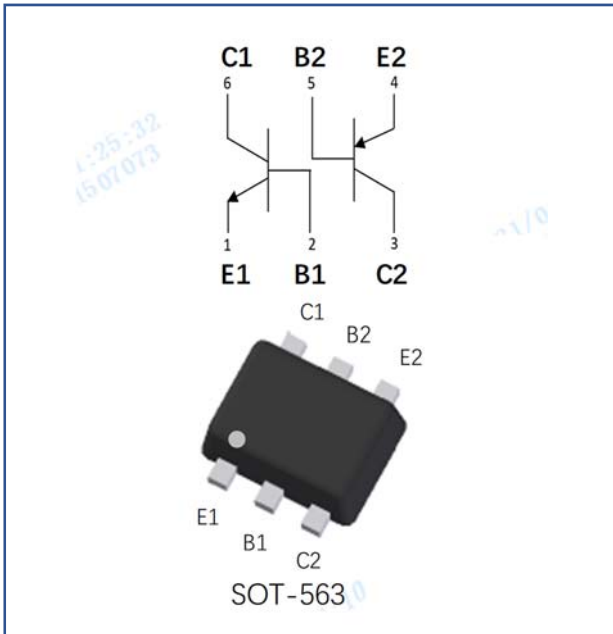


## Dual NPN+PNP Small Signal Transistor



### 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				Z7
Collector-base voltage	$V_{CBO}$	V	$I_C=100\mu\text{A}, I_E=0$	15
Collector-emitter voltage	$V_{CEO}$	V	$I_C=1\text{mA}, I_B=0$	12
Emitter-base voltage	$V_{EBO}$	V	$I_E=100\mu\text{A}, I_C=0$	6
Collector current	$I_C$	mA		500
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	$I_C=-100\mu A, I_E=0$	-15
Collector-emitter voltage	$V_{CEO}$	V	$I_C=1mA, I_B=0$	-12
Emitter-Base voltage	$V_{EBO}$	V	$I_E=-100\mu A, I_C=0$	-6
Collector current	$I_C$	mA		-500
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	$I_C=100\mu A, I_E=0$	15		
Collector-emitter breakdown voltage	$V_{(BR)CEO}$	V	$I_C=1mA, I_B=0$	12		
Emitter-base breakdown voltage	$V_{(BR)EBO}$	V	$I_E=100\mu A, I_C=0$	6		
Collector-base cut-off current	$I_{CBO}$	nA	$V_{CB}=15V, I_E=0$			100
Emitter-base cut-off current	$I_{EBO}$	nA	$V_{EB}=5V, I_C=0$			100
DC current gain	$h_{FE}$		$V_{CE}=2V, I_C=10mA$	200		
Collector-emitter saturation voltage	$V_{CE(sat)}$	V	$I_C=200mA, I_B=10mA$			0.22
Base-emitter saturation voltage	$V_{BE(sat)}$	V	$I_C=200mA, I_B=10mA$			1
Output capacitance	$C_{ob}$	pF	$V_{CB}=10V, I_E=0, f=1MHz$			6

**TR2-PNP**

Item	Symbol	Unit	Conditions	Min	Typ	Max
Collector-base breakdown voltage	$V_{(BR)CBO}$	V	$I_C=-100\mu A, I_E=0$	-15		
Collector-emitter breakdown voltage	$V_{(BR)CEO}$	V	$I_C=-1mA, I_B=0$	-12		
Emitter-base breakdown voltage	$V_{(BR)EBO}$	V	$I_E=-100\mu A, I_C=0$	-6		
Collector-Base cut-off current	$I_{CBO}$	nA	$V_{CB}=-15V, I_E=0$			-100
Emitter-Base Cut-off current	$I_{EBO}$	nA	$V_{EB}=-5V, I_C=0$			-100
DC current gain	$h_{FE}$		$V_{CE}=-2V, I_C=-10mA$	200		
Collector-emitter saturation voltage	$V_{CE(sat)}$	V	$I_C=-200mA, I_B=-10mA$			-0.22
Base-emitter saturation voltage	$V_{BE(sat)}$	V	$I_C=-200mA, I_B=-10mA$			-1
Output Capacitance	$C_{ob}$	pF	$V_{CB}=-10V, I_E=0, f=1MHz$			10

**■ Thermal Characteristics**

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

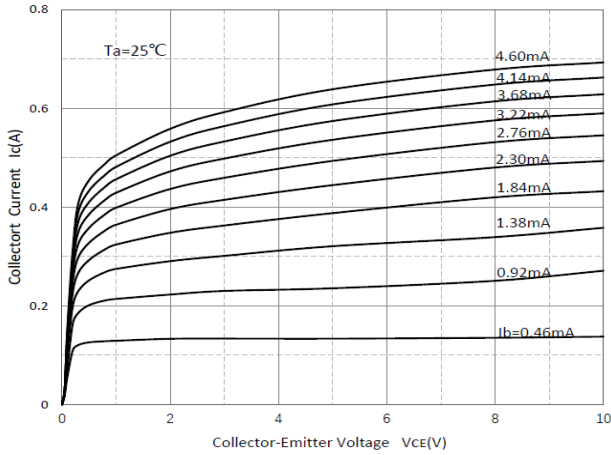


Fig 2: DC Current Gain Characteristics

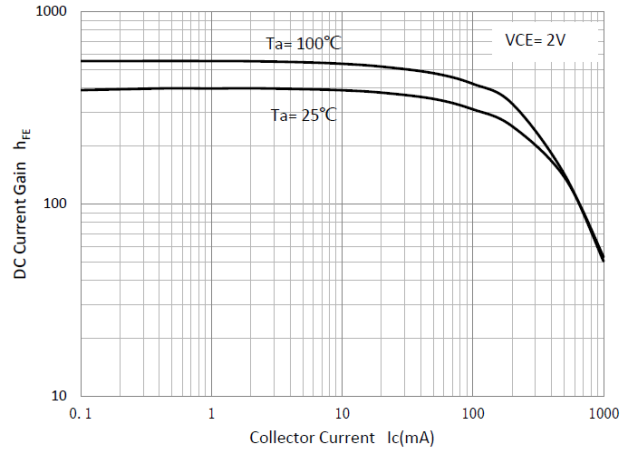


Fig 3: Collector-Emitter Saturation Voltage

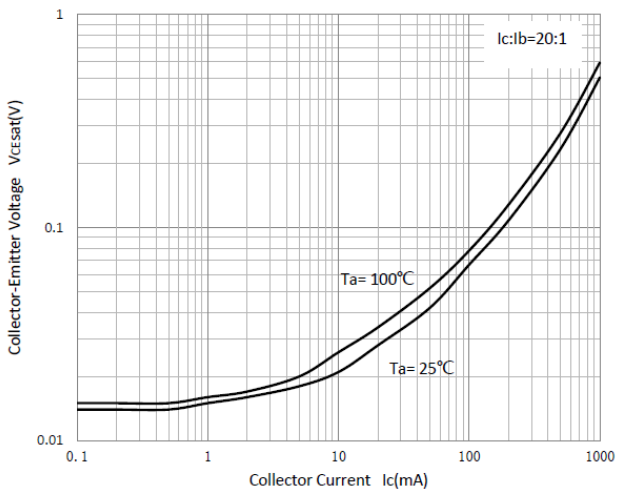


Fig 4: Base-Emitter Saturation Voltage

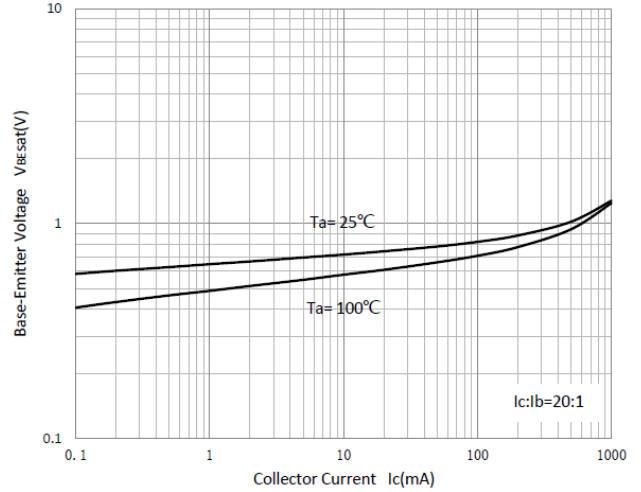


Fig 5: Base-Emitter On Voltage

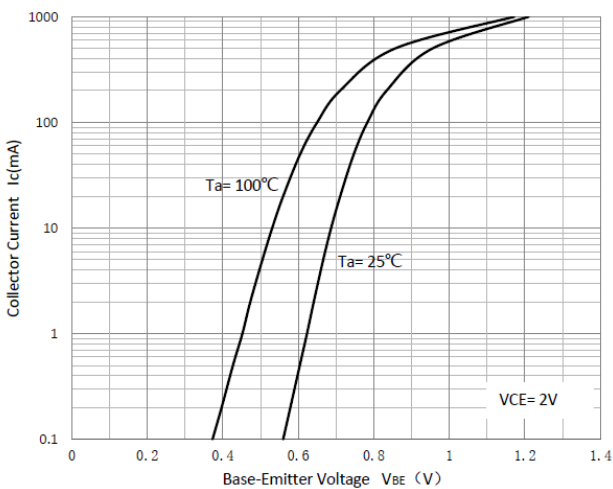


Fig 6: Cob/Cib-VCB/VEB

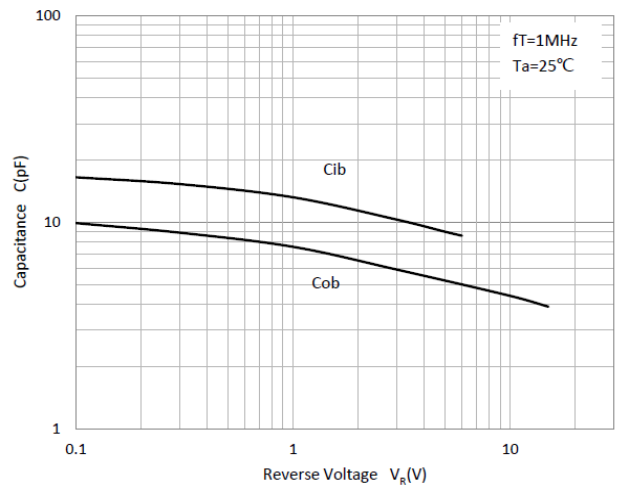
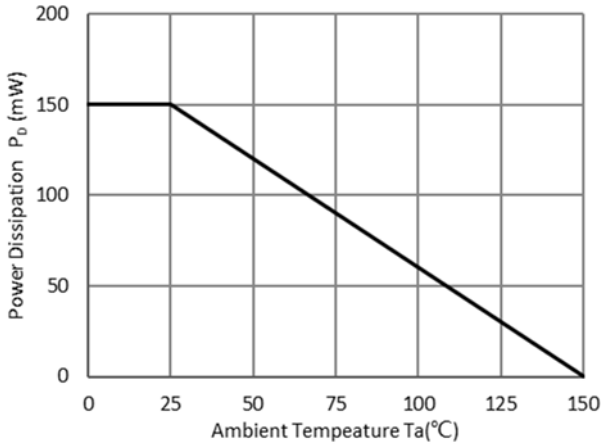






Fig 7: P<sub>D</sub>-T<sub>a</sub> Curve



TR2-PNP

Fig 1: Static Characteristics

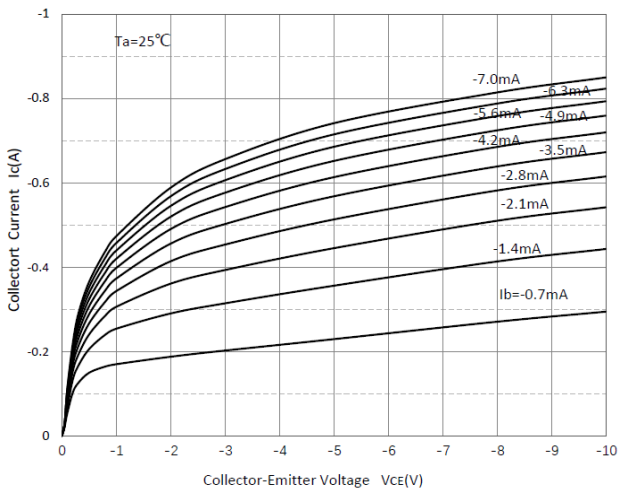


Fig 2: DC Current Gain Characteristics

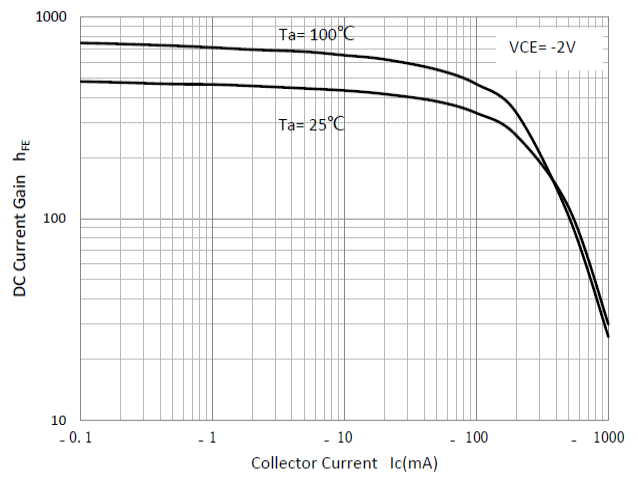


Fig 3: Collector-Emitter Saturation Voltage

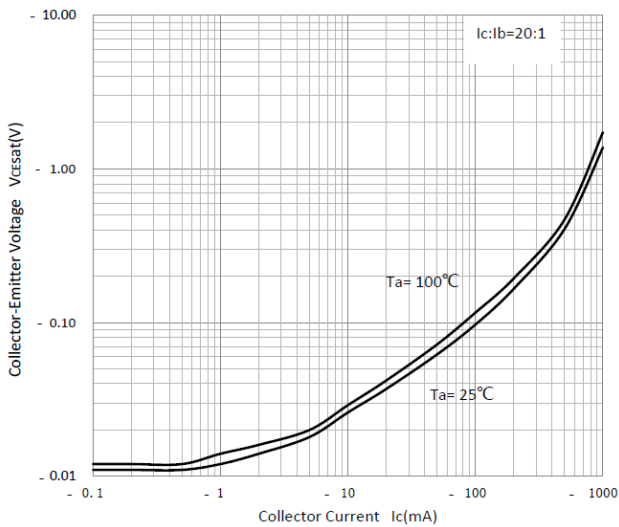


Fig 4: Base-Emitter Saturation Voltage

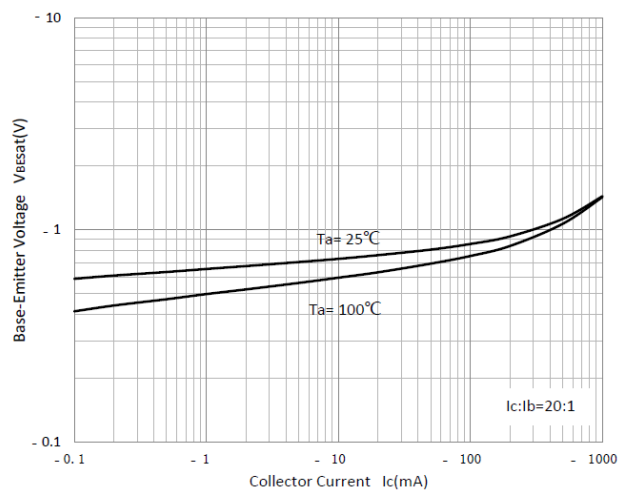




Fig 5: Base-Emitter On Voltage

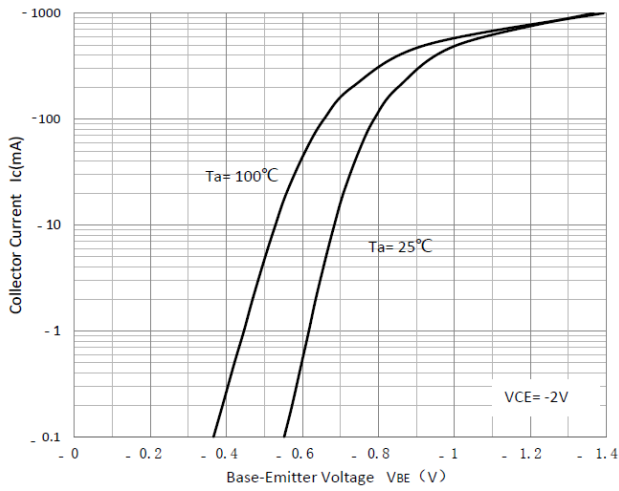


Fig 6: Cob/Cib-V<sub>CB</sub>/V<sub>EB</sub>

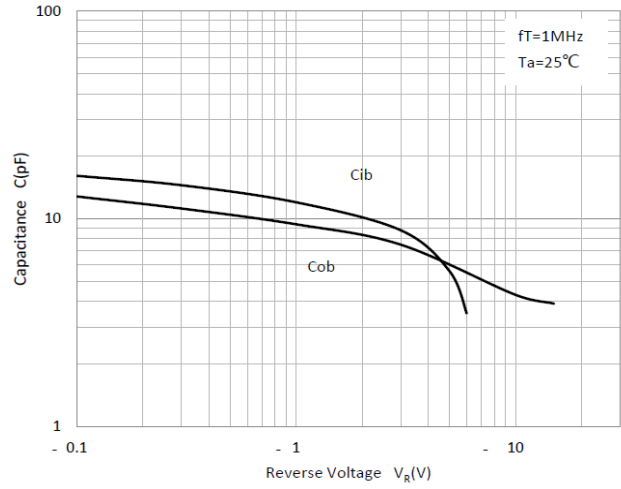
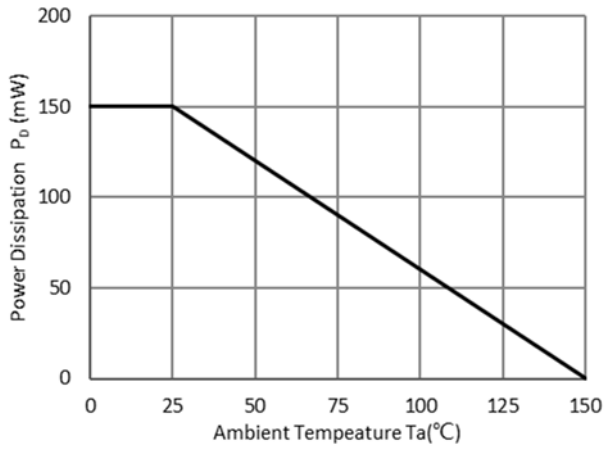


Fig 7: P<sub>D</sub>-Ta Curve

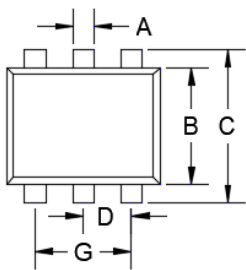


## Ordering Information

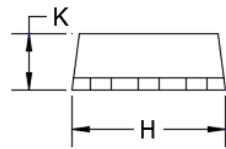
Preferred P/N	Packing code	Unit weight(g)	Minimum package(pcs)	Inner box quantity(pcs)	Outer carton quantity(pcs)	Delivery mode
EMZ7	F2	Approximate 0.0035	3000	30000	120000	7" reel

## Outline Dimensions

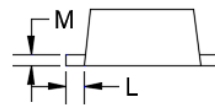
SOT-563



TOP VIEW



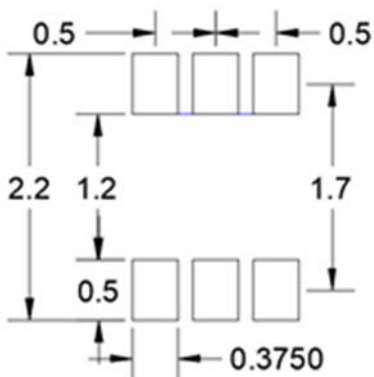
SIDE VIEW



SIDE VIEW

DIM	DIMENSIONS			
	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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