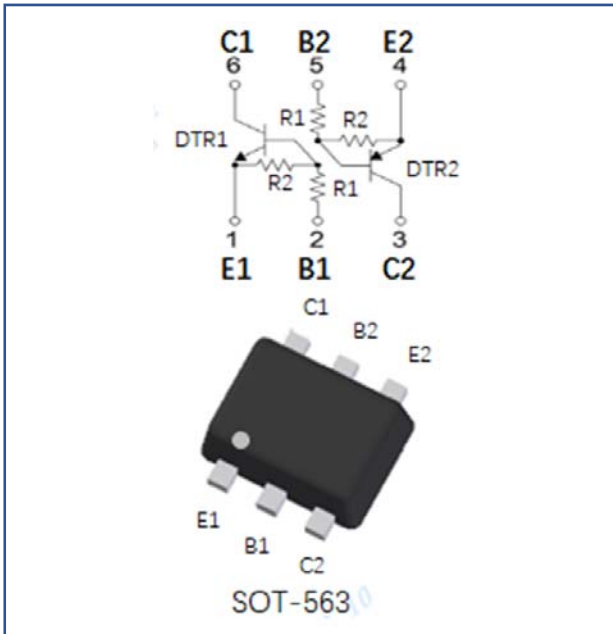


## NPN+PNP Digital Transistors (Built-in Resistors)



### 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)

#### DTR1-NPN

Item	Symbol	Unit	Conditions	Value
Device marking code				D3
Supply voltage	$V_{CC}$	V		50
Input voltage	$V_{IN}$	V		-10 to +40
Output current	$I_o$	mA		100
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

**DTR2-PNP**

Item	Symbol	Unit	Conditions	Value
Supply voltage	$V_{CC}$	V		-50
Input voltage	$V_{IN}$	V		-40 to +10
Output current	$I_o$	mA		-100
Power dissipation	$P_D$	mW		150
Junction temperature	$T_J$	°C		-55 to +150
Storage temperature	$T_{STG}$	°C		-55 to +150

**■ Electrical Characteristics** ( $T_a=25^\circ\text{C}$  Unless otherwise specified)**DTR1-NPN**

Item	Symbol	Unit	Conditions	Min	Typ	Max
Input voltage	$V_{I(off)}$	V	$V_{CC}=5V, I_c=100\mu A$	0.5		
	$V_{I(on)}$	V	$V_o=0.3V, I_c=10mA$			3
Output voltage	$V_{O(on)}$	V	$I_o / I_i = 10mA / 0.5 mA$			0.3
Input current	$I_i$	mA	$V_i=5V$			0.88
Output current	$I_{O(off)}$	uA	$V_{CC}=50V, V_i=0$			0.5
DC current gain	$G_1$		$V_o=5V, I_o=5mA$	30		
Input resistance	$R_1$	k $\Omega$		7	10	13
Resistance ratio	$R_2/R_1$			0.8	1	1.2
Transition frequency	$f_T$	MHz	$V_{CE}=10V, I_E=5mA, f=100MHz$		250	

**DTR2-PNP**

Item	Symbol	Unit	Conditions	Min	Typ	Max
Input voltage	$V_{I(off)}$	V	$V_{CC}=-5V, I_c=-100\mu A$	-0.5		
	$V_{I(on)}$	V	$V_O=-0.3V, I_c=-10mA$			-3
Output voltage	$V_{O(on)}$	V	$I_o / I_i = -10mA / -0.5 mA$			-0.3
Input current	$I_i$	mA	$V_i=-5V$			-0.88
Output current	$I_{O(off)}$	$\mu A$	$V_{CC}=-50V, V_i=0$			-0.5
DC current gain	$G_1$		$V_O=-5V, I_o = -5mA$	30		
Input resistance	$R_1$	k $\Omega$		7	10	13
Resistance ratio	$R_2/R_1$			0.8	1	1.2
Transition frequency	$f_T$	MHz	$V_{CE}=-10V, I_E=-5mA, f=100MHz$		250	

**■ 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

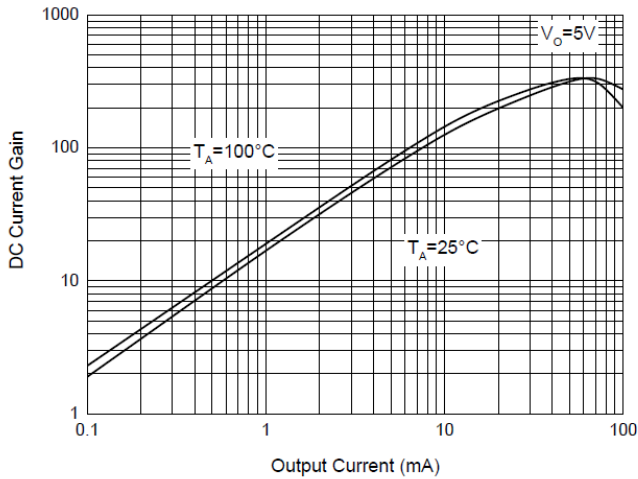
**Note:**

(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

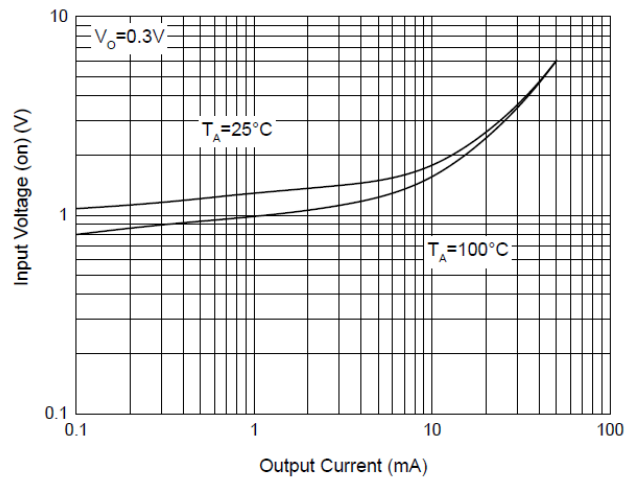
## ■ Characteristics

### DTR1-NPN

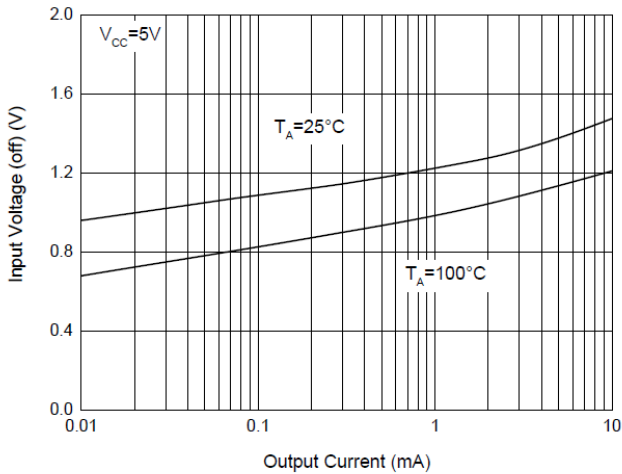
**Fig 1: DC Current Gain Characteristics**



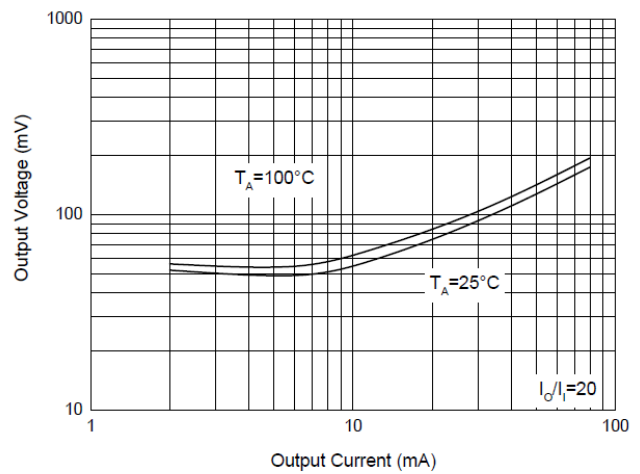
**Fig 2: Input Voltage (On) Characteristics**



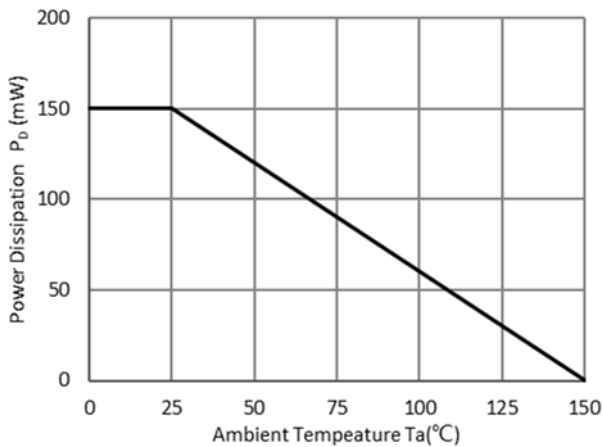
**Fig 3: Input Voltage (Off) Characteristics**



**Fig 4: Output Voltage Characteristics**



**Fig 5:  $P_D$ - $T_a$  Curve**





DTR2-PNP

Fig 1: DC Current Gain Characteristics

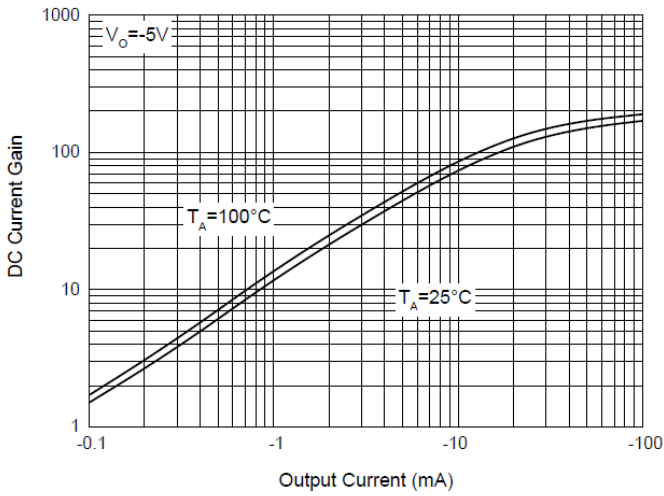


Fig 2: Input Voltage (On) Characteristics

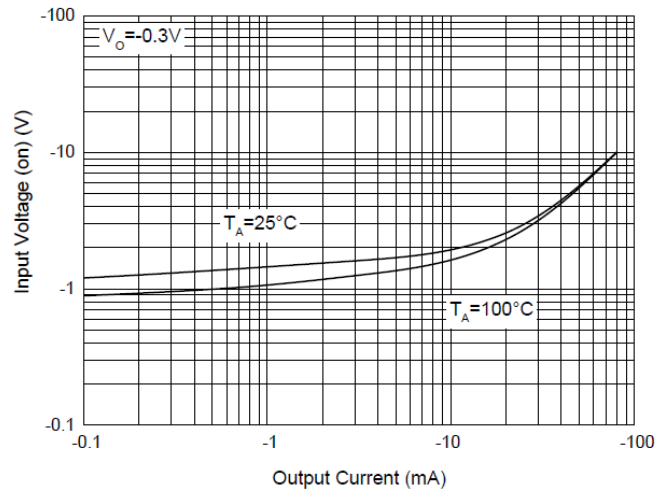


Fig 3: Input Voltage (Off) Characteristics

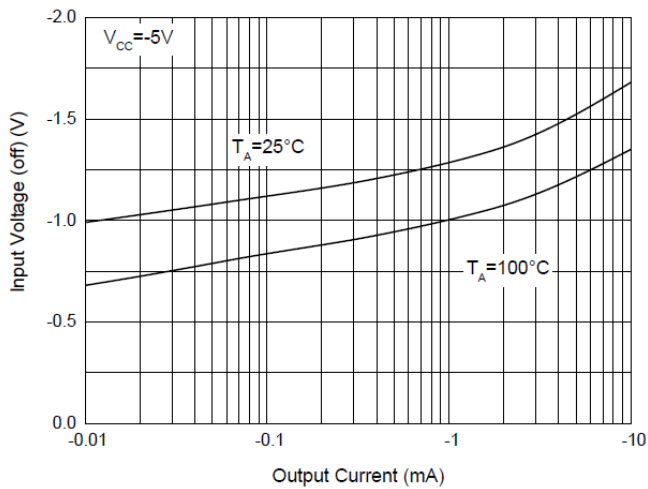


Fig 4: Output Voltage Characteristics

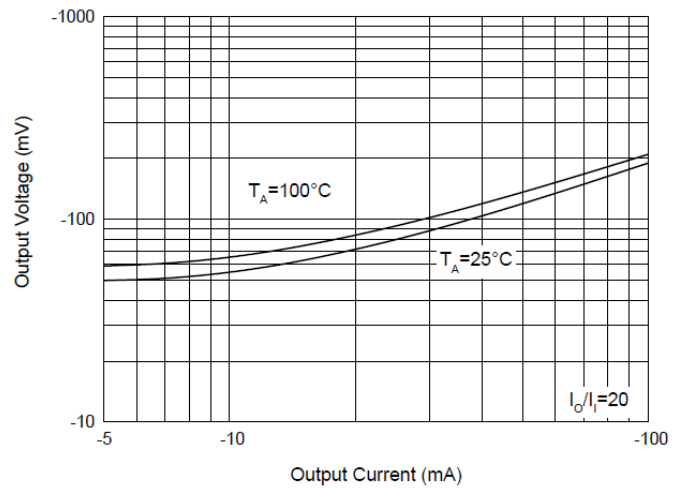
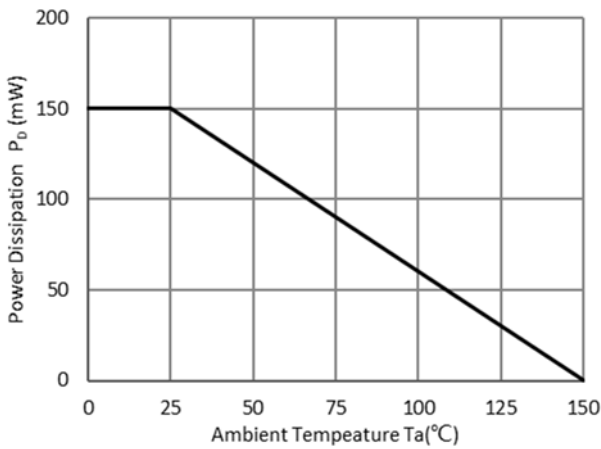


Fig 5: P<sub>D</sub>-T<sub>a</sub> Curve

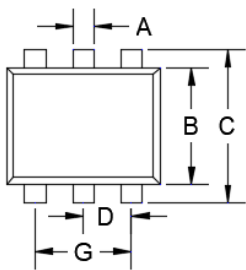


## Ordering Information

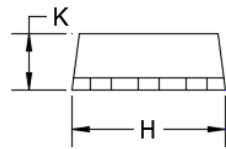
Preferred P/N	Packing code	Unit weight(g)	Minimum package(pcs)	Inner box quantity(pcs)	Outer carton quantity(pcs)	Delivery mode
EMD3	F2	Approximate 0.0035	3000	30000	120000	7" reel

## Outline Dimensions

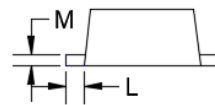
SOT-563



TOP VIEW



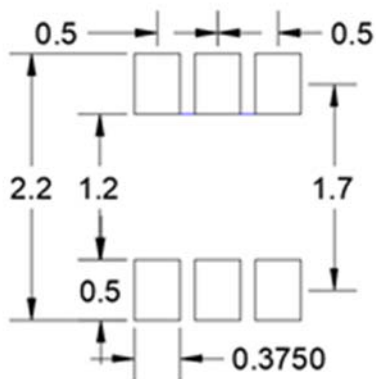
SIDE VIEW



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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