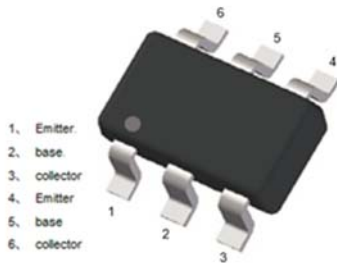
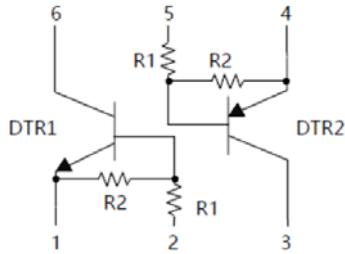


## Dual NPN+PNP Digital Transistors (Built-in Resistors)



### 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-363S
- **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				D2
Collector-base voltage	$V_{CC}$	V		50
Collector-emitter voltage	$V_{IN}$	V		-10 to +40
Collector current	$I_O$	mA		100
Power dissipation	$P_D$	mW		150
Operation junction temperature	$T_J$	$^\circ\text{C}$		-55 to +150
Storage temperature	$T_{STG}$	$^\circ\text{C}$		-55 to +150



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## DTR2-PNP

Item	Symbol	Unit	Conditions	Value
Collector-base voltage	$V_{CC}$	V		-50
Collector-emitter voltage	$V_{IN}$	V		-40 to +10
Collector current	$I_o$	mA		-100
Power dissipation	$P_D$	mW		150
Operation 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	$V_{I(\text{off})}$	V	$V_{CC}=5\text{V}, I_c=100\mu\text{A}$	0.5		
	$V_{I(\text{on})}$	V	$V_o=0.2\text{V}, I_c=5\text{mA}$			3
Output voltage	$V_{O(\text{on})}$	V	$I_o / I_i = 10\text{mA}/0.5\text{mA}$			0.3
Input current	$I_i$	mA	$V_i=5\text{V}$			0.36
Output current	$I_{O(\text{off})}$	$\mu\text{A}$	$V_{CC}=50\text{V}, V_i=0$			0.5
DC current gain	$G_1$		$V_o=5\text{V}, I_o = 5\text{mA}$	56		
Input resistance	$R_1$	$\text{k}\Omega$		15.4	22	28.6
Resistance ratio	$R_2/R_1$			0.8	1	1.2
Transition frequency	$f_T$	MHz	$V_o=10\text{V}, I_o=5\text{mA}, f=100\text{MHz}$		250	

## DTR2-PNP

Item	Symbol	Unit	Conditions	Min	Typ	Max
Input voltage	$V_{I(\text{off})}$	V	$V_{CC}=-5\text{V}, I_c=-100\mu\text{A}$	-0.5		
	$V_{I(\text{on})}$	V	$V_o=-0.2\text{V}, I_c=-5\text{mA}$			-3
Output voltage	$V_{O(\text{on})}$	V	$I_o / I_i = -10\text{mA}/-0.5\text{mA}$			-0.3
Input current	$I_i$	mA	$V_i=-5\text{V}$			-0.36
Output current	$I_{O(\text{off})}$	$\mu\text{A}$	$V_{CC}=-50\text{V}, V_i=0$			-0.5
DC current gain	$G_1$		$V_o=-5\text{V}, I_o = -5\text{mA}$	56		
Input resistance	$R_1$	$\text{k}\Omega$		15.4	22	28.6
Resistance ratio	$R_2/R_1$			0.8	1	1.2
Transition frequency	$f_T$	MHz	$V_o=-10\text{V}, I_o=-5\text{mA}, f=100\text{MHz}$		250	

## ■ Thermal Characteristics

Parameter	Symbol	Unit	Value
Thermal resistance, junction-to-ambient	$R_{\theta J-A}^{(1)}$	$^{\circ}\text{C}/\text{W}$	834
Thermal resistance, junction-to-case	$R_{\theta J-C}^{(1)}$	$^{\circ}\text{C}/\text{W}$	667

## Note:

(1) Device mounted on PCB, single-sided copper, with standard footprint



■ Characteristics

DTR1-NPN:

Fig 1: Input Voltage (On) Characteristics

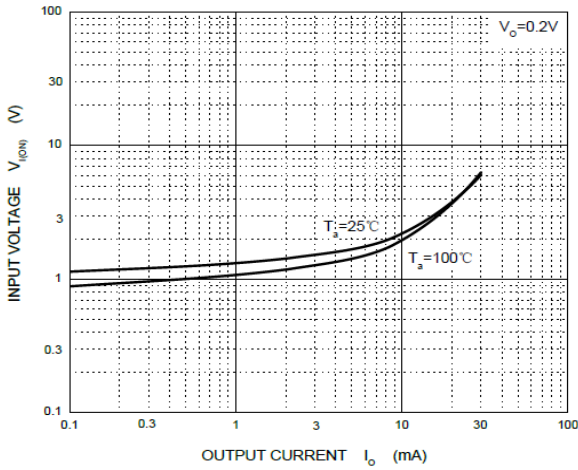


Fig 2: Input Voltage (Off) Characteristic

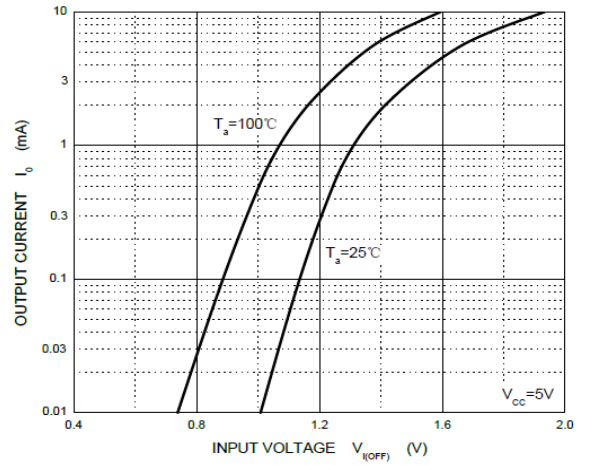


Fig 3: DC Current Gain Characteristics

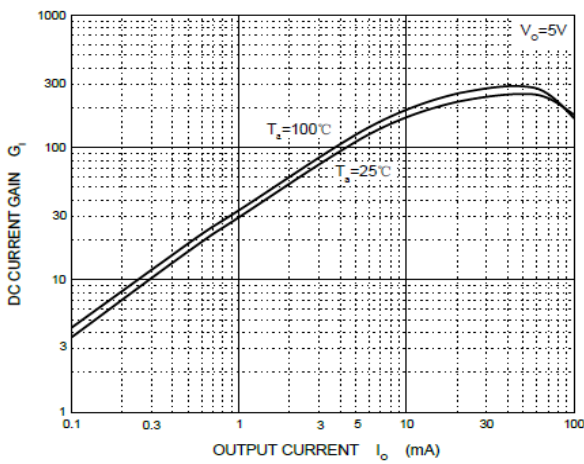


Fig 4: Output Voltage Characteristics

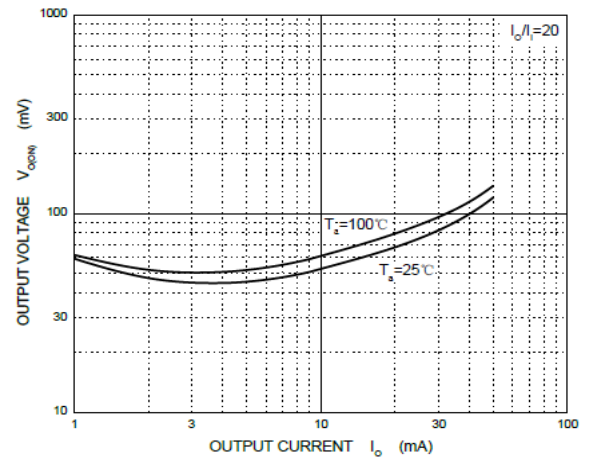
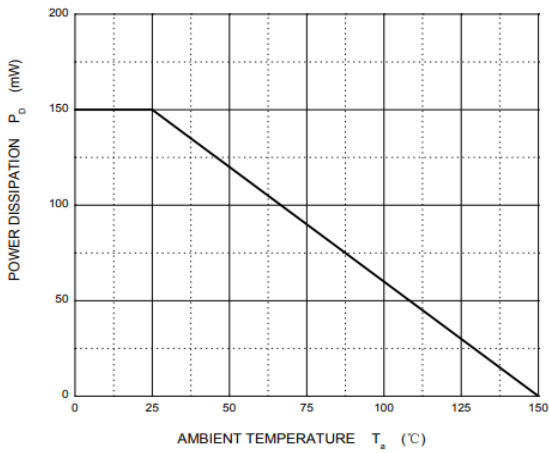


Fig 5: P\_D-Ta Curve





DTR2-PNP:

Fig 1: Input Voltage (On) Characteristics

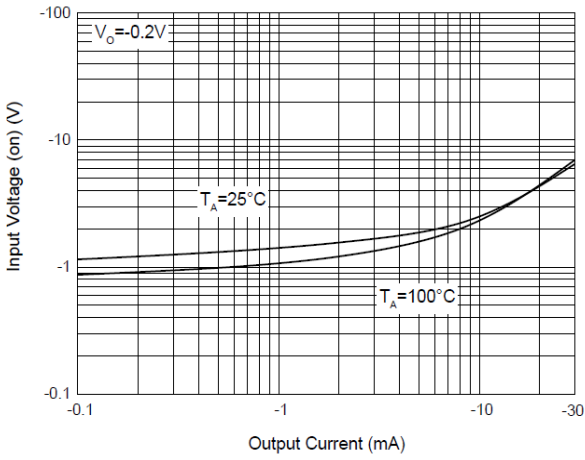


Fig 2: Input Voltage (Off) Characteristic

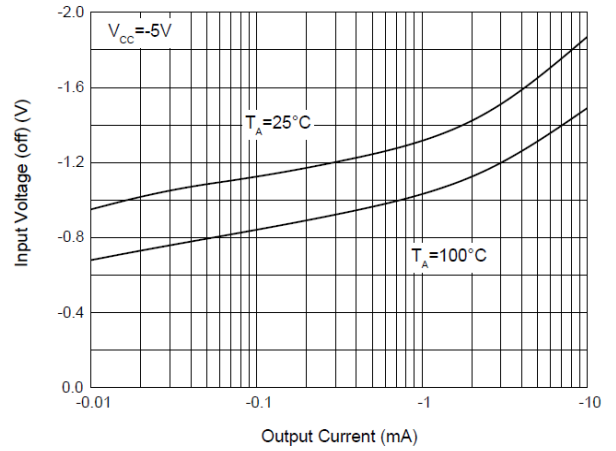


Fig 3: DC Current Gain Characteristics

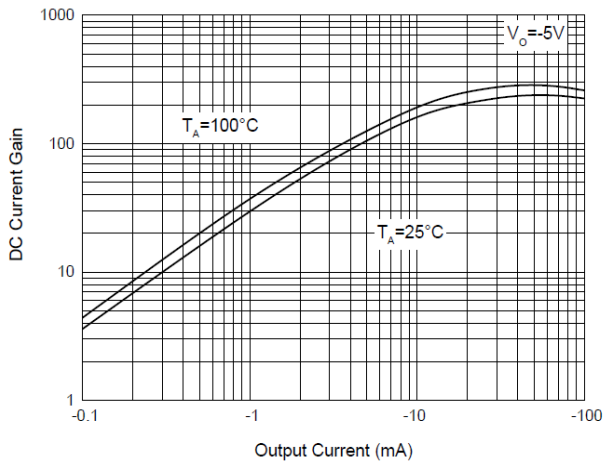
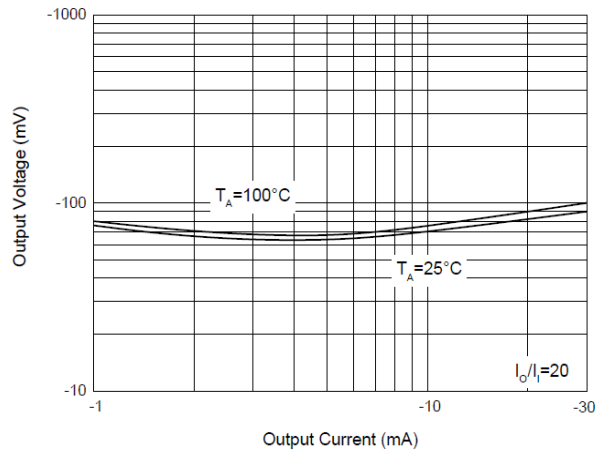


Fig 4: Output Voltage Characteristics

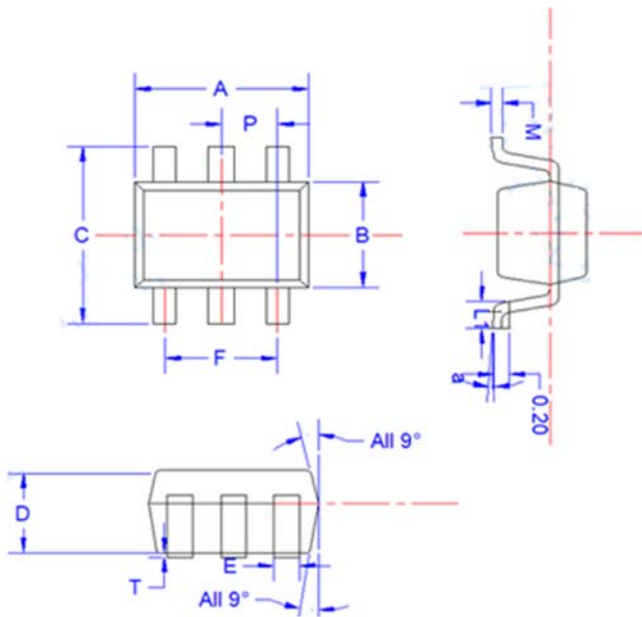




## ■ Ordering Information

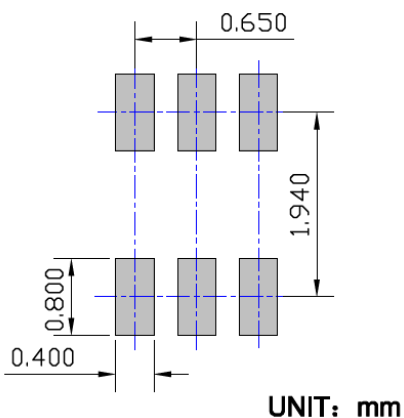
Preferred P/N	Packing code	Unit weight(g)	Minimum package(pcs)	Inner box quantity(pcs)	Outer carton quantity(pcs)	Delivery mode
UMD2NS	F2	Approximate 0.009	3000	30000	120000	7" reel
UMD2NS	F3	Approximate 0.009	10000	/	210000	7" reel

## ■ Outline Dimensions



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
E	0.15	0.25	0.35
B	1.15	1.25	1.35
C	2.00	2.10	2.20
P	0.650BSC		
A	1.80	2.00	2.20
T	0.00	0.05	0.100
D	0.90	0.95	1.00
L1	0.20	0.30	0.40
a	4°±4°		
M	0.10	0.15	0.25

## ■ Suggested Pad Layout





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