

**Features**

- Low Collector Capacitance
- Low Collector-Emitter Saturation Voltage
- Halogen Free. "Green" Device (Note 1)
- Moisture Sensitivity Level 1
- Epoxy Meets UL 94 V-0 Flammability Rating
- Lead Free Finish/RoHS Compliant ("P" Suffix Designates RoHS Compliant. See Ordering Information)

**Maximum Ratings @ 25°C Unless Otherwise Specified**

- Operating Junction Temperature Range: -55°C to +150°C
- Storage Temperature Range: -55°C to +150°C
- Thermal Resistance: 625°C/W Junction to Ambient

**NPN Pin1,2,6**

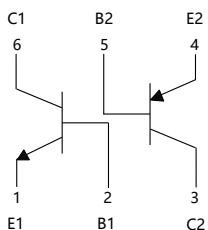
| Parameter                 | Symbol    | Rating | Unit |
|---------------------------|-----------|--------|------|
| Collector-Base Voltage    | $V_{CBO}$ | 80     | V    |
| Collector-Emitter Voltage | $V_{CEO}$ | 65     | V    |
| Emitter-Base Voltage      | $V_{EBO}$ | 6      | V    |
| Collector Current         | $I_C$     | 100    | mA   |
| Peak Collector Current    | $I_{CM}$  | 200    | mA   |
| Power Dissipation         | $P_C$     | 200    | mW   |

**PNP Pin3,4,5**

| Parameter                 | Symbol    | Rating | Unit |
|---------------------------|-----------|--------|------|
| Collector-Base Voltage    | $V_{CBO}$ | -80    | V    |
| Collector-Emitter Voltage | $V_{CEO}$ | -65    | V    |
| Emitter-Base Voltage      | $V_{EBO}$ | -6     | V    |
| Collector Current         | $I_C$     | -100   | mA   |
| Peak Collector Current    | $I_{CM}$  | -200   | mA   |
| Power Dissipation         | $P_C$     | 200    | mW   |

Note: 1. Halogen free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.

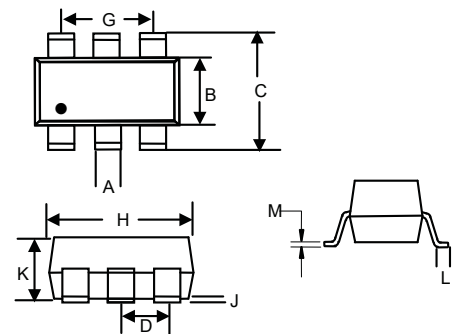
**Internal Structure**



**Marking: PJ**

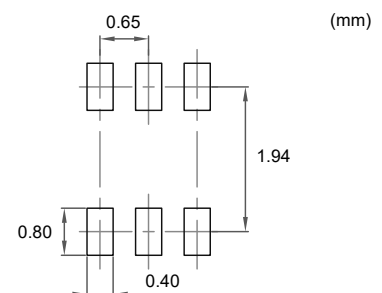
**NPN/PNP  
Small Signal  
Transistors**

**SOT-363**



| DIM | DIMENSIONS |       |      |      | NOTE |
|-----|------------|-------|------|------|------|
|     | INCHES     |       | MM   |      |      |
|     | MIN        | MAX   | MIN  | MAX  |      |
| A   | 0.006      | 0.014 | 0.15 | 0.35 |      |
| B   | 0.045      | 0.053 | 1.15 | 1.35 |      |
| C   | 0.079      | 0.096 | 2.00 | 2.45 |      |
| D   | 0.026      |       | 0.65 |      | TYP. |
| G   | 0.047      | 0.055 | 1.20 | 1.40 |      |
| H   | 0.071      | 0.087 | 1.80 | 2.20 |      |
| J   | ----       | 0.004 | ---- | 0.10 |      |
| K   | 0.031      | 0.043 | 0.80 | 1.10 |      |
| L   | 0.010      | 0.018 | 0.26 | 0.46 |      |
| M   | 0.003      | 0.006 | 0.08 | 0.15 |      |

**Suggested Solder Pad Layout**



**NPN Electrical Characteristics @ 25°C Unless Otherwise Specified**

| Parameter                            | Symbol        | Min  | Typ   | Max  | Units | Conditions                      |
|--------------------------------------|---------------|------|-------|------|-------|---------------------------------|
| Collector-Base Breakdown Voltage     | $V_{(BR)CBO}$ | 80   |       |      | V     | $I_C=10\mu A, I_E=0$            |
| Collector-Emitter Breakdown Voltage  | $V_{(BR)CEO}$ | 65   |       |      | V     | $I_C=10mA, I_B=0$               |
| Emitter-Base Breakdown Voltage       | $V_{(BR)EBO}$ | 6    |       |      | V     | $I_E=10\mu A, I_C=0$            |
| Collector-Base Cutoff Current        | $I_{CBO}$     |      |       | 15   | nA    | $V_{CB}=50V, I_E=0$             |
| Emitter-Base Cutoff Current          | $I_{EBO}$     |      |       | 100  | nA    | $V_{EB}=6V, I_C=0$              |
| DC Current Gain                      | $h_{FE}$      | 200  |       | 450  |       | $V_{CE}=5V, I_C=2mA$            |
| Collector-Emitter Saturation Voltage | $V_{CE(sat)}$ |      | 0.05  | 0.1  | V     | $I_C=10mA, I_B=0.5mA$           |
|                                      |               |      | 0.2   | 0.3  | V     | $I_C=100mA, I_B=5mA$            |
| Base-Emitter Saturation Voltage      | $V_{BE(sat)}$ |      | 0.755 | 0.85 | V     | $I_C=10mA, I_B=0.5mA$           |
|                                      |               |      | 1     |      | V     | $I_C=100mA, I_B=5mA$            |
| Base-Emitter Voltage                 | $V_{BE}$      | 0.58 | 0.65  | 0.7  | V     | $V_{CE}=5V, I_C=2mA$            |
|                                      |               |      |       | 0.77 | V     | $V_{CE}=5V, I_C=10mA$           |
| Collector Capacitance                | $C_c$         |      | 1.9   |      | pF    | $V_{CB}=10V, f=1MHz$            |
| Emitter Capacitance                  | $C_e$         |      | 11    |      | pF    | $V_{CB}=0.5V, f=1MHz$           |
| Transition Frequency                 | $f_T$         | 100  |       |      | MHz   | $V_{CE}=5V, I_C=10mA, f=100MHz$ |

## PNP Electrical Characteristics @ 25°C Unless Otherwise Specified

| Parameter                            | Symbol        | Min  | Typ    | Max   | Units | Conditions                              |
|--------------------------------------|---------------|------|--------|-------|-------|---|
| Collector-Base Breakdown Voltage     | $V_{(BR)CBO}$ | -80  |        |       | V     | $I_C = -10\mu A, I_E = 0$               |
| Collector-Emitter Breakdown Voltage  | $V_{(BR)CEO}$ | -65  |        |       | V     | $I_C = -10mA, I_B = 0$                  |
| Emitter-Base Breakdown Voltage       | $V_{(BR)EBO}$ | -6   |        |       | V     | $I_E = -10\mu A, I_C = 0$               |
| Collector-Base Cutoff Current        | $I_{CBO}$     |      |        | -15   | nA    | $V_{CB} = -50V, I_E = 0$                |
| Emitter-Base Cutoff Current          | $I_{EBO}$     |      |        | -100  | nA    | $V_{EB} = -6V, I_C = 0$                 |
| DC Current Gain                      | $h_{FE(1)}$   |      | 280    |       |       | $V_{CE} = -5V, I_C = -10\mu A$          |
|                                      | $h_{FE(2)}$   | 200  | 290    | 450   |       | $V_{CE} = -5V, I_C = -2mA$              |
| Collector-Emitter Saturation Voltage | $V_{CE(sat)}$ |      |        | -0.3  | V     | $I_C = -10mA, I_B = -0.5mA$             |
|                                      |               |      |        | -0.65 | V     | $I_C = -100mA, I_B = -5mA$              |
| Base-Emitter Saturation Voltage      | $V_{BE(sat)}$ |      | -0.755 | -0.85 | V     | $I_C = -10mA, I_B = -0.5mA$             |
|                                      |               |      | -0.9   |       | V     | $I_C = -100mA, I_B = -5mA$              |
| Base-Emitter Voltage                 | $V_{BE}$      | -0.6 | -0.65  | -0.75 | V     | $V_{CE} = -5V, I_C = -2mA$              |
|                                      |               |      |        | -0.82 | V     | $V_{CE} = -5V, I_C = -10mA$             |
| Collector Capacitance                | $C_c$         |      | 2.3    |       | pF    | $V_{CB} = -10V, f = 1MHz$               |
| Emitter Capacitance                  | $C_e$         |      | 10     |       | pF    | $V_{CB} = -0.5V, f = 1MHz$              |
| Transition Frequency                 | $f_T$         | 100  |        |       | MHz   | $V_{CE} = -5V, I_C = -10mA, f = 100MHz$ |

**Curve Characteristics (NPN Transistor)**

Fig. 1 - Static Characteristics

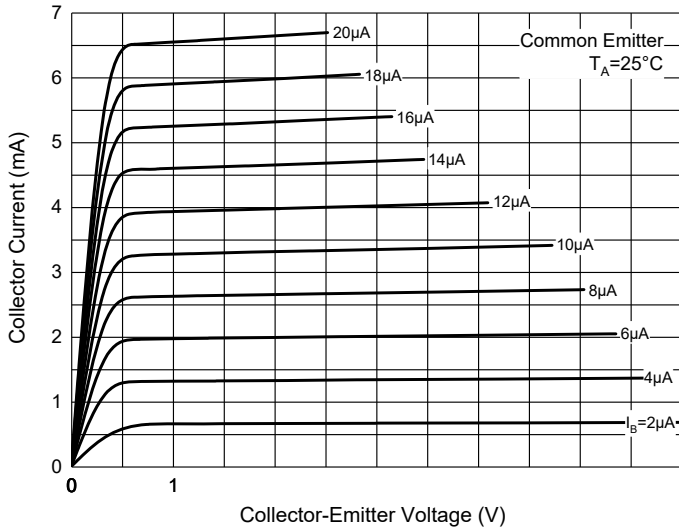


Fig. 2 - DC Current Gain Characteristics

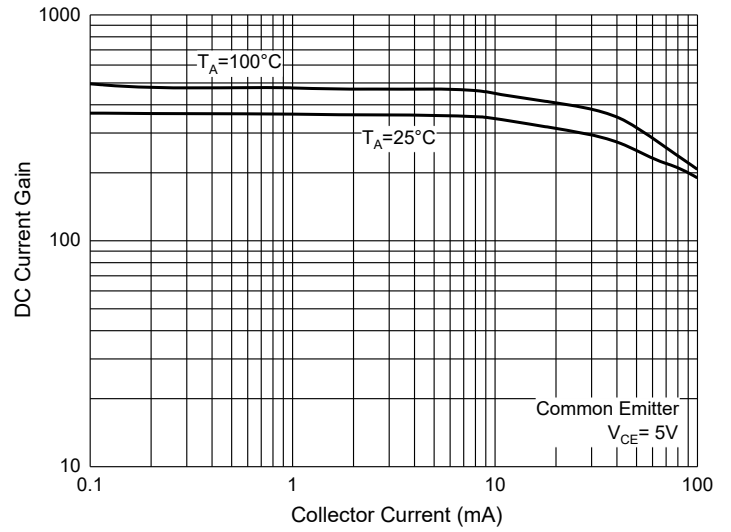


Fig. 3 - Collector-Emitter Saturation Voltage Characteristics

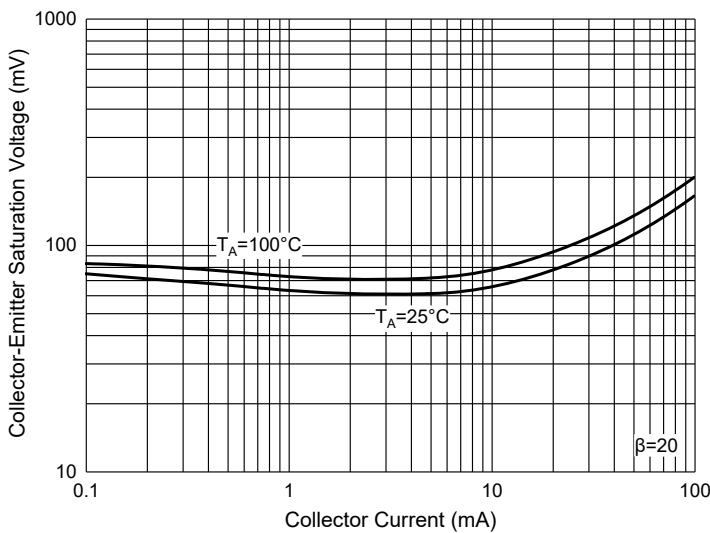


Fig. 4 - Base-Emitter Saturation Voltage Characteristics

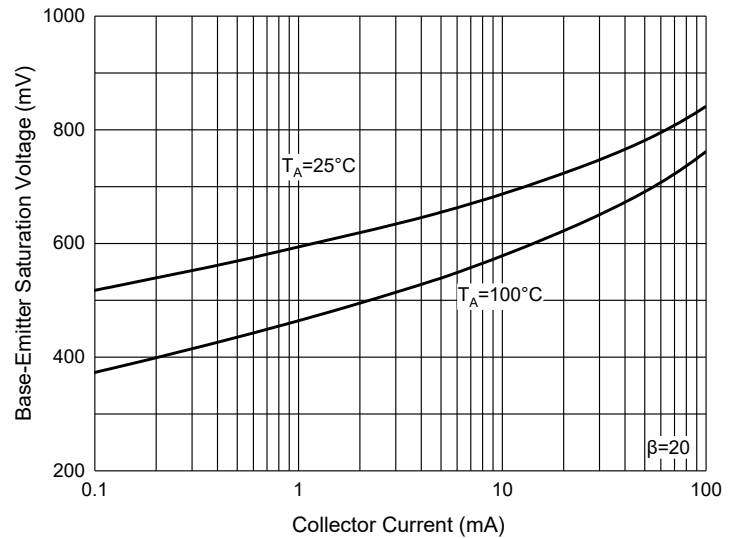


Fig. 5 - Base-Emitter Voltage Characteristics

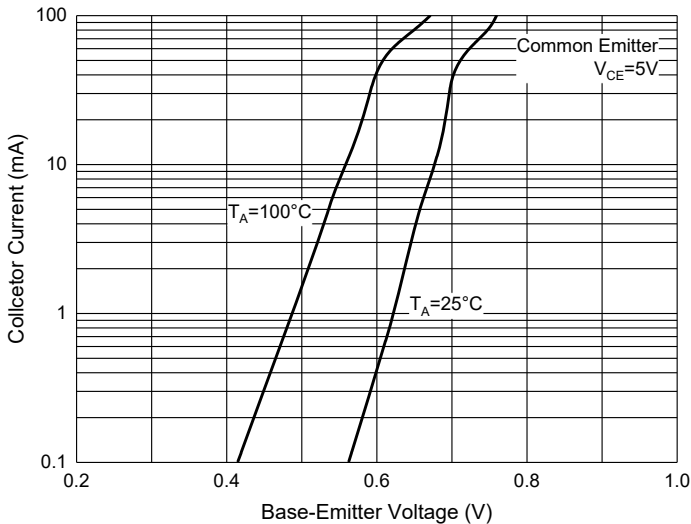
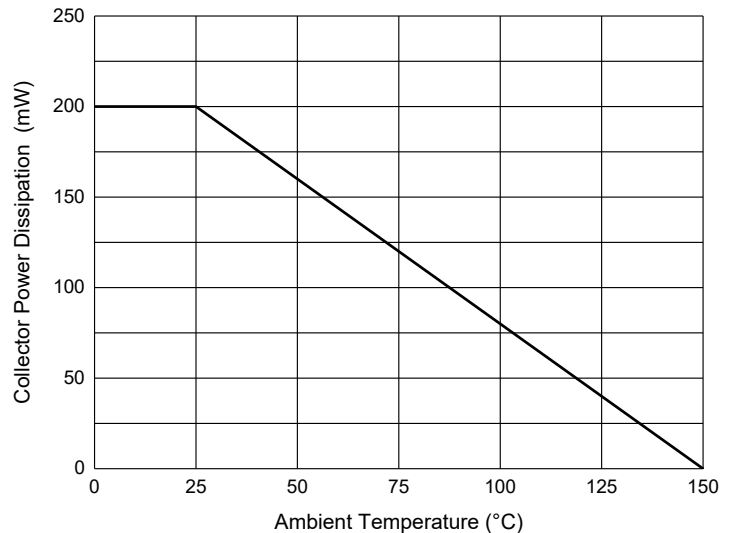


Fig. 6 - Collector Power Derating Curve



**Curve Characteristics (PNP Transistor)**

Fig. 7 - Static Characteristics

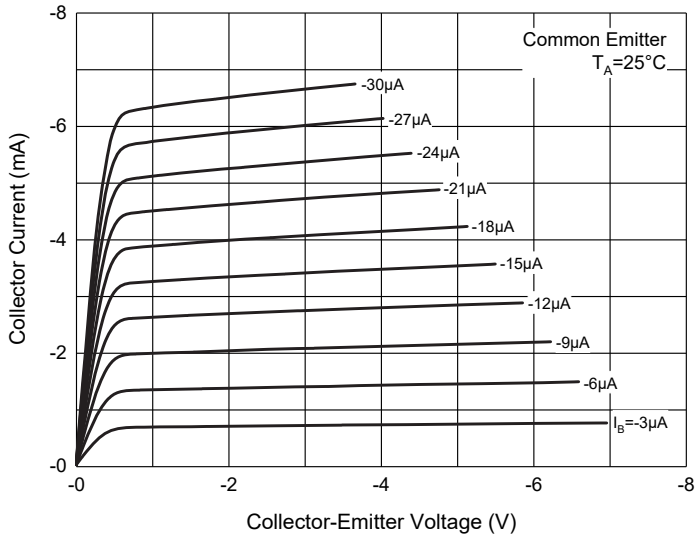


Fig. 8 - DC Current Gain Characteristics

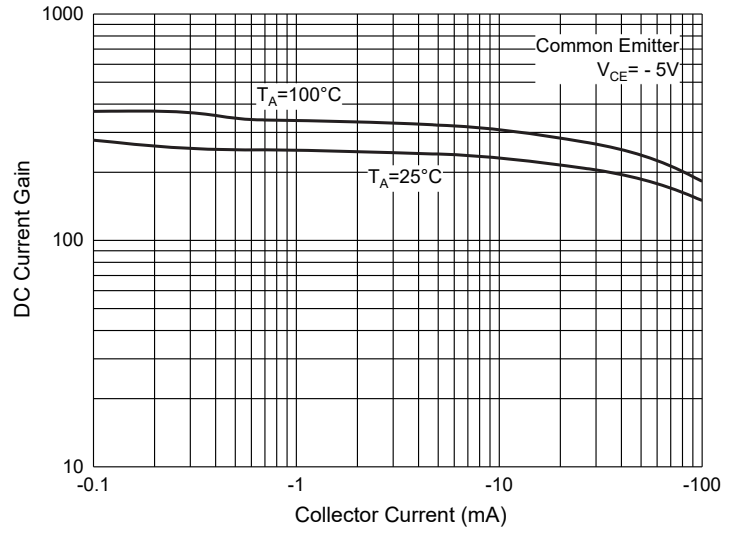


Fig. 9 - Collector-Emmitter Saturation Voltage Characteristics

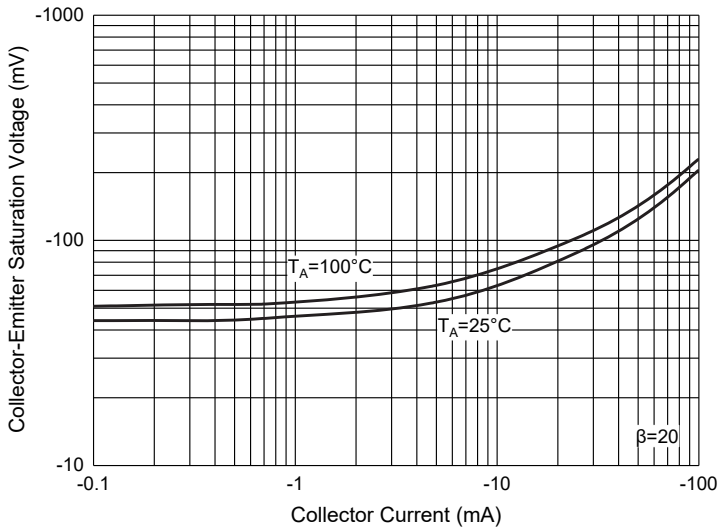


Fig. 10 - Base-Emmitter Saturation Voltage Characteristics

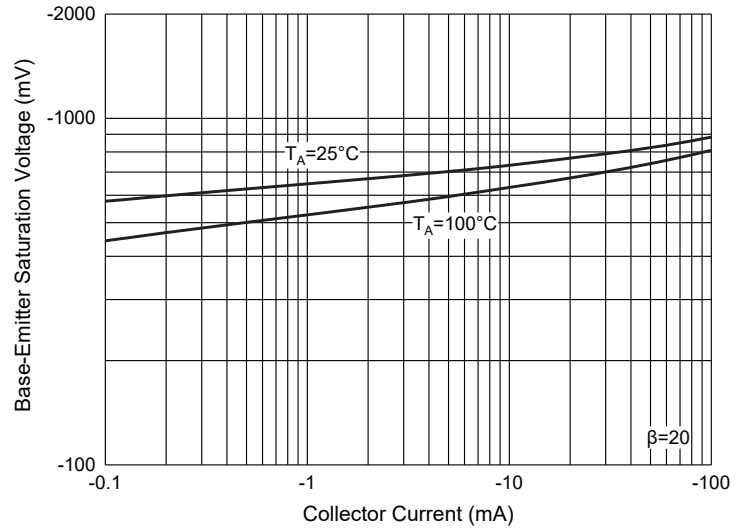


Fig. 11 - Base-Emmitter Voltage Characteristics

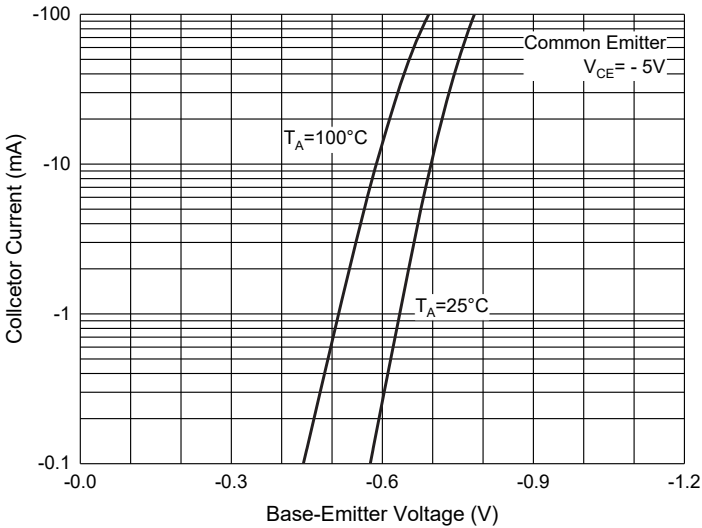
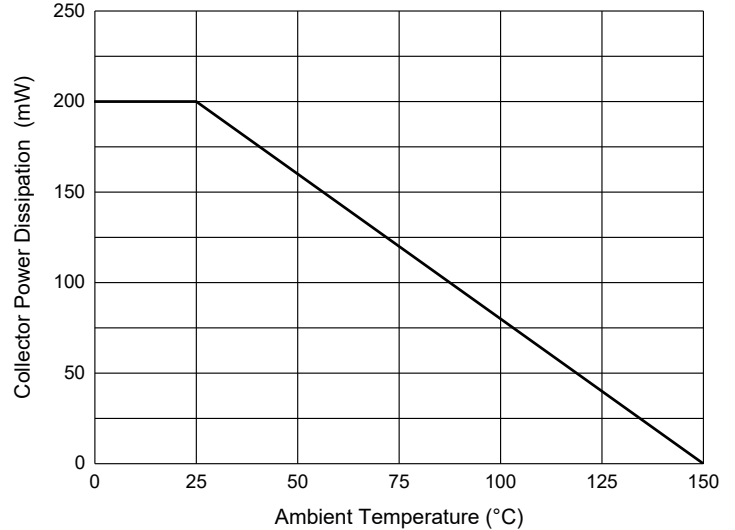


Fig. 12- Collector Power Derating Curve



## Ordering Information

| Device          | Packing               |
|-----------------|-----------------------|
| Part Number-TP  | Tape&Reel:3Kpcs/Reel  |
| Part Number-13P | Tape&Reel:10Kpcs/Reel |

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