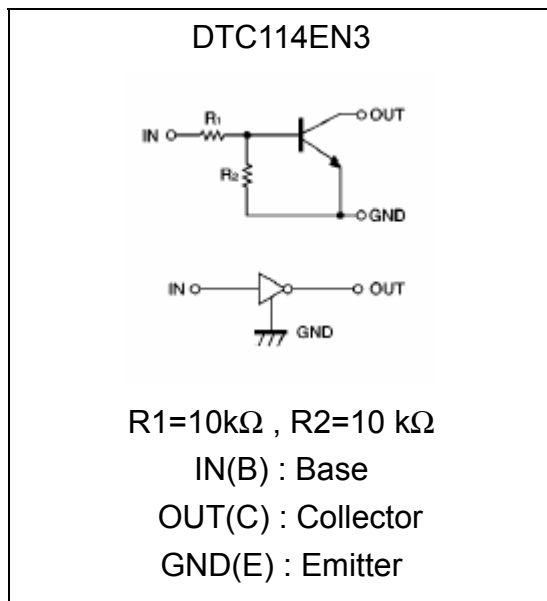
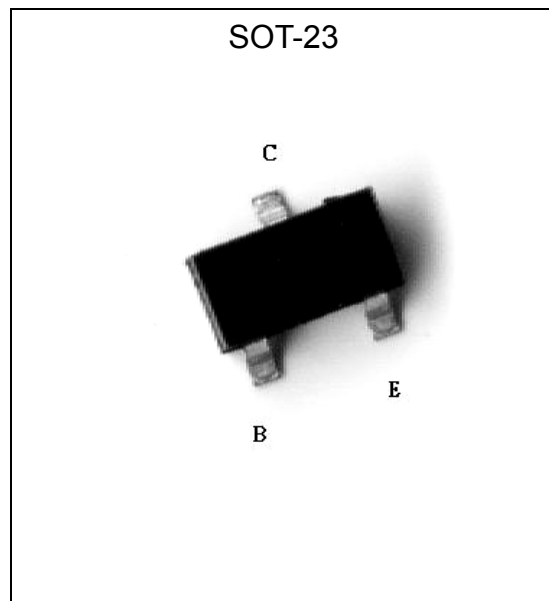


NPN Digital Transistors (Built-in Resistors)

DTC114EN3

Features

- Built-in bias resistors enable the configuration of an inverter circuit without connecting external input resistors (see equivalent circuit).
- The bias resistors consist of thin-film resistors with complete isolation to allow negative biasing of the input. They also have the advantage of almost completely eliminating parasitic effects.
- Only the on/off conditions need to be set for operation, making device design easy.
- Complements the DTA114EN3.
- Pb-free package

Equivalent Circuit

Outline

Absolute Maximum Ratings (Ta=25°C)

| Parameter | Symbol | Limits | Unit |
|----------------------|----------------------|----------|------|
| Supply Voltage | V _{CC} | 50 | V |
| Input Voltage | V _{IN} | -10~+40 | V |
| Output Current | I _O | 50 | mA |
| | I _{O(max.)} | 100 | mA |
| Power Dissipation | P _d | 200 | mW |
| Junction Temperature | T _j | 150 | °C |
| Storage Temperature | T _{stg} | -55~+150 | °C |



Characteristics (Ta=25°C)

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Test Conditions |
|----------------------|--------------------------------|------|------|------|------|--|
| Input Voltage | V _{I(off)} | - | - | 0.5 | V | V _{CC} =5V, I _o =100μA |
| | V _{I(on)} | 3 | - | - | V | V _o =0.3V, I _o =10mA |
| Output Voltage | V _{O(on)} | - | 0.1 | 0.3 | V | I _o /I _i =10mA/0.5mA |
| Input Current | I _i | - | - | 0.88 | mA | V _i =5V |
| Output Current | I _{O(off)} | - | - | 0.5 | μA | V _{CC} =50V, V _i =0V |
| DC Current Gain | G _i | 30 | - | - | - | V _o =5V, I _o =5mA |
| Input Resistance | R ₁ | 7 | 10 | 13 | kΩ | - |
| Resistance Ratio | R ₂ /R ₁ | 0.8 | 1 | 1.2 | - | - |
| Transition Frequency | f _T | - | 250 | - | MHz | V _{CE} =10V, I _c =5mA, f=100MHz* |

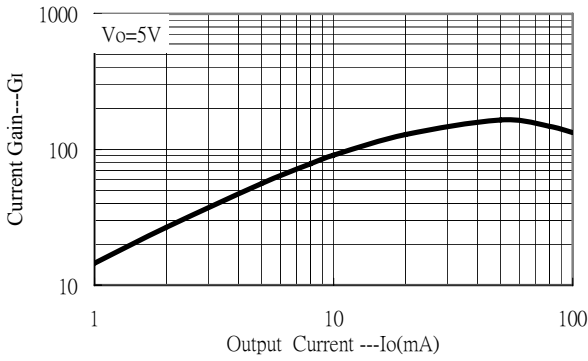
* Transition frequency of the device

Ordering Information

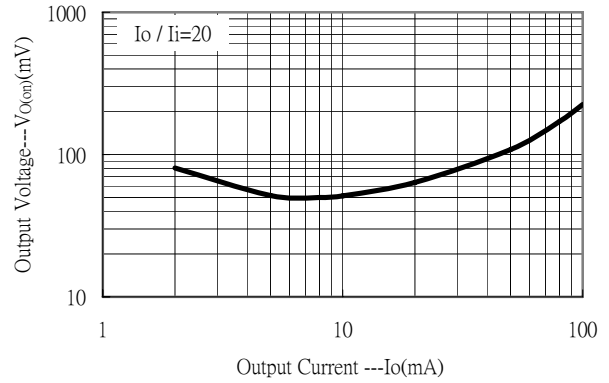
| Device | Package | Shipping | Marking |
|-----------|-----------------------------|------------------------|---------|
| DTC114EN3 | SOT-23 (Pb-free package) | 3000 pcs / tape & reel | 8A |

Characteristic Curves

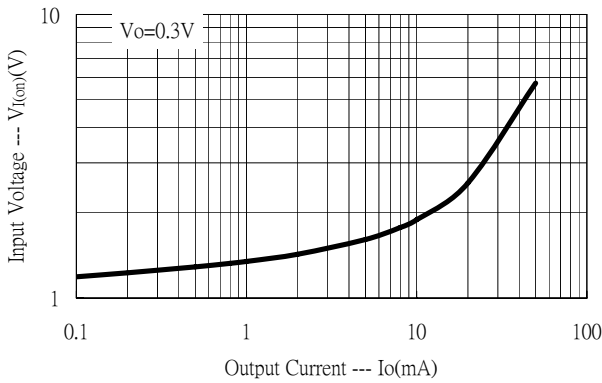
Current Gain vs Output Current



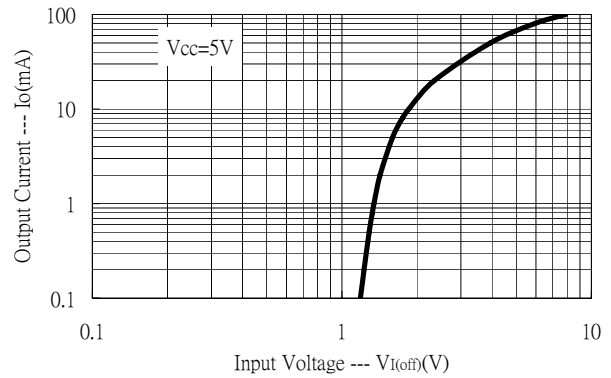
Output Voltage vs Output Current



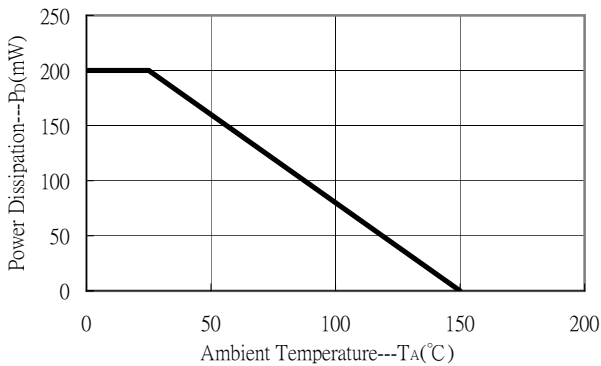
Input Voltage vs Output Current (ON characteristics)



Output Current vs Input Voltage (OFF characteristics)



Power Derating Curve





Product Designation

DT X X X X X XX
(1) (2) (3) (4) (5) (6) (7)

(1) Indicates that transistor is digital

(2) Indicates polarity
A, B PNP
C, D NPN

(3) Indicates device specification

(4) Indicates the basis of the R1 resistance value
1 1.0
2 2.2
3 3.3
4 4.7
6 6.8

(5) Indicates power-of-ten of R1 value
3 10^3
4 10^4

The value of R1 is indicated by combining (4) and (5)

24 $2.2 \times 10^4 = 22k\Omega$
43 $4.3 \times 10^3 = 4.7k\Omega$

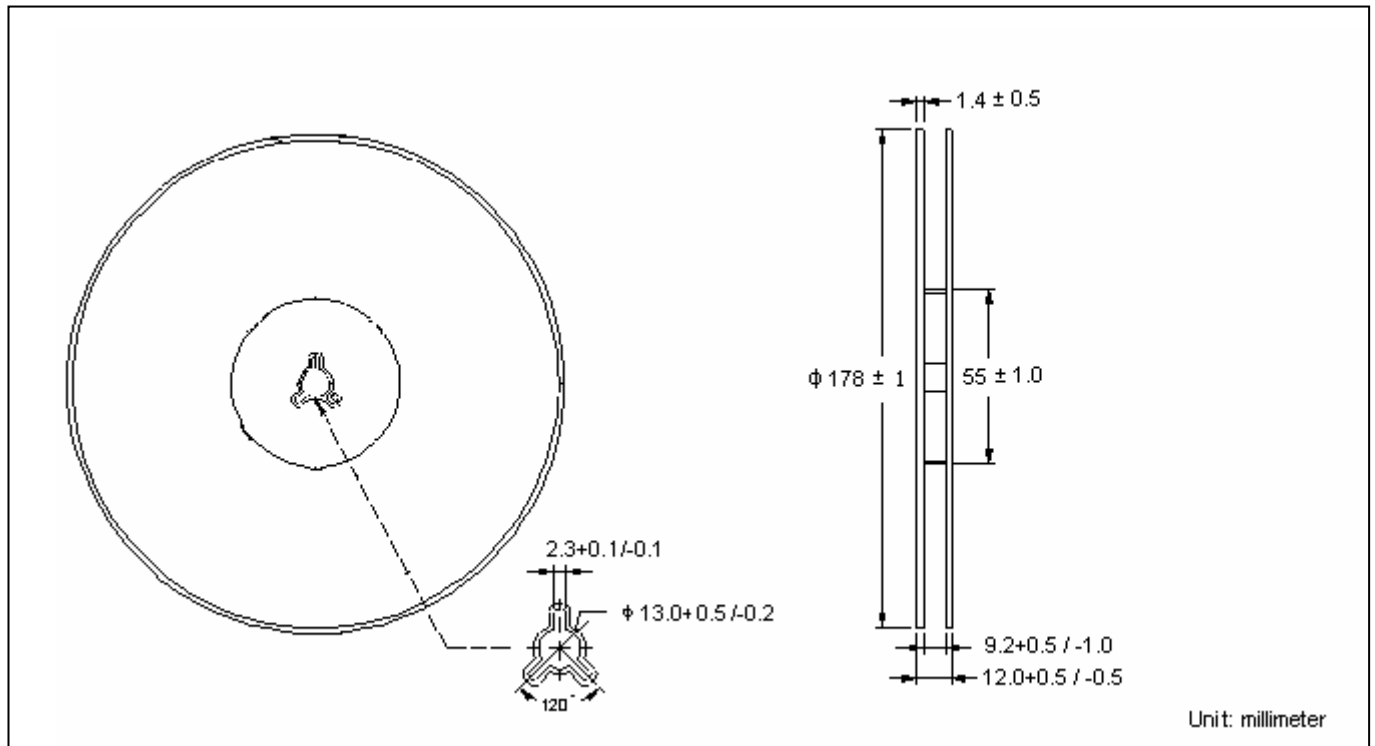
(6) Indicates resistance ratio R1 / R2

E R1/R2 = 1/1
X R1/R2 = 1/2
Y R1/R2 = 1/5
Z R1/R2 = 1/10
J R1/R2 = 1/20
W R1/R2 = 2/1
U R1/R2 = 10/1
V R1/R2 = 5/1
T R1 only
G R2 only

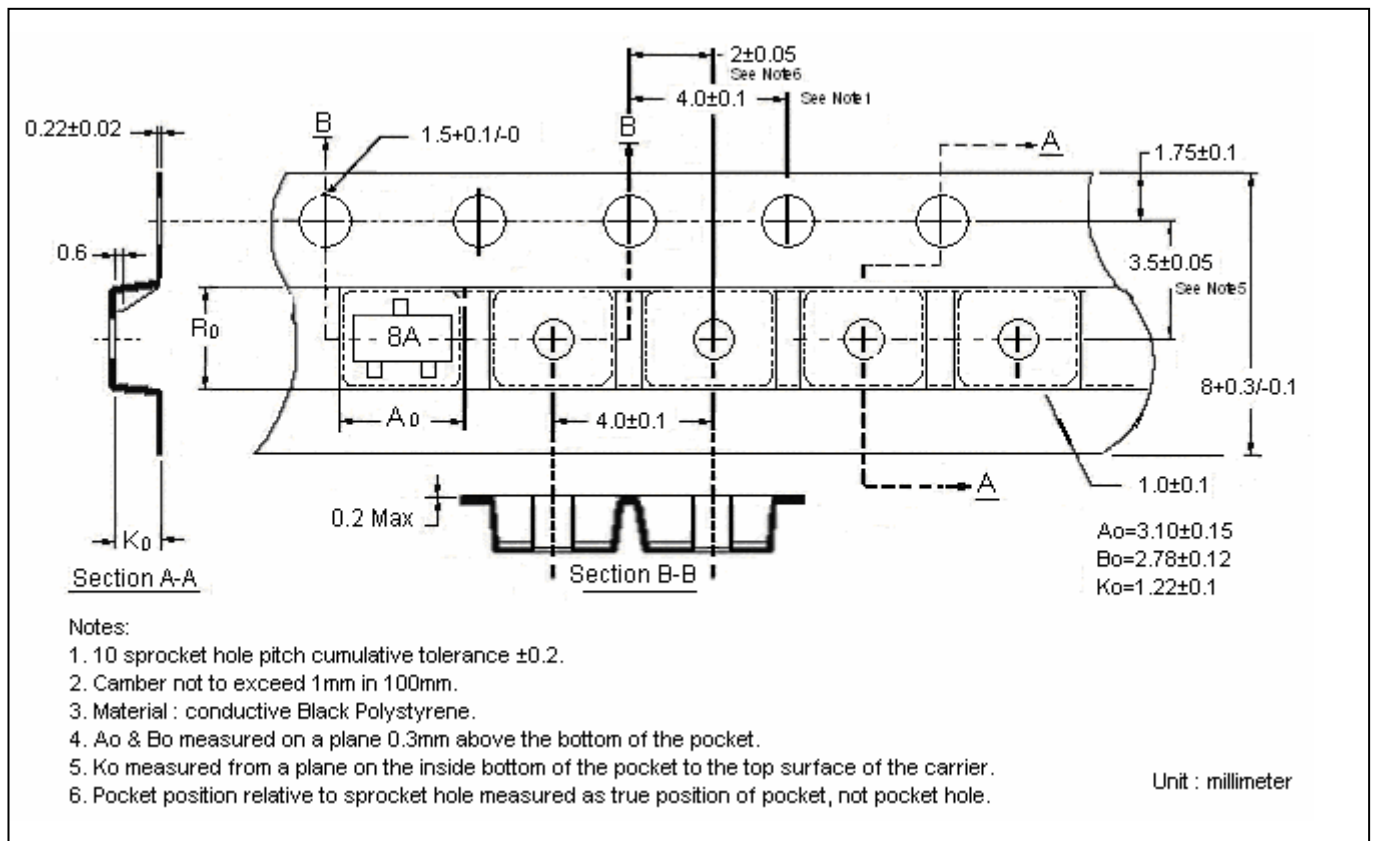
(7) Indicates package shape

N3 SOT-23
A3 TO-92

Reel Dimension



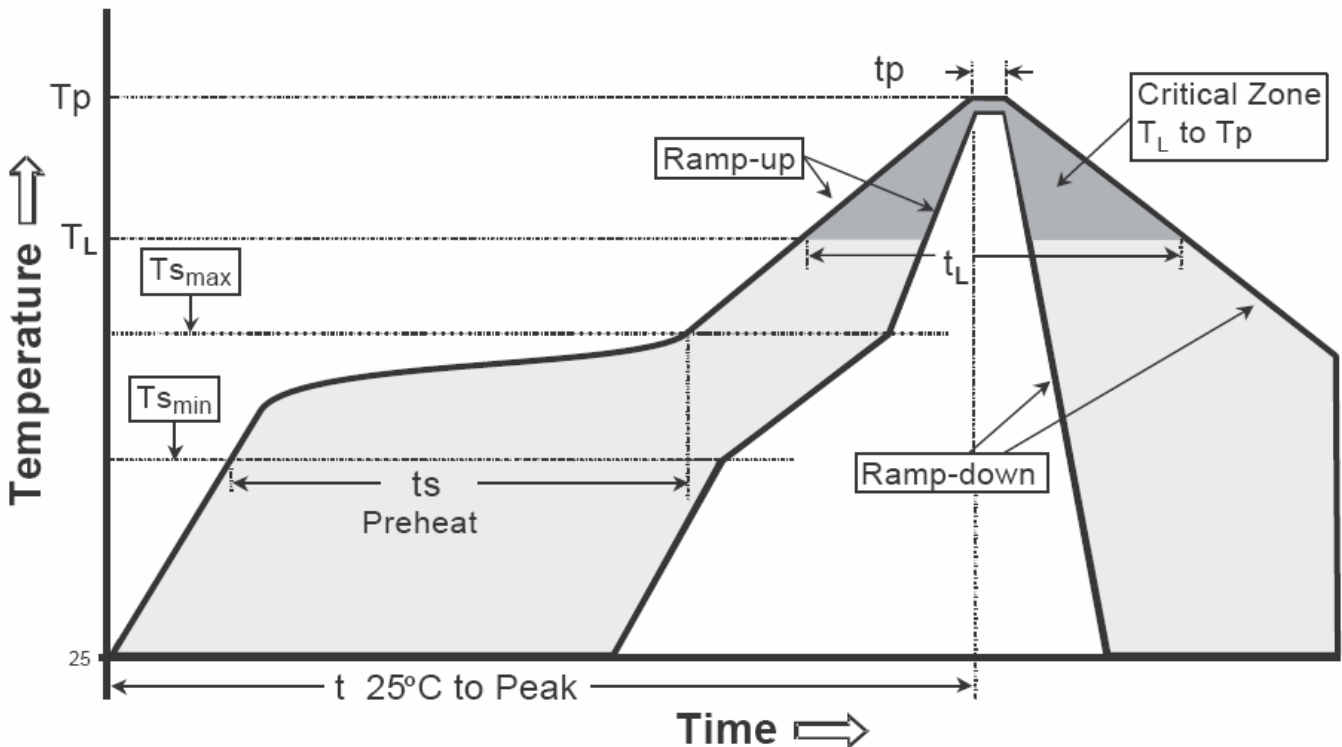
Carrier Tape Dimension



Recommended wave soldering condition

| | | |
|-----------------|------------------|-----------------|
| Product | Peak Temperature | Soldering Time |
| Pb-free devices | 260 +0/-5 °C | 5 +1/-1 seconds |

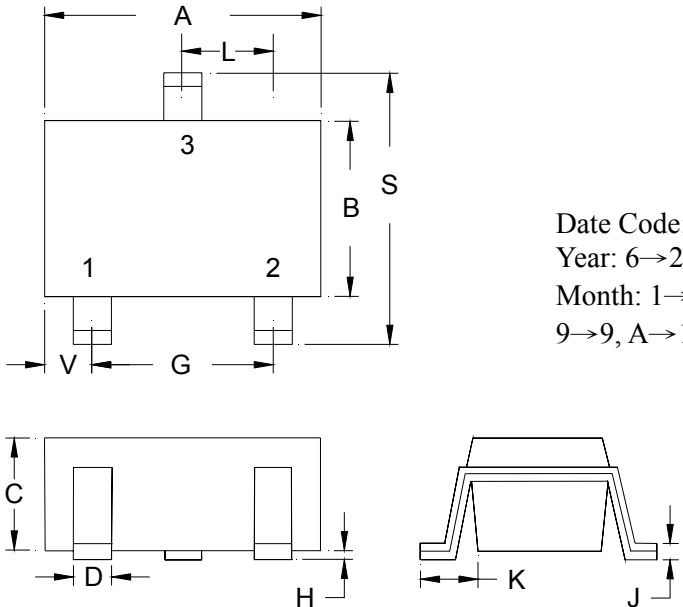
Recommended temperature profile for IR reflow



| Profile feature | Sn-Pb eutectic Assembly | Pb-free Assembly |
|---|-------------------------|------------------|
| Average ramp-up rate (T _{smax} to T _p) | 3°C/second max. | 3°C/second max. |
| Preheat | | |
| -Temperature Min(T _{s min}) | 100°C | 150°C |
| -Temperature Max(T _{s max}) | 150°C | 200°C |
| -Time(t _{s min} to t _{s max}) | 60-120 seconds | 60-180 seconds |
| Time maintained above: | | |
| -Temperature (T _L) | 183°C | 217°C |
| - Time (t _L) | 60-150 seconds | 60-150 seconds |
| Peak Temperature(T _p) | 240 +0/-5 °C | 260 +0/-5 °C |
| Time within 5°C of actual peak temperature(t _p) | 10-30 seconds | 20-40 seconds |
| Ramp down rate | 6°C/second max. | 6°C/second max. |
| Time 25 °C to peak temperature | 6 minutes max. | 8 minutes max. |

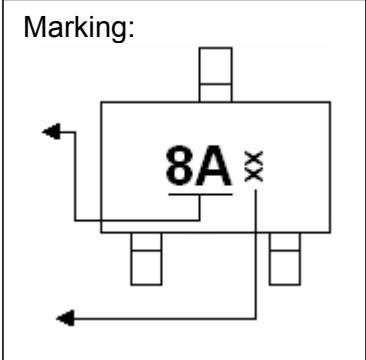
Note : All temperatures refer to topside of the package, measured on the package body surface.

SOT-23 Dimension



The diagram shows three views of the SOT-23 package: a top view with dimensions A, L, B, S, 1, 2, 3, V, and G; a side view with dimensions C, D, and H; and a perspective view with dimensions K and J. The top view labels 1, 2, and 3 correspond to Pin 1, Base, and Collector respectively.

Marking:



The marking diagram shows a rectangular package with a top lead and two bottom leads. The marking '8A' is shown in the center, with a small symbol to its right. Arrows point to the top lead and the left bottom lead.

Product Code

Date Code: Year+Month
 Year: 6→2006, 7→2007
 Month: 1→1, 2→2, . . .
 9→9, A→10, B→11, C→12

3-Lead SOT-23 Plastic Surface Mounted Package
 CYStek Package Code: N3

Style : Pin 1.Base 2.Emitter 3.Collector

*:Typical

| DIM | Inches | | Millimeters | | DIM | Inches | | Millimeters | |
|-----|--------|--------|-------------|------|-----|--------|--------|-------------|-------|
| | Min. | Max. | Min. | Max. | | Min. | Max. | Min. | Max. |
| A | 0.1102 | 0.1204 | 2.80 | 3.04 | J | 0.0034 | 0.0070 | 0.085 | 0.177 |
| B | 0.0472 | 0.0630 | 1.20 | 1.60 | K | 0.0128 | 0.0266 | 0.32 | 0.67 |
| C | 0.0335 | 0.0512 | 0.89 | 1.30 | L | 0.0335 | 0.0453 | 0.85 | 1.15 |
| D | 0.0118 | 0.0197 | 0.30 | 0.50 | S | 0.0830 | 0.1083 | 2.10 | 2.75 |
| G | 0.0669 | 0.0910 | 1.70 | 2.30 | V | 0.0098 | 0.0256 | 0.25 | 0.65 |
| H | 0.0005 | 0.0040 | 0.013 | 0.10 | | | | | |

- Notes :** 1.Controlling dimension : millimeters.
 2.Maximum lead thickness includes lead finish thickness, and minimum lead thickness is the minimum thickness of base material.
 3.If there is any question with packing specification or packing method, please contact your local CYStek sales office.

Material :

- Lead : Pure tin plated.
- Mold Compound : Epoxy resin family, flammability solid burning class:UL94V-0.

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