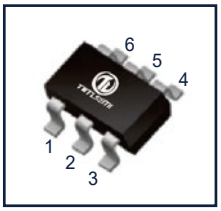
# TL-MMDT5451

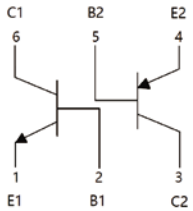
SOT-363 DUAL TRANSISTOR (NPN+PNP)

## Features

- Epitaxial Planar Die Construction
- Ideal for low Power Amplification and Switching
- One 5551(NPN), one 5401(PNP)



SOT-363



Equivalent Circuit

## Ordering information

| Product ID | Pack | Naming rule | Marking | hFE(1) | Qty(PCS) |
|---|---|---|---|---|---|
| MMDT5451 | SOT-363 | MMDT5451<br>产品名称<br>product name | KNM | 100-300 | 3000 |

## MAXIMUM RATINGS NPN 5551 ($T_A$=25℃)

| Symbol | Parameter | Value | Uniat |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 180 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 160 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 6 | V |
| $I_C$ | Collector Current | 0.2 | A |
| $P_C$ | Collector Power Dissipation | 0.2 | W |
| $R_{\theta JA}$ | Thermal Resistance from Junction to Ambient | 625 | ℃/W |
| $T_J$,$T_{stg}$ | Operation Junction And Storage Temperature Range | -55～+150 | ℃ |

## ELECTRICAL CHARACTERISTICS NPN 5551 ($T_A$=25℃)

| Symbol | Parameter | Test conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| $V_{(BR)CBO}$ | Collector-base breakdown voltage | $I_C$=100μA, $I_E$=0 | 180 | | | V |
| $V_{(BR)CEO}$ | Collector-emitter breakdown voltage | $I_C$=1mA, $I_B$=0 | 160 | | | V |
| $V_{(BR)EBO}$ | Emitter-base breakdown voltage | $I_E$=10μA, $I_C$=0 | 6 | | | V |
| $I_{CBO}$ | Collector cut-off current | $V_{CB}$=120V, $I_E$=0 | | | 0.05 | μA |
| $I_{EBO}$ | Emitter cut-off current | $V_{EB}$=4V, $I_C$=0 | | | 0.05 | μA |
| $h_{FE(1)}$ | DC current gain | $V_{CE}$=5V, $I_C$=1mA | 80 | | | |
| $h_{FE(2)}$ | | $V_{CE}$=5V, $I_C$=10mA | 100 | | 300 | |
| $h_{FE(3)}$ | | $V_{CE}$=5V, $I_C$=50mA | 30 | | | |
| $V_{CE(sat)}$ | Collector-emitter saturation voltage | $I_C$=10mA, $I_B$=1mA | | | 0.15 | V |
| | | $I_C$=50mA, $I_B$=5mA | | | 0.2 | V |
| $V_{BE(sat)}$ | Base-emitter saturation voltage | $I_C$=10mA, $I_B$=1mA | 0.75 | | 1 | V |
| | | $I_C$=50mA, $I_B$=5mA | | | 1 | V |
| $C_{obo}$ | Output Capacitance | $V_{CB}$=10V, f =1.0MHz, $I_E$ = 0 | | | 6.0 | pF |
| $f_T$ | Transition frequency | $V_{CE}$=10V, $I_C$=10mA, f=100MHz | 100 | | 300 | MHz |
| NF | Noise Figure | $V_{CE}$= 5.0V, $I_C$= 200μA,<br>$R_S$=1.0kΩ =1.0kHz | | | 8.0 | dB |

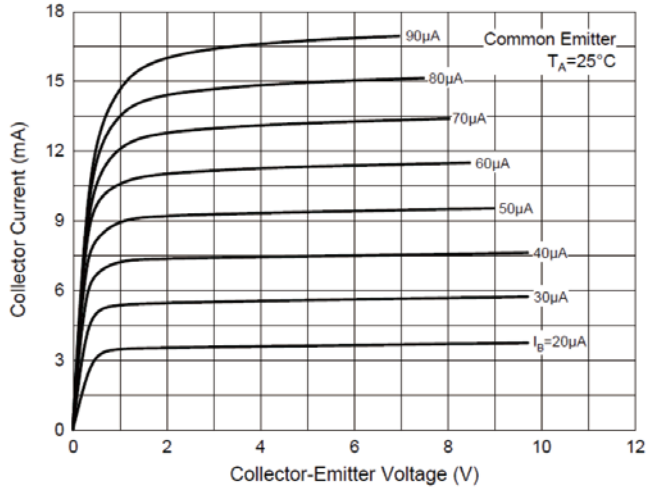
## MAXIMUM RATINGS PNP 5401 ($T_A$=25℃)

| Symbol | Parameter | Value | Uniat |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | -160 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | -150 | V |
| $V_{EBO}$ | Emitter-Base Voltage | -5 | V |
| $I_C$ | Collector Current | -0.2 | A |
| $P_C$ | Collector Power Dissipation | -0.2 | W |
| $R_{\theta JA}$ | Thermal Resistance from Junction to Ambient | 625 | ℃/W |
| $T_J$,$T_{stg}$ | Operation Junction And Storage Temperature Range | -55～+150 | ℃ |

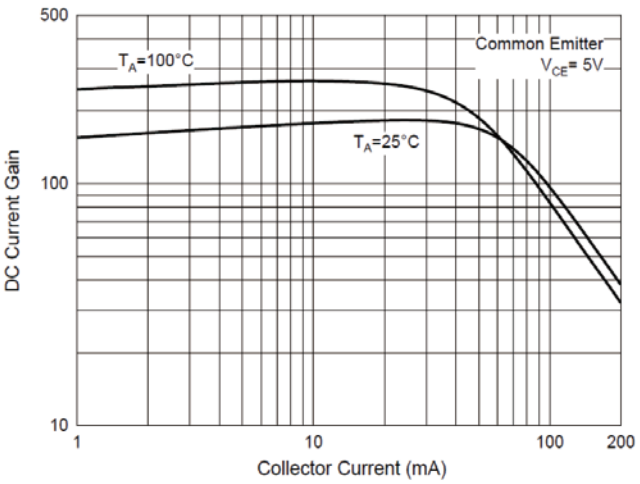
## ELECTRICAL CHARACTERISTICS PNP 5401 ($T_A$=25℃)

| Symbol | Parameter | Test conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| $V_{(BR)CBO}$ | Collector-base breakdown voltage | $I_C$=-100μA, $I_E$=0 | -160 | | | V |
| $V_{(BR)CEO}$ | Collector-emitter breakdown voltage | $I_C$=-1mA, $I_B$=0 | -150 | | | V |
| $V_{(BR)EBO}$ | Emitter-base breakdown voltage | $I_E$=-10μA, $I_C$=0 | -5 | | | V |
| $I_{CBO}$ | Collector cut-off current | $V_{CB}$=-120V, $I_E$=0 | | | -50 | nA |
| $I_{EBO}$ | Emitter cut-off current | $V_{EB}$=-3V, $I_C$=0 | | | -50 | nA |
| $h_{FE(1)}$ | DC current gain | $V_{CE}$=-5V, $I_C$=-1mA | 50 | | | |
| $h_{FE(2)}$ | | $V_{CE}$=-5V, $I_C$=-10mA | 100 | | 300 | |
| $h_{FE(3)}$ | | $V_{CE}$=-5V, $I_C$=-50mA | 50 | | | |
| $V_{CE(sat)}$ | Collector-emitter saturation voltage | $I_C$=-10mA, $I_B$=-1mA | | | -0.2 | V |
| | | $I_C$=-50mA, $I_B$=-5mA | | | -0.5 | V |
| $V_{BE(sat)}$ | Base-emitter saturation voltage | $I_C$=-10mA, $I_B$=-1mA | | | -1 | V |
| | | $I_C$=-50mA, $I_B$=-5mA | | | -1 | V |
| $C_{obo}$ | Output Capacitance | $V_{CB}$=-10V, f =1.0MHz, $I_E$ = 0 | | | 6.0 | pF |
| $f_T$ | Transition frequency | $V_{CE}$=-10V, $I_C$=-10mA, f=100MHz | 100 | | 300 | MHz |
| NF | Noise Figure | $V_{CE}$=-5.0V, $I_C$=-200μA, $R_S$=10Ω=1.0kHz | | | 8.0 | dB |

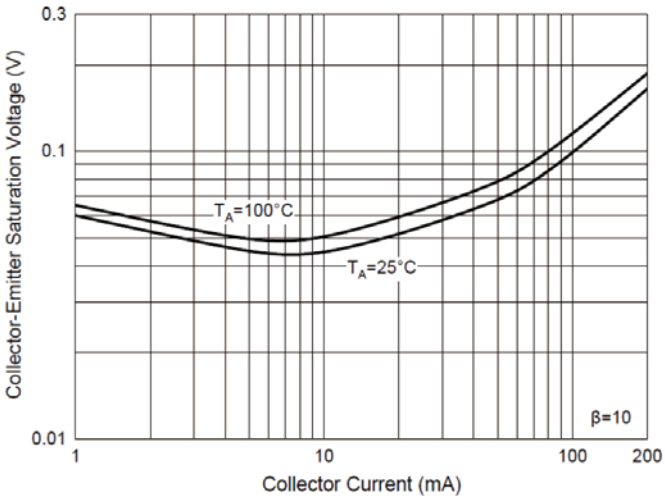
## Typical Characteristics (NPN Transistor)



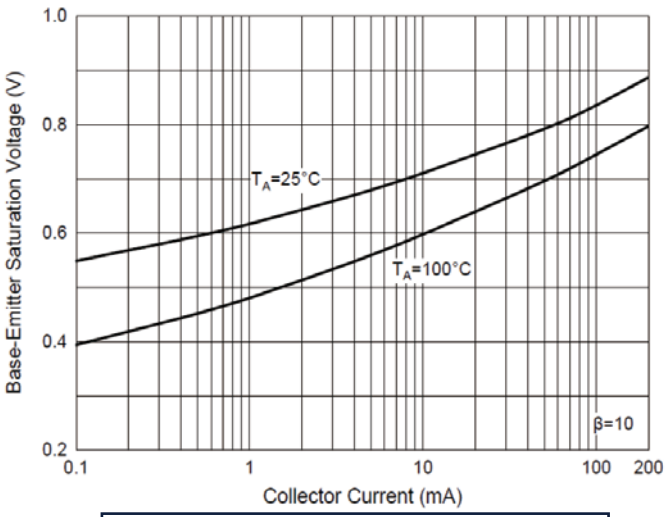

Static Characteristics



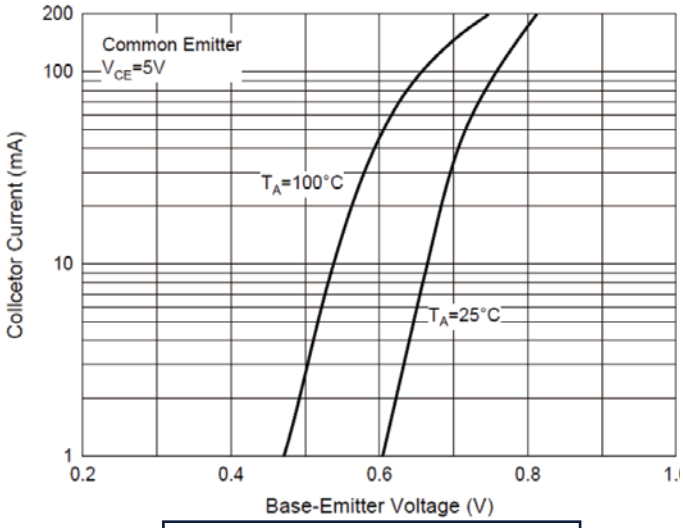

DC Current Gain Characteristics



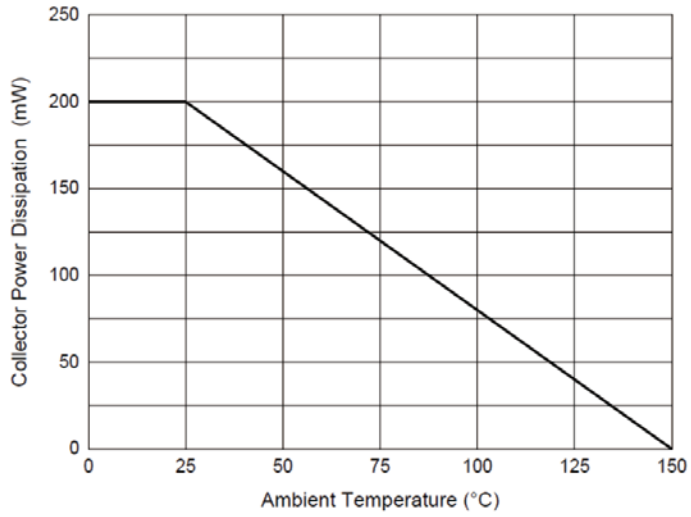

Collector-Emitter Saturation Voltage Characteristics




Base-Emitter Saturation Voltage Characteristics

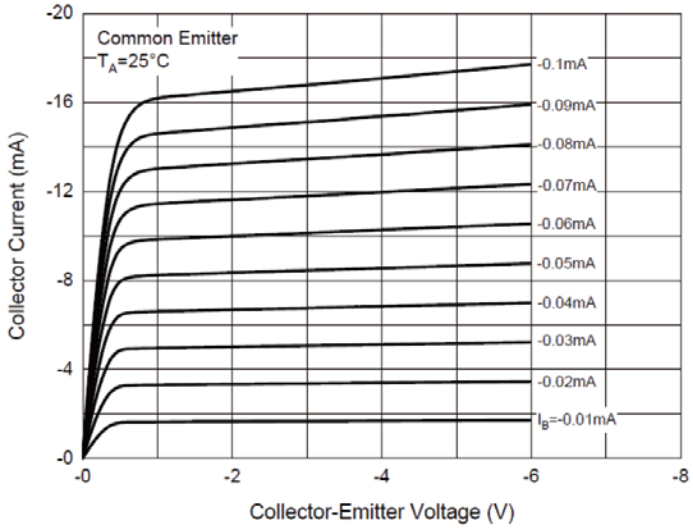



Base-Emitter Voltage Characteristics

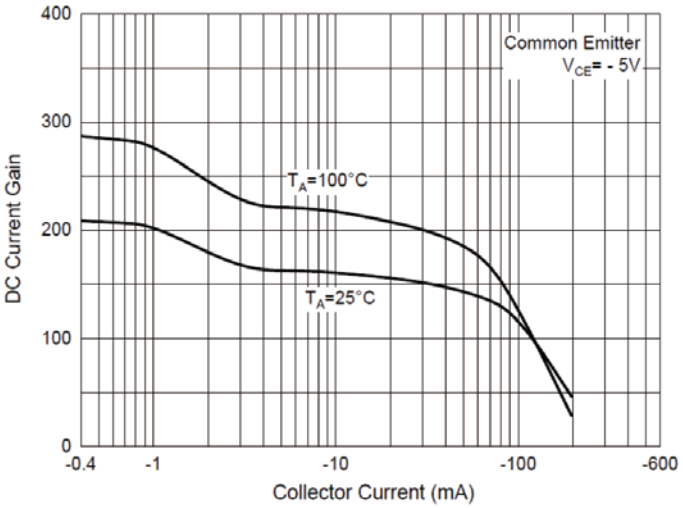



Collector Power Derating Curve

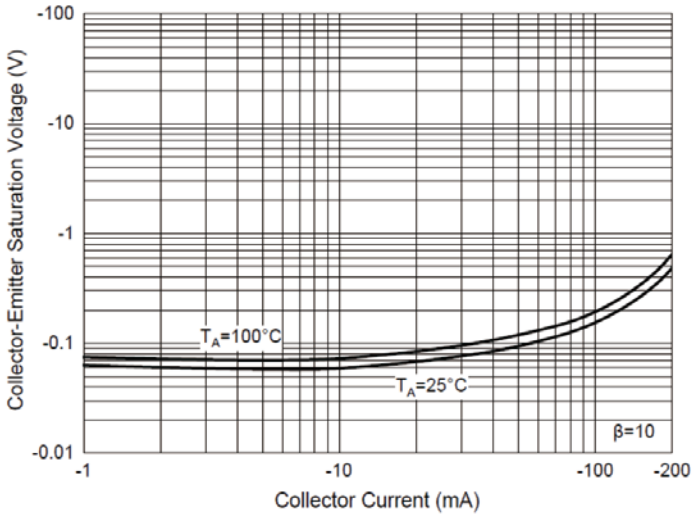
## Typical Characteristics (PNP Transistor)



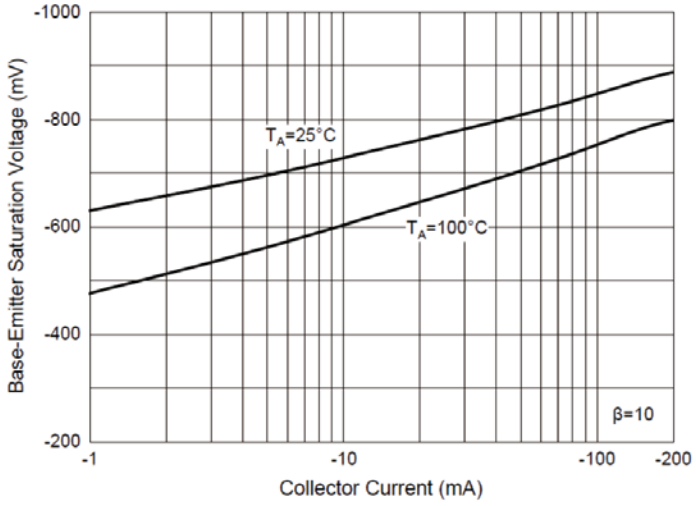

Static Characteristics



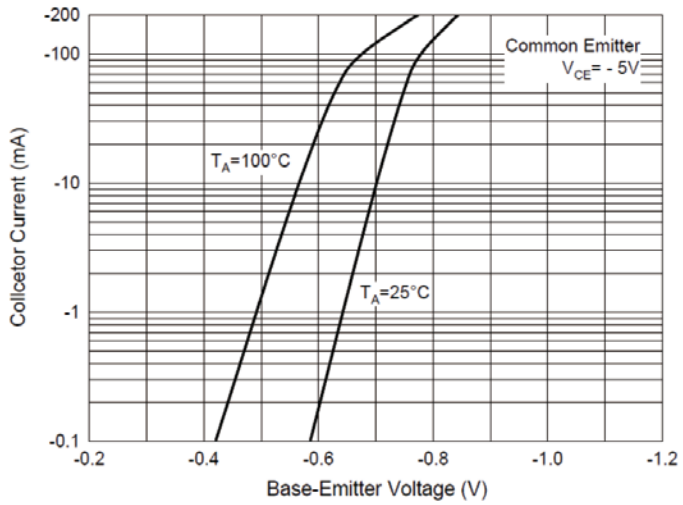

DC Current Gain Characteristics



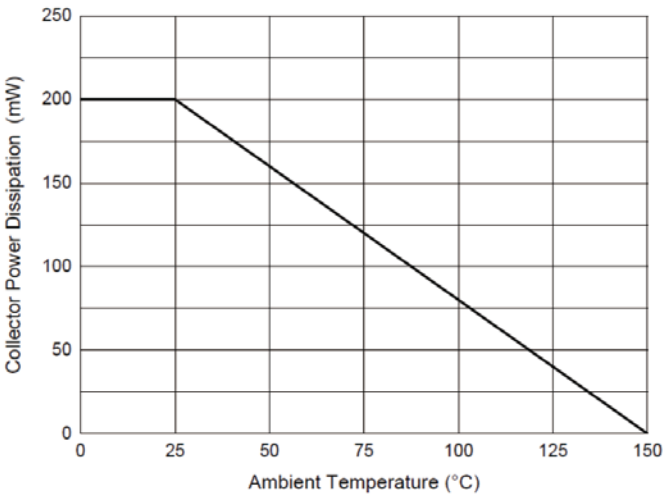

Collector-Emitter Saturation Voltage Characteristics




Base-Emitter Saturation Voltage Characteristics

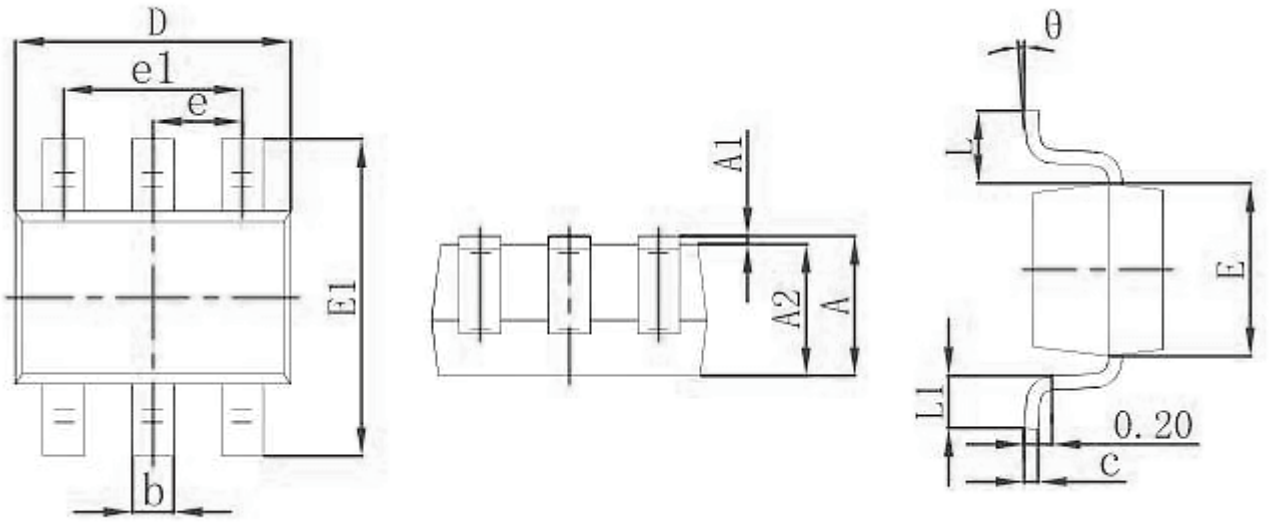



Base-Emitter Voltage Characteristics




Collector Power Derating Curve

## SOT-363 Package Outline Dimensions




| Symbol | Dimensions in Millimeters | | Dimensions In Inches | |
|---|---|---|---|---|
| | Min | Max | Min | Max |
| A | 0.900 | 1.100 | 0.035 | 0.043 |
| A1 | 0.000 | 0.100 | 0.000 | 0.004 |
| A2 | 0.900 | 1.000 | 0.035 | 0.039 |
| b | 0.150 | 0.350 | 0.006 | 0.014 |
| c | 0.100 | 0.150 | 0.004 | 0.006 |
| D | 2.000 | 2.200 | 0.079 | 0.087 |
| E | 1.150 | 1.350 | 0.045 | 0.053 |
| E1 | 2.150 | 2.450 | 0.085 | 0.096 |
| e | 0.650 TYP | | 0.026 TYP | |
| e1 | 1.200 | 1.400 | 0.047 | 0.055 |
| L | 0.525 REF | | 0.021 REF | |
| L1 | 0.260 | 0.460 | 0.010 | 0.018 |
| θ | 0° | 8° | 0° | 8° |