**JIANGSU CHANGJIANG ELECTRONICS TECHNOLOGY CO., LTD**
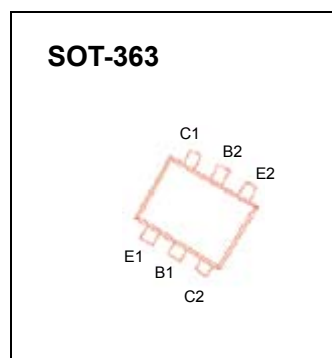
# SOT-363 Plastic-Encapsulate Transistors

**MMDT2227**   TRANSISTOR (NPN+PNP)

**SOT-363**



### FEATURE
- Epitaxial planar die construction
- One 2222A NPN
  One 2907A PNP
- Ideal for power amplification and switching

**MARKING: K27**

**NPN 2222A**

**MAXIMUM RATINGS (Ta=25℃ unless otherwise noted)**

| Symbol | Parameter | Value | Units |
|--------|-----------|-------|-------|
| $V_{CBO}$ | Collector-Base Voltage | 75 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 40 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 6 | V |
| $I_C$ | Collector Current -Continuous | 600 | mA |
| $P_C$ | Collector Power Dissipation | 200 | mW |
| $T_J$ | Junction Temperature | 150 | ℃ |
| $T_{stg}$ | Storage Temperature | -55-150 | ℃ |
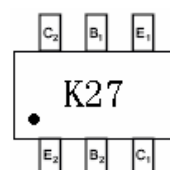


E2 B2 C2 NPN
E1 B1 C1 PNP

**ELECTRICAL CHARACTERISTICS (Ta=25℃ unless otherwise specified)**

| Parameter | Symbol | Test conditions | Min | Max | Unit |
|-----------|--------|-----------------|-----|-----|------|
| **Collector-base breakdown voltage** | $V_{(BR)CBO}$ | $I_C$= 10μA, $I_E$=0 | 75 | | V |
| **Collector-emitter breakdown voltage** | $V_{(BR)CEO}$ | $I_C$= 10mA, $I_B$=0 | 40 | | V |
| **Emitter-base breakdown voltage** | $V_{(BR)EBO}$ | $I_E$=10μA.$I_C$=0 | 6 | | V |
| **Collector cut-off current** | $I_{CBO}$ | $V_{CB}$= 60V, $I_E$=0 | | 10 | nA |
| **Collector cut-off current** | $I_{CEX}$ | $V_{CE}$=60V,$V_{EB(off)}$=3V | | 10 | nA |
| **Emitter cut-off current** | $I_{EBO}$ | $V_{EB}$= 3 V, $I_C$=0 | | 10 | nA |
| **DC current gain** | $h_{FE(1)}^*$ | $V_{CE}$=10V, $I_C$= 0.1mA | 35 | | |
| | $h_{FE(2)}^*$ | $V_{CE}$=10V, $I_C$= 1mA | 50 | | |
| | $h_{FE(3)}^*$ | $V_{CE}$=10V, $I_C$= 10mA | 75 | | |
| | $h_{FE(4)}^*$ | $V_{CE}$=10V, $I_C$= 150mA | 100 | 300 | |
| | $h_{FE(5)}^*$ | $V_{CE}$=10V, $I_C$= 500mA | 40 | | |
| | $h_{FE(6)}^*$ | $V_{CE}$=1V, $I_C$= 150mA | 35 | | |
| **Collector-emitter saturation voltage** | $V_{CE(sat)1}^*$ | $I_C$=150mA, $I_B$= 15mA | | 0.3 | V |
| | $V_{CE(sat)2}^*$ | $I_C$=500mA, $I_B$= 50mA | | 1 | V |
| **Base-emitter saturation voltage** | $V_{BE(sat)1}^*$ | $I_C$=150mA, $I_B$=15mA | 0.6 | 1.2 | V |
| | $V_{BE(sat)2}^*$ | $I_C$=500mA, $I_B$= 50mA | | 2 | V |
| **Transition frequency** | $f_T$ | $V_{CE}$=20V, $I_C$= 20mA, f=100MHz | 300 | | MHz |
| **Output Capacitance** | $C_{ob}$ | $V_{CB}$=10V, $I_E$=0,f=1MHz | | 8 | pF |
| **Input Capacitance** | $C_{ib}$ | $V_{EB}$=0.5V,$I_C$= 0,f=1MHz | | 25 | pF |
| **Noise Figure** | NF | $V_{CE}$=10V, $I_C$=100μA, f=1KHz,Rs=1KΩ | | 4 | dB |

*pulse test

## Switching characteristics

| Parameter | Symbol | Test conditions | Min | Max | Unit |
|---|---|---|---|---|---|
| Delay time | $t_d$ | | | 10 | nS |
| Rise time | $t_r$ | $V_{CC}$=30V, $I_C$=150mA, | | 25 | nS |
| Storage time | $t_S$ | $V_{BE(off)}$=0.5V,$I_{B1}$=15mA | | 225 | nS |
| Fall time | $t_f$ | | | 60 | nS |

## PNP 2907A

## MAXIMUM RATINGS (Ta=25℃ unless otherwise noted)

| Symbol | Parameter | Value | Units |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | -60 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | -60 | V |
| $V_{EBO}$ | Emitter-Base Voltage | -5 | V |
| $I_C$ | Collector Current -Continuous | -600 | mA |
| $P_C$ | Collector Power Dissipation | 200 | mW |
| $T_J$ | Junction Temperature | 150 | ℃ |
| $T_{stg}$ | Storage Temperature | -55-150 | ℃ |

## ELECTRICAL CHARACTERISTICS (Ta=25℃ unless otherwise specified)

| Parameter | Symbol | Test conditions | Min | Max | Unit |
|---|---|---|---|---|---|
| Collector-base breakdown voltage | $V_{(BR)CBO}$ | $I_C$= -10μA, $I_E$=0 | -60 | | V |
| Collector-emitter breakdown voltage | $V_{(BR)CEO}$ | $I_C$= -10mA, $I_B$=0 | -60 | | V |
| Emitter-base breakdown voltage | $V_{(BR)EBO}$ | $I_E$=-10μA, $I_C$=0 | -5 | | V |
| Collector cut-off current | $I_{CBO}$ | $V_{CB}$=-50V, $I_E$=0 | | -10 | nA |
| Collector cut-off current | $I_{CEX}$ | $V_{CE}$=-30V,$V_{EB(off)}$=-0.5V | | -50 | nA |
| Emitter cut-off current | $I_{EBO}$ | $V_{EB}$=-3V, $I_C$=0 | | -10 | nA |
| DC current gain | $h_{FE(1)}^*$ | $V_{CE}$=-10V, $I_C$= -0.1mA | 75 | | |
| | $h_{FE(2)}^*$ | $V_{CE}$=-10V, $I_C$= -1mA | 100 | | |
| | $h_{FE(3)}^*$ | $V_{CE}$=-10V, $I_C$=-10mA | 100 | | |
| | $h_{FE(4)}^*$ | $V_{CE}$=-10V, $I_C$= -150mA | 100 | 300 | |
| | $h_{FE(5)}^*$ | $V_{CE}$=-10V, $I_C$=-500mA | 50 | | |
| Collector-emitter saturation voltage | $V_{CE(sat)1}^*$ | $I_C$=-150mA, $I_B$=-15mA | | -0.4 | V |
| | $V_{CE(sat)2}^*$ | $I_C$=-500mA, $I_B$=- 50mA | | -1.6 | V |
| Base-emitter saturation voltage | $V_{BE(sat)1}^*$ | $I_C$=-150mA, $I_B$=-15mA | | -1.3 | V |
| | $V_{BE(sat)2}^*$ | $I_C$=-500mA, $I_B$= -50mA | | -2.6 | V |
| Transition frequency | $f_T$ | $V_{CE}$=-20V, $I_C$= -50mA,$f$=100MHz | 200 | | MHz |
| Output Capacitance | $C_{ob}$ | $V_{CB}$=-10V, $I_E$= 0,$f$=1MHz | | 8 | pF |
| Input Capacitance | $C_{ib}$ | $V_{EB}$=-2V, $I_C$= 0,$f$=1MHz | | 30 | pF |
| Delay time | $t_d$ | | | 10 | nS |
| Rise time | $t_r$ | | | 40 | nS |
| Storage time | $t_s$ | $V_{CC}$=-30V,$I_C$=-150mA, $I_{B1}$=-15mA | | 225 | nS |
| Fall time | $t_f$ | | | 60 | nS |

*pulse test