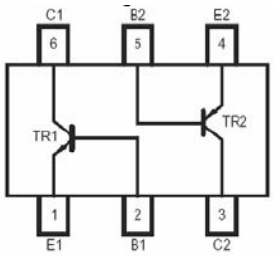
## Small Signal Surface Mount Transistor MMDT2227

## FEATURES

Lead-free

- Epitaxial planar die construction.
- Complementary Pair.
- Ultra-small surface mount package.
- One 2222A-Type NPN,
  One 2907A-Type PNP.




**SOT-363**

## APPLICATIONS

- Ideal for low power amplification and switching .

## ORDERING INFORMATION

| Type No. | Marking | Package Code |
|---|---|---|
| MMDT2227 | K27 | SOT-363 |

## MAXIMUM RATING ,NPN 2222A Section @ Ta=25℃ unless otherwise specified

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | 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 |
| $P_D$ | Power Dissipation | 200 | mW |
| $R_{\theta JA}$ | Thermal Resistance, Junction to Ambient | 625 | ℃/W |
| $T_j, T_{stg}$ | Junction and Storage Temperature | -55 to+150 | ℃ |

## MAXIMUM RATING ,PNP 2907A Section @ Ta=25℃ unless otherwise specified

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CBO}$ | 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 |
| $P_D$ | Power Dissipation | 200 | mW |
| $R_{\theta JA}$ | Thermal Resistance, Junction to Ambient | 625 | ℃/W |
| $T_j, T_{stg}$ | Junction and Storage Temperature | -55 to+150 | ℃ |

## Small Signal Surface Mount Transistor MMDT2227

## ELECTRICAL CHARACTERISTICS OF TR2 , NPN2222A SECTION

@ 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<br>$V_{CB}$=60V,$I_E$=0,$T_A$=150℃ | - | 10<br>10 | nA<br>μA |
| Collector cut-off current | $I_{CEX}$ | $V_{CE}$=60V, $V_{EB(OFF)}$=3.0V | - | 10 | nA |
| Emitter cut-off current | $I_{EBO}$ | $V_{EB}$=3V $I_C$=0 | - | 10 | nA |
| Base cut-off current | $I_{BL}$ | $V_{CE}$=60V $V_{EB(OFF)}$=3.0V | - | 20 | nA |
| DC current gain | $h_{FE}$ | $V_{CE}$=10V,$I_C$=100μA<br>$V_{CE}$=10V,$I_C$=1.00mA<br>$V_{CE}$=10V,$I_C$=10mA<br>$V_{CE}$=10V,$I_C$=150mA<br>$V_{CE}$=10V,$I_C$=500mA<br>$V_{CE}$=10V,$I_C$=10mA,$T_A$=-55℃<br>$V_{CE}$=1.0V,$I_C$=150mA, | 35<br>50<br>75<br>100<br>40<br>50<br>35 | -<br>-<br>-<br>300<br>-<br>-<br>- | |
| Collector-emitter saturation voltage | $V_{CE(sat)}$ | $I_C$=150mA $I_B$=15mA<br>$I_C$=500mA $I_B$=50mA | - | 0.3<br>1.0 | V |
| Base-emitter saturation voltage | $V_{BE(sat)}$ | $I_C$=150mA $I_B$=15mA<br>$I_C$=500mA $I_B$=50mA | 0.6<br>- | 1.2<br>2.0 | V |
| Transition frequency | $f_T$ | $V_{CE}$=20V,$I_C$=20mA ,f=100MHz | 300 | - | MHz |
| Output Capacitance | $C_{obo}$ | $V_{CB}$=10V,f=1.0MHz,$I_E$=0 | - | 8 | pF |
| Input Capacitance | $C_{ibo}$ | $V_{EB}$=0.5V,f=1.0MHz,$I_C$=0 | - | 25 | pF |
| Noise Figure | NF | $V_{CE}$=10V,f=1.0kHz,$I_C$=0.1mA<br>$R_g$=1.0KΩ, | - | 4.0 | dB |
| Delay Time | $t_d$ | $V_{CC}$=30V,$I_C$=150mA,<br>$V_{BE(off)}$=-0.5V,$I_{B1}$=15mA | - | 10 | ns |
| Rise Time | $t_r$ | | - | 25 | ns |

## Small Signal Surface Mount Transistor MMDT2227

## ELECTRICAL CHARACTERISTICS OF TR2, PNP2907A SECTION

@ 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<br>$V_{CB}$=-50V $I_E$=0 $T_A$=125℃ | - | -10 | nA<br>μA |
| Collector cut-off current | $I_{CEX}$ | $V_{CE}$=-30V $V_{EB(OFF)}$=-0.5V | - | -50 | nA |
| Base cut-off current | $I_{BL}$ | $V_{CE}$=-30V $V_{EB(OFF)}$=-0.5V | - | -50 | nA |
| DC current gain | $h_{FE}$ | $V_{CE}$=-10V $I_C$=-100μA<br>$V_{CE}$=-10V $I_C$=-1mA<br>$V_{CE}$=-10V $I_C$=-10mA<br>$V_{CE}$=-10V $I_C$=-150mA<br>$V_{CE}$=-10V $I_C$=-500mA | 75<br>100<br>100<br>100<br>50 | -<br>-<br>-<br>300<br>- | |
| Collector-emitter saturation voltage | $V_{CE(sat)}$ | $I_C$=-150mA $I_B$=-15mA<br>$I_C$=-500mA $I_B$=-50mA | - | -0.4<br>-1.6 | V |
| Base-emitter saturation voltage | $V_{BE(sat)}$ | $I_C$=-150mA $I_B$=-15mA<br>$I_C$=-500mA $I_B$=-50mA | - | -1.3<br>-2.6 | V |
| Transition frequency | $f_T$ | $V_{CE}$=-20V,$I_C$=-50mA ,f=100MHz | 200 | - | MHz |
| Output Capacitance | $C_{obo}$ | $V_{CB}$=-10V,f=1.0MHz,$I_E$=0 | - | -8.0 | pF |
| Input Capacitance | $C_{ibo}$ | $V_{EB}$=-2.0V,f=1.0MHz,$I_C$=0 | - | 30 | pF |
| Turn-on time | $t_{on}$ | $I_C$=-150mA,$V_{CC}$=-30V,$I_{B1}$=-15mA | - | 45 | ns |
| Delay Time | $t_d$ | $V_{CC}$=-30V,$I_C$=-150mA,$I_{B1}$=-15mA | - | 10 | ns |
| Rise Time | $t_r$ | | - | 40 | ns |

## Small Signal Surface Mount Transistor MMDT2227

TYPICAL CHARACTERISTICS @ Ta=25℃ unless otherwise specified

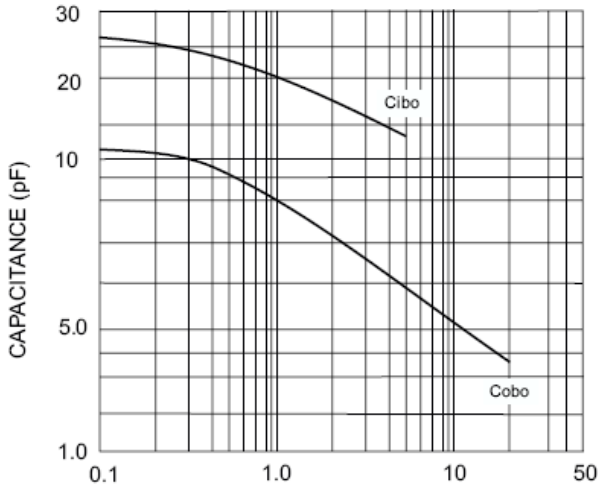



Fig. 1 (2222A) Capacitances (Typical)

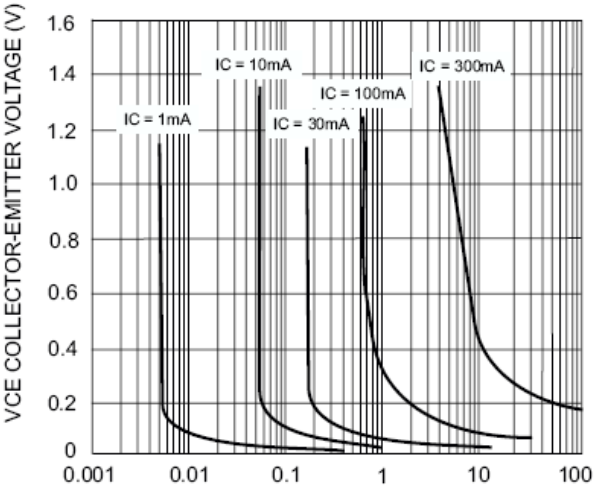



Fig. 4 (2907A) Typical Collector Saturation Region

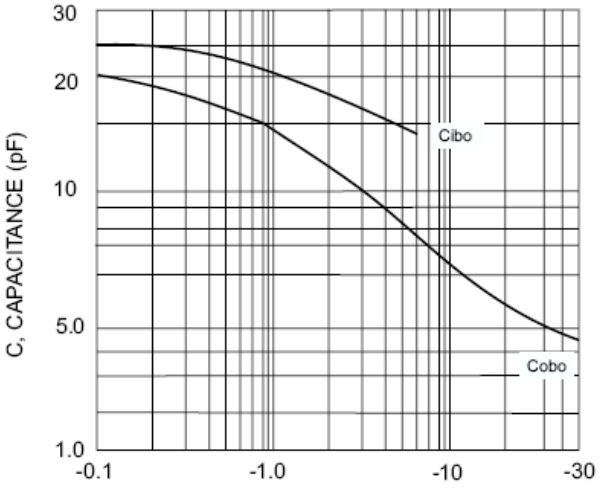



Fig. 3 (2907A) Capacitances (Typical)

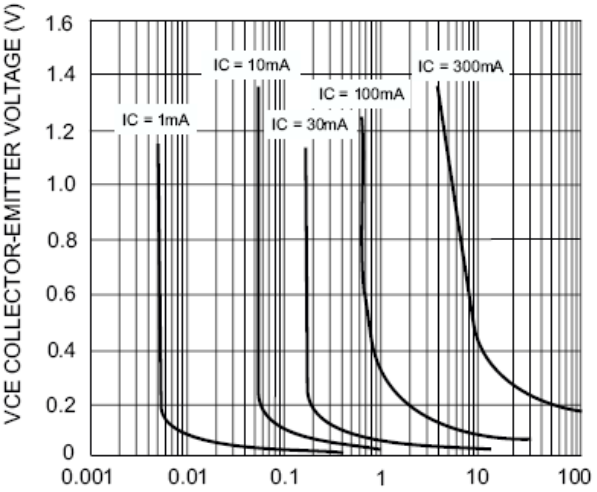
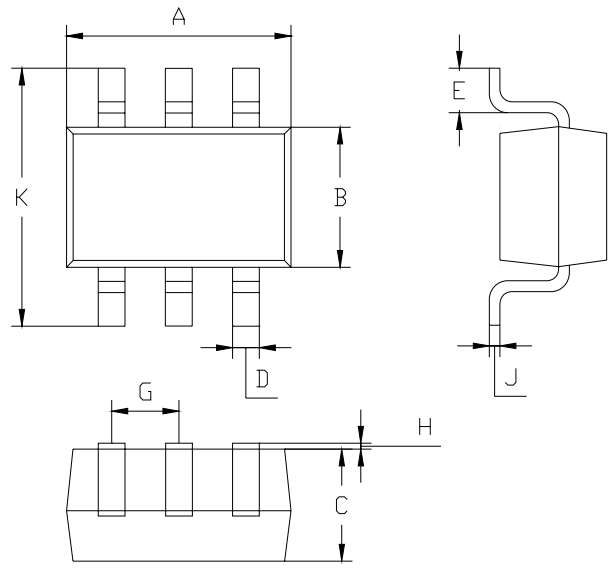



Fig. 4 (2907A) Typical Collector Saturation Region

## Small Signal Surface Mount Transistor MMDT2227

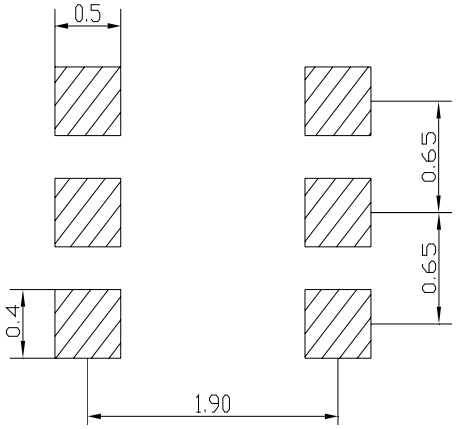
## PACKAGE OUTLINE

Plastic surface mounted package SOT-363




| SOT-363 | | |
|---|---|---|
| Dim | Min | Max |
| A | 1.8 | 2.2 |
| B | 1.15 | 1.35 |
| C | 1.0Typical | |
| D | 0.10 | 0.30 |
| E | 0.25 | 0.40 |
| G | 0.65Typical | |
| H | 0.02 | 0.10 |
| J | 0.1Typical | |
| K | 2.1 | 2.3 |
| All Dimensions in mm | | |

## SOLDERING FOOTPRINT




Unit : mm

## PACKAGE INFORMATION

| Device | Package | Shipping |
|---|---|---|
| MMDT2227 | SOT-363 | 3000/Tape&Reel |