# MOSPEC

## COMPLEMENTARY SILICON PLASTIC POWER TRANSISTORS

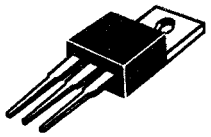
... designed for use in high-frequency drivers in audio amplifier applications.

| NPN | PNP |
|---|---|
| MJE15028 | MJE15029 |
| MJE15030 | MJE15031 |

8.0 AMPERE
COMPLEMENTARY SILICON
POWER TRANSISTORS
120-150 Volts
50 Watts

FEATURES:

* Collector-Emitter Sustaining Voltage-
  $V_{CEO(SUS)}$ = 120 V (Min) -MJE15028,MJE15029
  = 150V (Min) -MJE15030,MJE15031
* DC Current Gain Specified to 8.0 Amperes
  hFE = 40(Min) @ $I_C$ =3.0 A
  = 20(Min) @ $I_C$=4.0 A
* TO-220AB Compact Package



TO-220

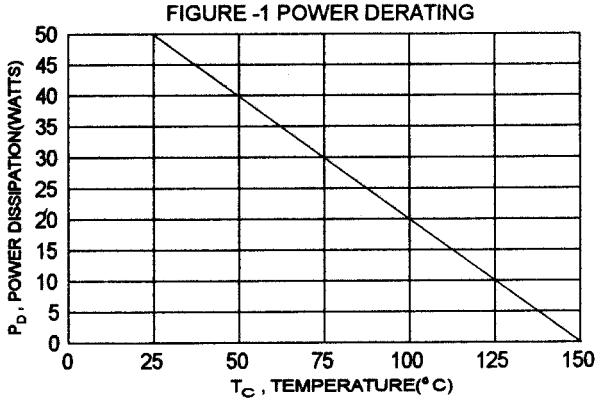
## MAXIMUM RATINGS

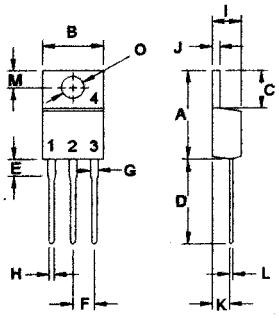
| Characteristic | Symbol | MJE15028 MJE15029 | MJE15030 MJE15031 | Unit |
|---|---|---|---|---|
| Collector-Emitter Voltage | $V_{CEO}$ | 120 | 150 | V |
| Collector-Base Voltage | $V_{CBO}$ | 120 | 150 | V |
| Emitter-Base Voltage | $V_{EBO}$ | 5.0 | | V |
| Collector Current - Continuous<br>- Peak | $I_C$ | 8.0<br>16 | | A |
| Base Current | $I_B$ | 2.0 | | A |
| Total Power Dissipation@$T_C$ = 25°C<br>Derate above 25°C | $P_D$ | 50<br>0.4 | | W<br>W/°C |
| Operating and Storage Junction Temperature Range | $T_J$ ,$T_{STG}$ | -65 to +150 | | °C |

## THERMAL CHARACTERISTICS

| Characteristic | Symbol | Max | Unit |
|---|---|---|---|
| Thermal Resistance Junction to Case | Rθjc | 2.50 | °C/W |

FIGURE -1 POWER DERATING




PIN 1.BASE
2.COLLECTOR
3.EMITTER
4.COLLECTOR(CASE)

| DIM | MILLIMETERS | |
|---|---|---|
| | MIN | MAX |
| A | 14.68 | 15.31 |
| B | 9.78 | 10.42 |
| C | 5.01 | 6.52 |
| D | 13.06 | 14.62 |
| E | 3.57 | 4.07 |
| F | 2.42 | 3.66 |
| G | 1.12 | 1.36 |
| H | 0.72 | 0.96 |
| I | 4.22 | 4.98 |
| J | 1.14 | 1.38 |
| K | 2.20 | 2.97 |
| L | 0.33 | 0.55 |
| M | 2.48 | 2.98 |
| O | 3.70 | 3.90 |

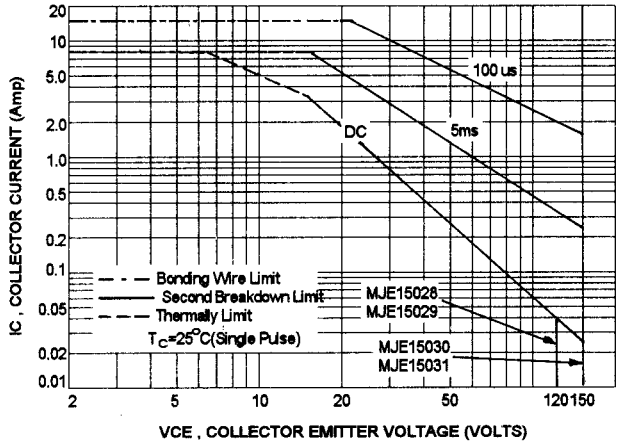
## ELECTRICAL CHARACTERISTICS ( $T_C$ = 25°C unless otherwise noted )

| Characteristic | | Symbol | Min | Max | Unit |
|---|---|---|---|---|---|
| **OFF CHARACTERISTICS** | | | | | |
| Collector-Emitter Sustaining Voltage(1)<br>( $I_C$ = 10 mA, $I_B$ = 0 ) | MJE15028,MJE15029<br>MJE15030,MJE15031 | $V_{CEO(SUS)}$ | 120<br>150 | | V |
| Collector Cutoff Current<br>( $V_{CE}$ = 120 V, $I_B$ = 0 )<br>( $V_{CE}$ = 150 V, $I_B$ = 0 ) | MJE15028,MJE15029<br>MJE15030,MJE15031 | $I_{CEO}$ | | 0.1<br>0.1 | mA |
| Collector Cutoff Current<br>( $V_{CB}$ = 120 V, $I_E$ = 0 )<br>( $V_{CB}$ = 150 V, $I_E$ = 0 ) | MJE15028,MJE15029<br>MJE15030,MJE15031 | $I_{CBO}$ | | 10<br>10 | uA |
| Emitter Cutoff Current<br>( $V_{EB}$ = 5.0 V , $I_C$ = 0 ) | | $I_{EBO}$ | | 10 | uA |
| **ON CHARACTERISTICS** (1) | | | | | |
| DC Current Gain<br>( $I_C$ = 0.1 A, $V_{CE}$ = 2.0 V )<br>( $I_C$ = 2.0 A, $V_{CE}$ = 2.0 V )<br>( $I_C$ = 3.0 A, $V_{CE}$ = 2.0 V )<br>( $I_C$ = 4.0 A, $V_{CE}$ = 2.0 V ) | | hFE | 40<br>40<br>40<br>20 | | |
| Collector-Emitter Saturation Voltage<br>( $I_C$ = 1.0 A, $I_B$ = 0.1 A ) | | $V_{CE(sat)}$ | | 0.5 | V |
| Base-Emitter On Voltage<br>( $I_C$ = 1.0 A, $V_{CE}$ = 2.0 V ) | | $V_{BE(on)}$ | | 1.0 | V |
| **DYNAMIC CHARACTERISTICS** | | | | | |
| Current-Gain-Bandwidth Product (2)<br>( $I_C$ = 0.5 A, $V_{CE}$ = 10 V, f = 1 0 MHz ) | | $f_T$ | 30 | | MHz |

(1) Pulse Test: Pulse width = 300 μs , Duty Cycle ≦ 2.0%

(2) $f_T = |h_{fe}| \cdot f_{test}$

FIG-2 ACTIVE REGION SAFE OPERATING AREA




There are two limitation on the power handling ability of a transistor:average junction temperature and second breakdown safe operating area curves indicate $I_C$-$V_{CE}$ limits of the transistor that must be observed for reliable operation i.e., the transistor must not be sub-jected to greater dissipation than curves indicate.

The data of Fig-2 and Fig-3 is base on $T_{J(PK)}$=150 °C;$T_C$ is variable depending on conditions. second breakdown pulse limits are valid for duty cycles to 10% provided $T_{J(PK)}$≤150°C,At high case temperatures, thermal limita - tion will reduce the power that can be handled to values less than the limitations imposed by second breakdown.

FIG-3 REVERSE BIASE SAFE OPERATING AREA

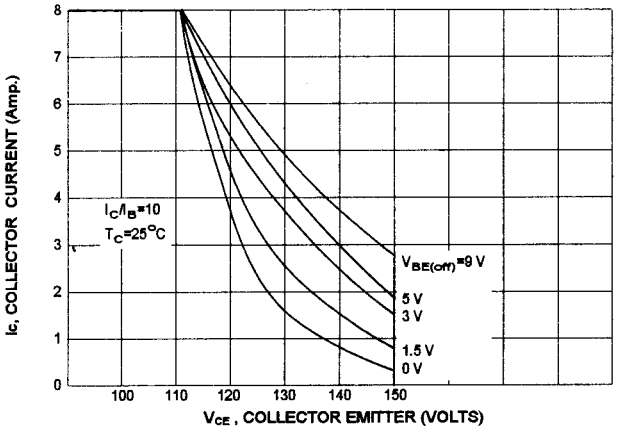



FIG-4 CAPACITANCES

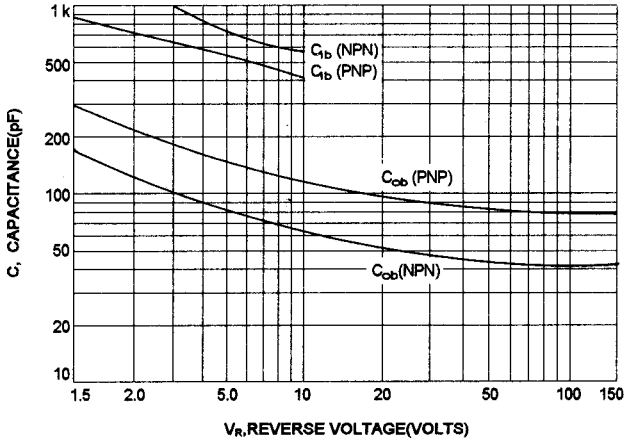



FIG-5 SMALL-SIGNAL CURRENT GAIN

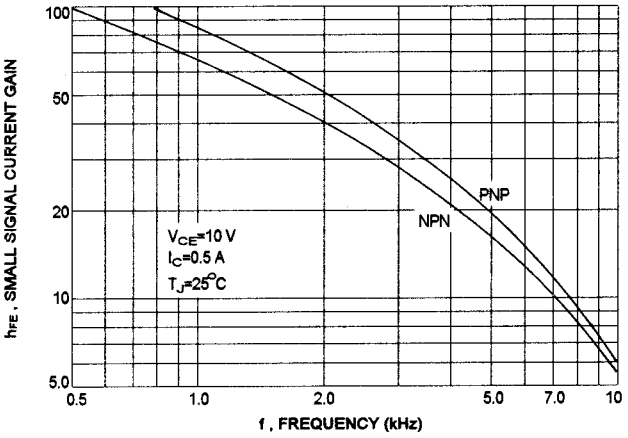



FIG-6 CURRENT GAIN- BANDWIDTH PRODUCT

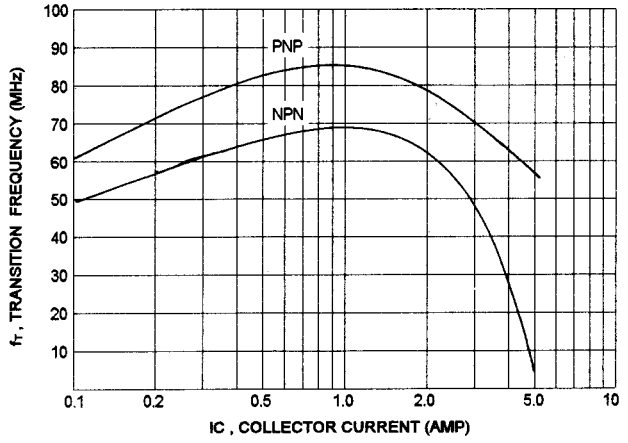
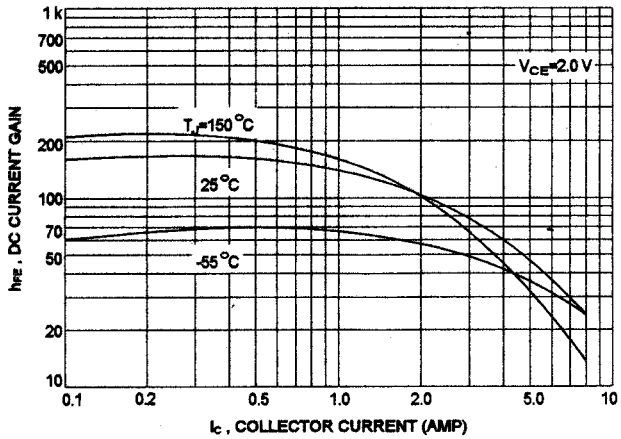


FIG-7 DC CURRENT GAIN

NPN- MJE15028, MJE15030




PNP- MJE15029, MJE15031

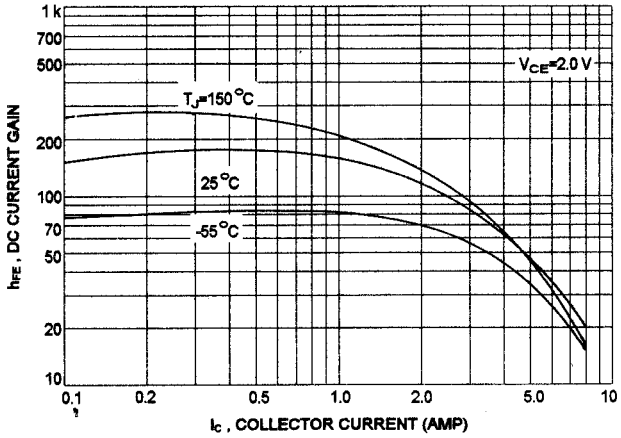
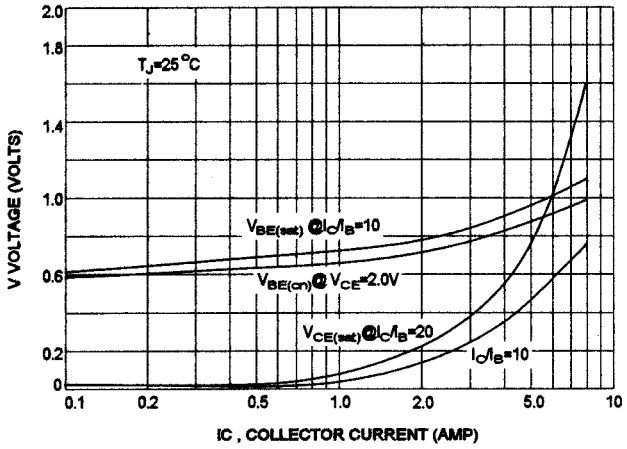



FIG-8 "ON" VOLTAGE

NPN-MJE15028, MJE15030




PNP-MJE15029, MJE15031

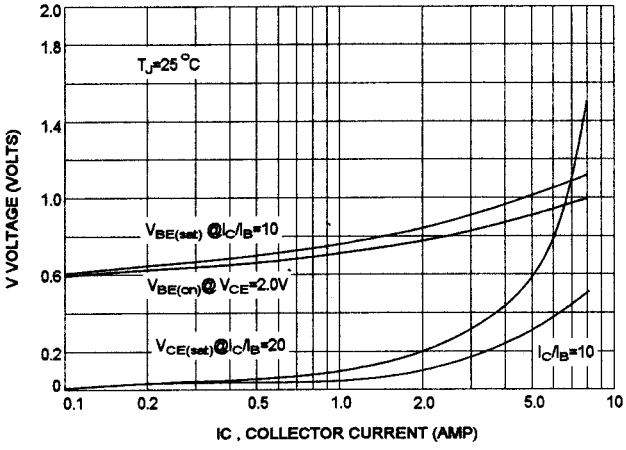



FIG-9 TURN-ON TIME

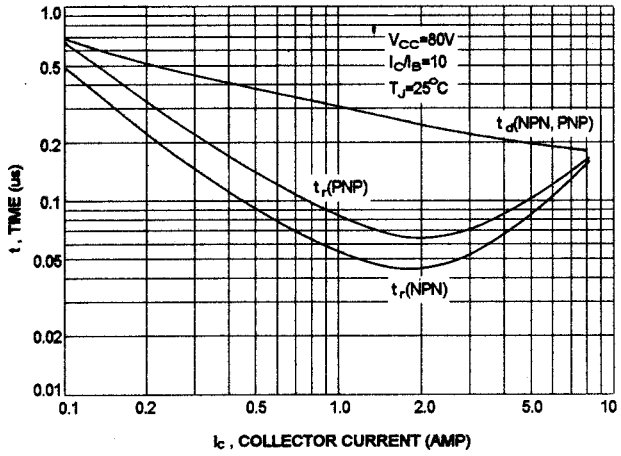



FIG-10 TURN-OFF TIME