

## COMPLEMENTARY SILICON PLASTIC POWER TRANSISTORS

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

### FEATURES:

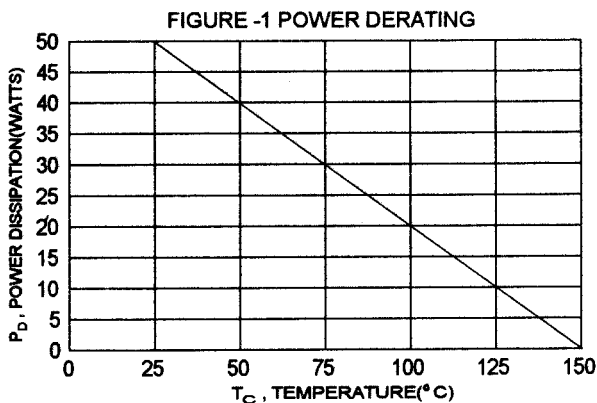
- \* Collector-Emitter Sustaining Voltage-  
 $V_{CEO(BUS)}$  = 120 V (Min) -MJE15028,MJE15029  
 = 150V (Min) -MJE15030,MJE15031
- \* DC Current Gain Specified to 8.0 Ampers  
 $hFE = 40(\text{Min}) @ I_C = 3.0 \text{ A}$   
 $= 20(\text{Min}) @ I_C = 4.0 \text{ A}$
- \* TO-220AB Compact Package

### 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 - Peak	$I_C$	8.0 16		A
Base Current	$I_B$	2.0		A
Total Power Dissipation @ $T_C = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	50 0.4		W W/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	$T_J, T_{STG}$	-65 to +150		$^\circ\text{C}$

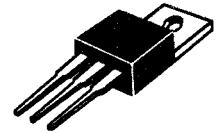
### THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance Junction to Case	$R_{\theta jc}$	2.50	$^\circ\text{C/W}$

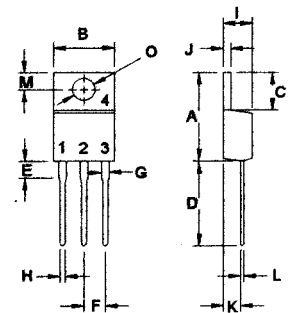


NPN	PNP
MJE15028	MJE15029
MJE15030	MJE15031

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



TO-220



- 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

MJE15028, MJE15030 NPN / MJE15029, MJE15031 PNP

**ELECTRICAL CHARACTERISTICS (  $T_c = 25^\circ\text{C}$  unless otherwise noted )**

Characteristic	Symbol	Min	Max	Unit
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**OFF CHARACTERISTICS**

Collector-Emitter Sustaining Voltage(1) ( $I_c = 10 \text{ mA}$ , $I_B = 0$ ) MJE15028,MJE15029 MJE15030,MJE15031	$V_{CE(sus)}$	120 150		V
Collector Cutoff Current ( $V_{CE} = 120 \text{ V}$ , $I_B = 0$ ) ( $V_{CE} = 150 \text{ V}$ , $I_B = 0$ ) MJE15028,MJE15029 MJE15030,MJE15031	$I_{CEO}$		0.1 0.1	mA
Collector Cutoff Current ( $V_{CB} = 120 \text{ V}$ , $I_E = 0$ ) ( $V_{CB} = 150 \text{ V}$ , $I_E = 0$ ) MJE15028,MJE15029 MJE15030,MJE15031	$I_{CBO}$		10 10	$\mu\text{A}$
Emitter Cutoff Current ( $V_{EB} = 5.0 \text{ V}$ , $I_C = 0$ )	$I_{EBO}$		10	$\mu\text{A}$

**ON CHARACTERISTICS (1)**

DC Current Gain ( $I_c = 0.1 \text{ A}$ , $V_{CE} = 2.0 \text{ V}$ ) ( $I_c = 2.0 \text{ A}$ , $V_{CE} = 2.0 \text{ V}$ ) ( $I_c = 3.0 \text{ A}$ , $V_{CE} = 2.0 \text{ V}$ ) ( $I_c = 4.0 \text{ A}$ , $V_{CE} = 2.0 \text{ V}$ )	hFE	40 40 40 20		
Collector-Emitter Saturation Voltage ( $I_c = 1.0 \text{ A}$ , $I_B = 0.1 \text{ A}$ )	$V_{CE(sat)}$		0.5	V
Base-Emitter On Voltage ( $I_c = 1.0 \text{ A}$ , $V_{CE} = 2.0 \text{ V}$ )	$V_{BE(on)}$		1.0	V

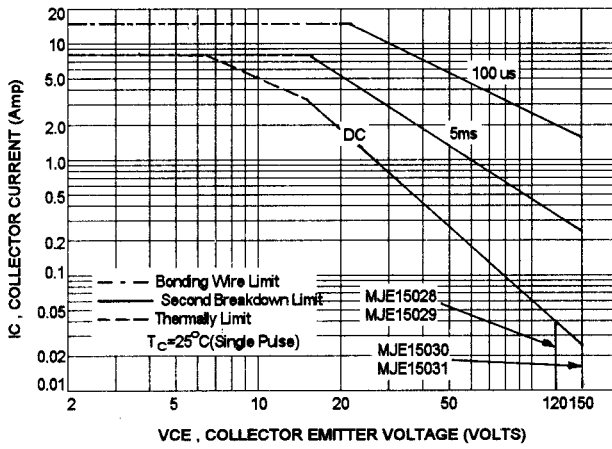
**DYNAMIC CHARACTERISTICS**

Current-Gain-Bandwidth Product (2) ( $I_c = 0.5 \text{ A}$ , $V_{CE} = 10 \text{ V}$ , $f = 10 \text{ MHz}$ )	$f_T$	30		MHz
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(1) Pulse Test: Pulse width =  $300 \mu\text{s}$ , Duty Cycle  $\leq 2.0\%$

(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 subjected to greater dissipation than curves indicate.

The data of Fig-2 and Fig-3 is base on  $T_{J(PK)} = 150^\circ\text{C}$ ;  $T_C$  is variable depending on conditions. second breakdown pulse limits are valid for duty cycles to 10% provided  $T_{J(PK)} \leq 150^\circ\text{C}$ . At high case temperatures, thermal limitation 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

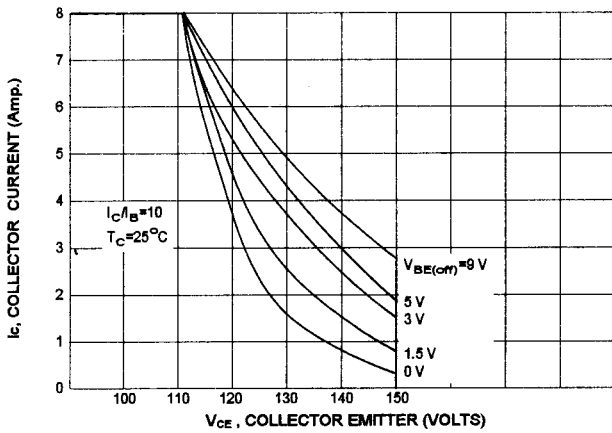


FIG-4 CAPACITANCES

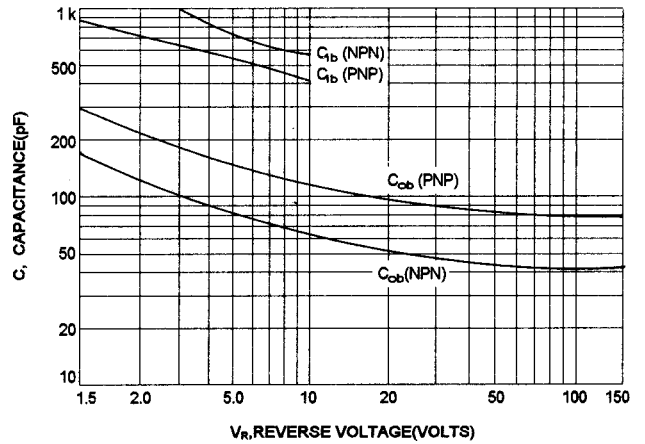


FIG-5 SMALL-SIGNAL CURRENT GAIN

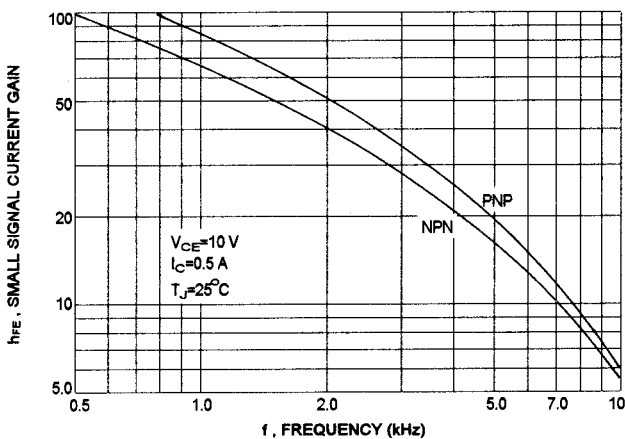


FIG-6 CURRENT GAIN- BANDWIDTH PRODUCT

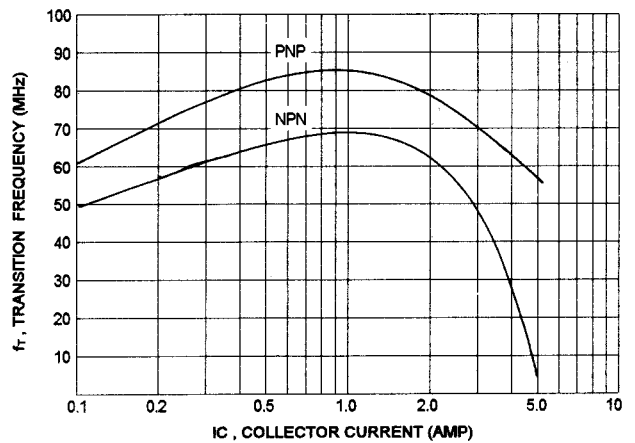
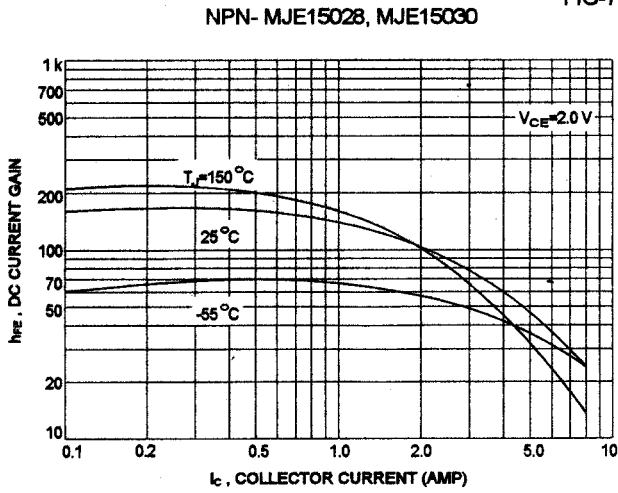


FIG-7 DC CURRENT GAIN



PNP- MJE15029, MJE15031

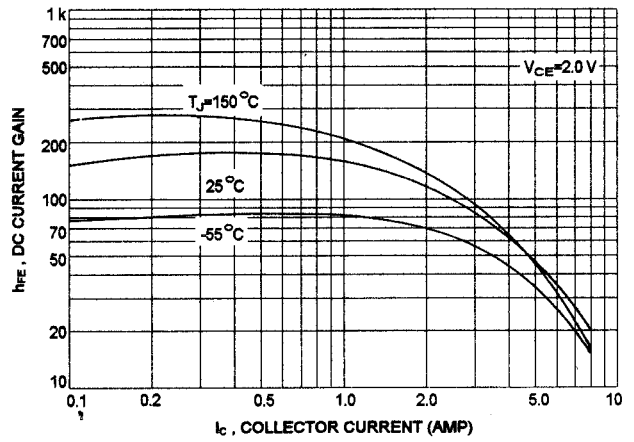
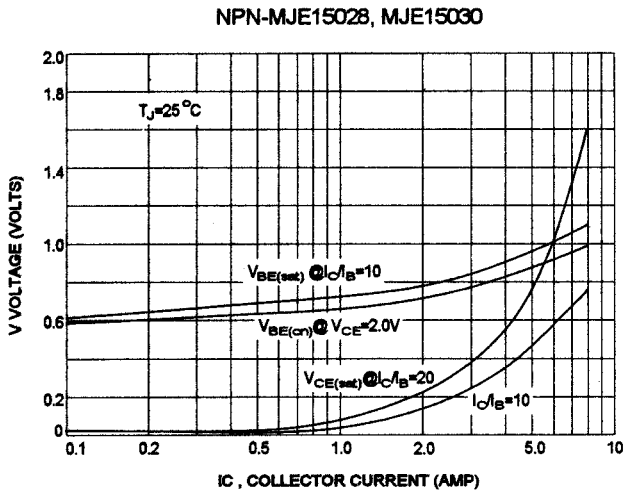


FIG-8 "ON" VOLTAGE



PNP-MJE15029, MJE15031

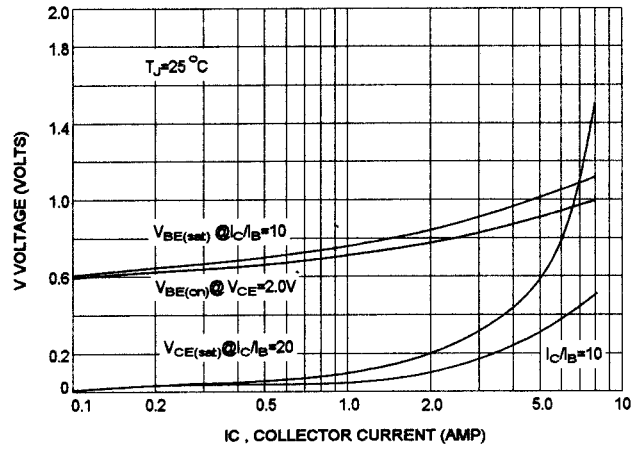


FIG-9 TURN-ON TIME

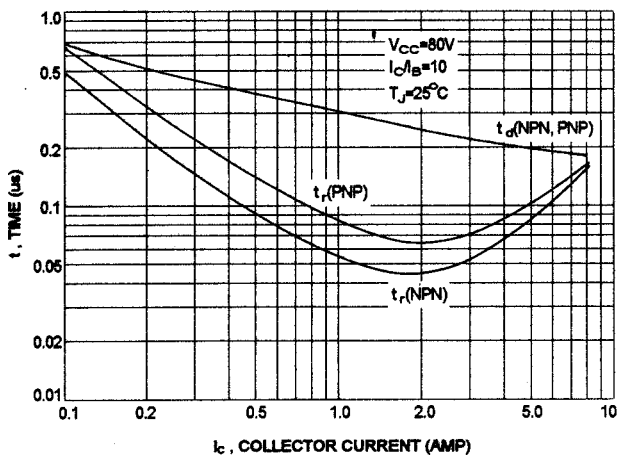


FIG-10 TURN-OFF TIME

