Complementary Silicon Plastic Power Transistors

- . . . designed for use as high-frequency drivers in audio amplifiers.
- DC Current Gain Specified to 5.0 Amperes

 $h_{FE} = 50 \text{ (Min)} @ I_{C} = 0.5 \text{ Adc}$

= 10 (Min) @ I_C = 2.0 Adc

• Collector-Emitter Sustaining Voltage —

VCEO(sus) = 250 Vdc (Min) — MJE15032, MJE15033

High Current Gain — Bandwidth Product

fT = 30 MHz (Min) @ IC = 500 mAdc

TO–220AB Compact Package

MAXIMUM RATINGS

Rating	Symbol	MJE15032 MJE15033	Unit
Collector–Emitter Voltage	VCEO	250	Vdc
Collector-Base Voltage	VCB	250	Vdc
Emitter–Base Voltage	V _{EB}	5.0	Vdc
Collector Current — Continuous — Peak	IC	8.0 16	Adc
Base Current	ΙΒ	2.0	Adc
Total Power Dissipation @ T _C = 25°C Derate above 25°C	PD	50 0.40	Watts W/°C
Total Power Dissipation @ T _A = 25°C Derate above 25°C	PD	2.0 0.016	Watts 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	$R_{\theta JC}$	2.5	°C/W
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	62.5	°C/W

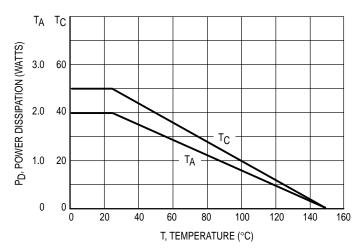


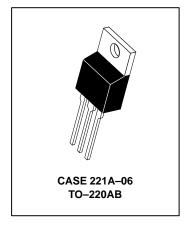
Figure 1. Power Derating

Preferred devices are Motorola recommended choices for future use and best overall value.

NPN MJE15032* PNP MJE15033*

*Motorola Preferred Device

8.0 AMPERES
POWER TRANSISTORS
COMPLEMENTARY
SILICON
250 VOLTS
50 WATTS





MJE15032 MJE15033

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

Characteristic		Symbol	Min	Max	Unit
OFF CHARACTERISTICS					
Collector–Emitter Sustaining Voltage (1) (I _C = 10 mAdc, I _B = 0)	MJE15032, MJE15033	VCEO(sus)	250	_	Vdc
Collector Cutoff Current (V _{CB} = 150 Vdc, I _E = 0)	MJE15032, MJE15033	ICBO	_	10	μAdc
Emitter Cutoff Current (V _{BE} = 5.0 Vdc, I _C = 0)		I _{EBO}	_	10	μAdc
ON CHARACTERISTICS (1)					
DC Current Gain (I _C = 0.5 Adc, V _{CE} = 5.0 Vdc) (I _C = 1.0 Adc, V _{CE} = 5.0 Vdc) (I _C = 2.0 Adc, V _{CE} = 5.0 Vdc)		hFE	50 50 10		_
Collector–Emitter Saturation Voltage (I _C = 1.0 Adc, I _B = 0.1 Adc)		VCE(sat)	_	0.5	Vdc
Base–Emitter On Voltage (I _C = 1.0 Adc, V _{CE} = 5.0 Vdc)		V _{BE(on)}	_	1.0	Vdc
DYNAMIC CHARACTERISTICS					
Current Gain — Bandwidth Product (2) (I _C = 500 mAdc, V _{CE} = 10 Vdc, f _{test} = 1.0 MHz)		fΤ	30	_	MHz

⁽¹⁾ Pulse Test: Pulse Width $\leq 300 \,\mu\text{s}$, Duty Cycle $\leq 2.0\%$.

⁽²⁾ $f_T = |h_{fe}| \cdot f_{test}$

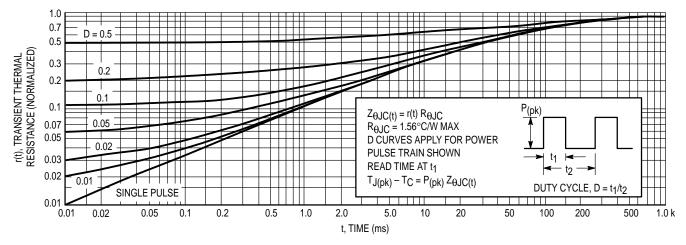


Figure 2. Thermal Response

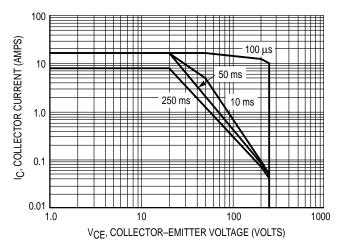


Figure 3. MJE15032 & MJE15033 Safe Operating Area

There are two limitations on the power handling ability of a transistor: average junction temperature and second breakdown. Safe operating area curves indicate $I_{\text{C}} - V_{\text{CE}}$ limits of the transistor that must be observed for reliable operation, i.e., the transistor must not be subjected to greater dissipation then the curves indicate.

The data of Figures 3 and 4 is based on $T_{J(pk)} = 150^{\circ}C$; T_{C} is variable depending on conditions. Second breakdown pulse limits are valid for duty cycles to 10% provided $T_{J(pk)} < 150^{\circ}C$. $T_{J(pk)}$ may be calculated from the data in Figure 2. At high case temperatures, thermal limitations will reduce the power that can be handled to values less than the limitations imposed by second breakdown.

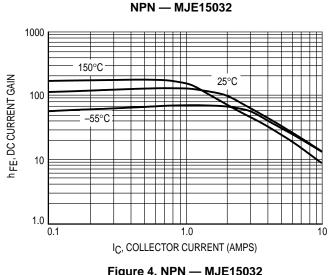


Figure 4. NPN — MJE15032 VCE = 5 V DC Current Gain

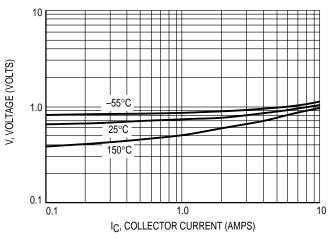


Figure 6. NPN — MJE15032 VCE = 5 V VBE(on) Curve

PNP — MJE15033

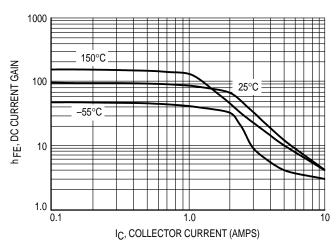


Figure 5. PNP — MJE15033 V_{CE} = 5 V DC Current Gain

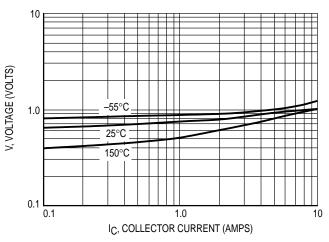


Figure 7. PNP — MJE15033 VCE = 5 V VBE(on) Curve

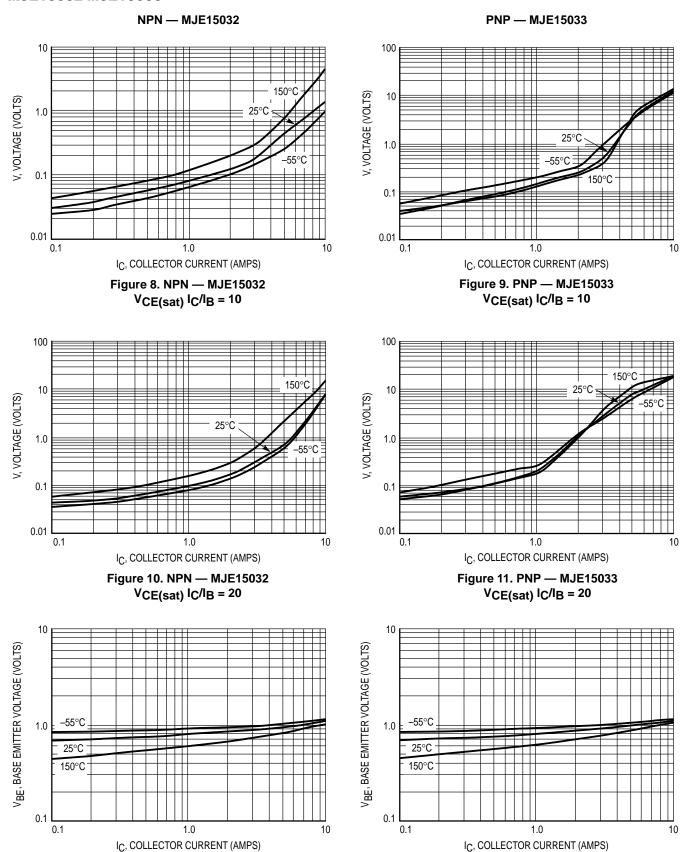


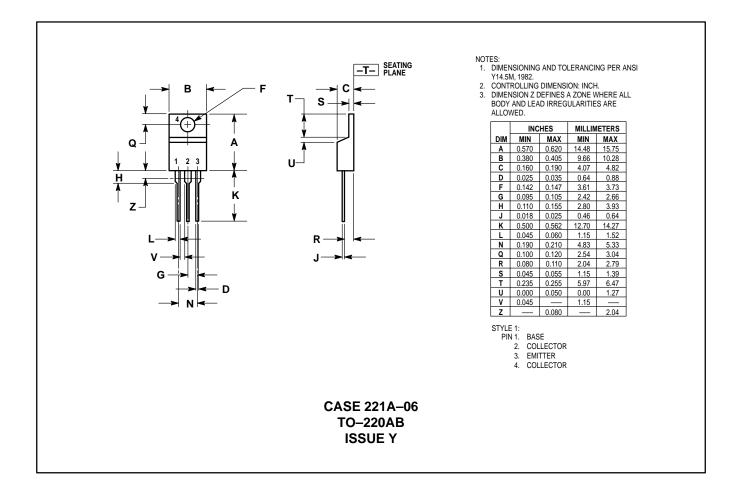
Figure 12. NPN — MJE15032

 $V_{BE(sat)} I_{C}/I_{B} = 10$

Figure 13. PNP — MJE15033

VBE(sat) IC/IB = 10

PACKAGE DIMENSIONS



MJE15032 MJE15033

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MJE15032/D