# **Complementary Silicon Plastic Power Transistors**

#### TO-220, NPN & PNP Devices

Complementary silicon plastic power transistors are designed for use as high-frequency drivers in audio amplifiers.

#### **Features**

- High Current Gain Bandwidth Product
- TO-220 Compact Package
- Epoxy meets UL 94 V-0 @ 0.125 in
- These Devices are Pb-Free and are RoHS Compliant\*

#### **MAXIMUM RATINGS**

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V <sub>CEO</sub>	350	Vdc
Collector-Base Voltage	V <sub>CB</sub>	350	Vdc
Emitter-Base Voltage	V <sub>EB</sub>	5.0	Vdc
Collector Current – Continuous	I <sub>C</sub>	4.0	Adc
Collector Current – Peak	I <sub>CM</sub>	8.0	Adc
Base Current	Ι <sub>Β</sub>	1.0	Adc
Total Power Dissipation  @ T <sub>C</sub> = 25°C  Derate above 25°C	P <sub>D</sub>	50 0.40	W W/°C
Total Power Dissipation @ T <sub>A</sub> = 25°C Derate above 25°C	P <sub>D</sub>	2.0 0.016	W W/°C
Operating and Storage Junction Temperature Range	T <sub>J</sub> , T <sub>stg</sub>	-65 to +150	°C
ESD – Human Body Model	HBM	3B	V
ESD – Machine Model	MM	С	V

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

#### 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

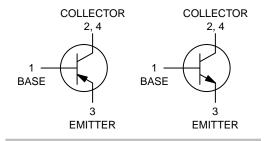


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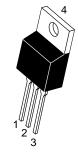
www.onsemi.com

# 4.0 AMPERES POWER TRANSISTORS COMPLEMENTARY SILICON 350 VOLTS, 50 WATTS

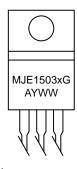
#### **COMPLEMENTARY**



#### MARKING DIAGRAM



TO-220 CASE 221A STYLE 1



MJE1503x = Device Code

x = 4 or 5

= Location Code

= Year

WW = Work Week
G = Pb-Free Package

#### **ORDERING INFORMATION**

Device	Package	Shipping
MJE15034G	TO-220 (Pb-Free)	50 Units / Rail
MJE15035G	TO-220 (Pb-Free)	50 Units / Rail

<sup>\*</sup>For additional information on our Pb–Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

#### **ELECTRICAL CHARACTERISTICS** (T<sub>C</sub> = 25°C unless otherwise noted)

Characteristic		Symbol	Min	Max	Unit
OFF CHARACTERISTICS					
Collector–Emitter Sustaining Voltage (Note 1)	$(I_C = 10 \text{ mAdc}, I_B = 0)$	V <sub>CEO(sus)</sub>	350	_	Vdc
Collector Cutoff Current	$(V_{CB} = 350 \text{ Vdc}, I_{E} = 0)$	I <sub>CBO</sub>	-	10	μAdc
Emitter Cutoff Current	$(V_{BE} = 5.0 \text{ Vdc}, I_{C} = 0)$	I <sub>EBO</sub>	-	10	μAdc
ON CHARACTERISTICS (Note 1)					
DC Current Gain	$ \begin{aligned} &(I_C = 0.1 \text{ Adc, } V_{CE} = 5.0 \text{ Vdc}) \\ &(I_C = 0.5 \text{ Adc, } V_{CE} = 5.0 \text{ Vdc}) \\ &(I_C = 1.0 \text{ Adc, } V_{CE} = 5.0 \text{ Vdc}) \\ &(I_C = 2.0 \text{ Adc, } V_{CE} = 5.0 \text{ Vdc}) \end{aligned} $	h <sub>FE</sub>	100 100 50 10	- - -	-
Collector–Emitter Saturation Voltage	$(I_C = 1.0 \text{ Adc}, I_B = 0.1 \text{ Adc})$	V <sub>CE(sat)</sub>	-	0.5	Vdc
Base-Emitter On Voltage	$(I_C = 1.0 \text{ Adc}, V_{CE} = 5.0 \text{ Vdc})$	V <sub>BE(on)</sub>	-	1.0	Vdc
DYNAMIC CHARACTERISTICS					
Current Gain – Bandwidth Product (Note 2) (I <sub>C</sub> = 500 mAdc, V <sub>CE</sub> = 10 Vdc, f <sub>test</sub> = 1.0 MHz)		f⊤	30	_	MHz

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

- 1. Pulse Test: Pulse Width  $\leq$  300  $\mu$ s, Duty Cycle  $\leq$  2.0%.
- 2.  $f_T = |h_{fe}| \cdot f_{test}$ .

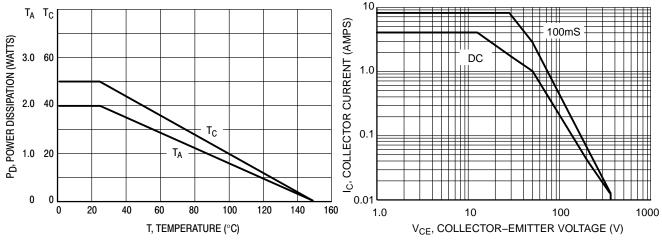


Figure 1. Power Derating

Figure 2. Active Region Safe Operating Area

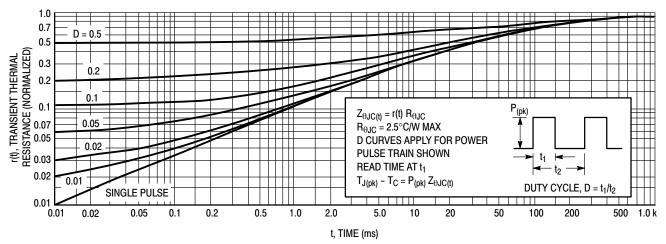


Figure 3. Thermal Response

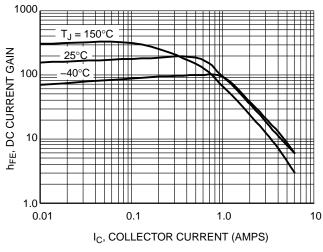


Figure 4. DC Current Gain, V<sub>CE</sub> = 5.0 V NPN MJE15034

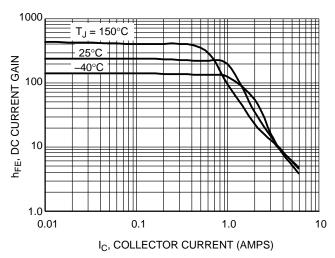


Figure 5. DC Current Gain, V<sub>CE</sub> = 5.0 V PNP MJE15035

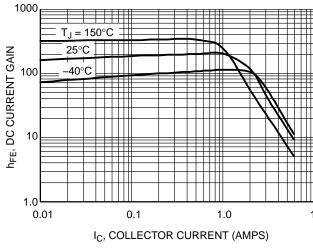


Figure 6. DC Current Gain, V<sub>CE</sub> = 20 V NPN MJE15034

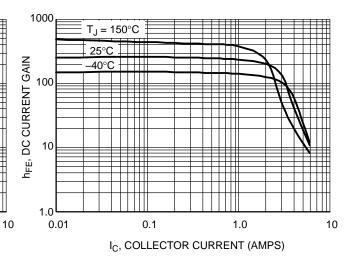


Figure 7. DC Current Gain, V<sub>CE</sub> = 20 V PNP MJE15035

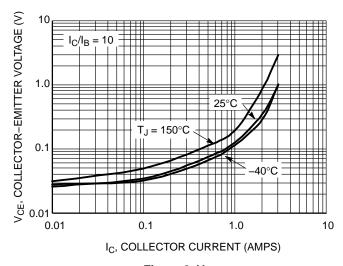


Figure 8. V<sub>CE(sat)</sub> NPN MJE15034

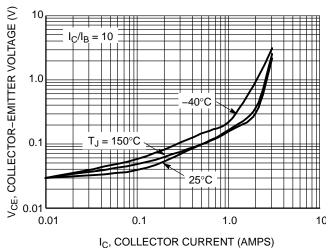


Figure 9. V<sub>CE(sat)</sub> PNP MJE15035

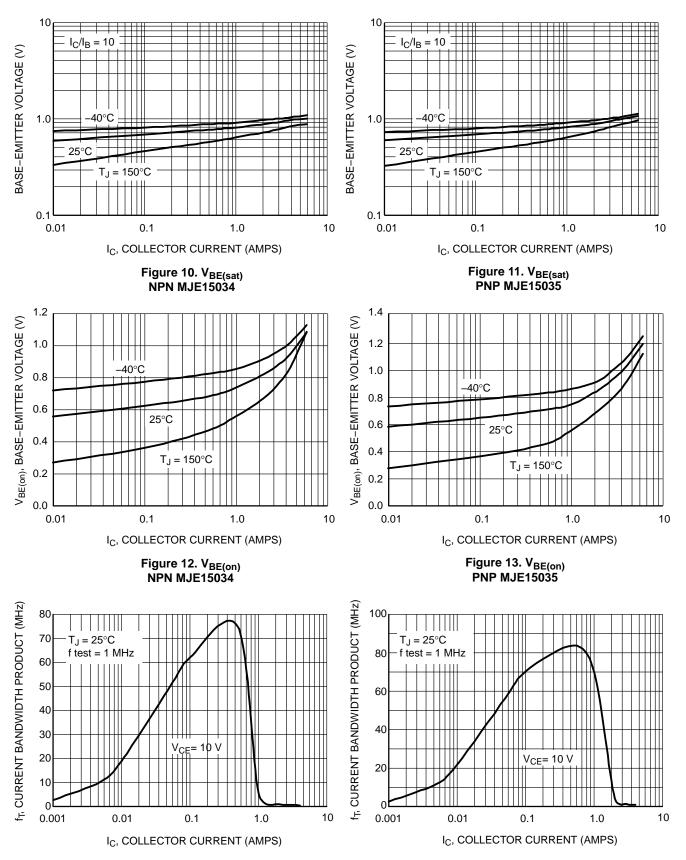
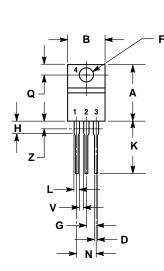


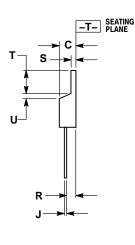
Figure 14. Typical Current Gain Bandwidth Product NPN MJE15034

Figure 15. Typical Current Gain Bandwidth Product PNP MJE15035

#### PACKAGE DIMENSIONS

TO-220 CASE 221A-09 **ISSUE AH** 





- DIMENSIONING AND TOLERANCING PER ANSI
- CONTROLLING DIMENSION: INCH.
- DIMENSION Z DEFINES A ZONE WHERE ALL BODY AND LEAD IRREGULARITIES ARE ALLOWED.

	INC	HES	MILLIMETERS		
DIM	MIN	MAX	MIN	MAX	
Α	0.570	0.620	14.48	15.75	
В	0.380	0.415	9.66	10.53	
С	0.160	0.190	4.07	4.83	
D	0.025	0.038	0.64	0.96	
F	0.142	0.161	3.61	4.09	
G	0.095	0.105	2.42	2.66	
Н	0.110	0.161	2.80	4.10	
J	0.014	0.024	0.36	0.61	
K	0.500	0.562	12.70	14.27	
L	0.045	0.060	1.15	1.52	
N	0.190	0.210	4.83	5.33	
Q	0.100	0.120	2.54	3.04	
R	0.080	0.110	2.04	2.79	
S	0.045	0.055	1.15	1.39	
Т	0.235	0.255	5.97	6.47	
U	0.000	0.050	0.00	1.27	
٧	0.045		1.15		
Z		0.080		2.04	

#### PIN 1 BASE

- COLLECTOR
- **EMITTER**
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