

2N3055A (NPN), MJ15015 (NPN), MJ15016 (PNP)

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

Characteristic	Symbol	Min	Max	Unit
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OFF CHARACTERISTICS (Note 2)

Collector-Emitter Sustaining Voltage (Note 3) ($I_C = 200\text{ mAdc}$, $I_B = 0$)	2N3055A MJ15015, MJ15016	$V_{CEO(sus)}$	60 120	– –	Vdc
Collector Cutoff Current ($V_{CE} = 30\text{ Vdc}$, $V_{BE(off)} = 0\text{ Vdc}$) ($V_{CE} = 60\text{ Vdc}$, $V_{BE(off)} = 0\text{ Vdc}$)	2N3055A MJ15015, MJ15016	I_{CEO}	– –	0.7 0.1	mAdc
Collector Cutoff Current (Note 3) ($V_{CEV} = \text{Rated Value}$, $V_{BE(off)} = 1.5\text{ Vdc}$)	2N3055A MJ15015, MJ15016	I_{CEV}	– –	5.0 1.0	mAdc
Collector Cutoff Current ($V_{CEV} = \text{Rated Value}$, $V_{BE(off)} = 1.5\text{ Vdc}$, $T_C = 150^\circ\text{C}$)	2N3055A MJ15015, MJ15016	I_{CEV}	– –	30 6.0	mAdc
Emitter Cutoff Current ($V_{EB} = 7.0\text{ Vdc}$, $I_C = 0$)	2N3055A MJ15015, MJ15016	I_{EBO}	– –	5.0 0.2	mAdc

SECOND BREAKDOWN (Note 3)

Second Breakdown Collector Current with Base Forward Biased ($t = 0.5\text{ s non-repetitive}$) ($V_{CE} = 60\text{ Vdc}$)	2N3055A MJ15015, MJ15016	$I_{S/b}$	1.95 3.0	– –	Adc
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ON CHARACTERISTICS (Note 2 and 3)

DC Current Gain ($I_C = 4.0\text{ Adc}$, $V_{CE} = 2.0\text{ Vdc}$) ($I_C = 4.0\text{ Adc}$, $V_{CE} = 4.0\text{ Vdc}$) ($I_C = 10\text{ Adc}$, $V_{CE} = 4.0\text{ Vdc}$)	h_{FE}	10 20 5.0	70 70 –	–
Collector-Emitter Saturation Voltage ($I_C = 4.0\text{ Adc}$, $I_B = 400\text{ mAdc}$) ($I_C = 10\text{ Adc}$, $I_B = 3.3\text{ Adc}$) ($I_C = 15\text{ Adc}$, $I_B = 7.0\text{ Adc}$)	$V_{CE(sat)}$	– – –	1.1 3.0 5.0	Vdc
Base-Emitter On Voltage ($I_C = 4.0\text{ Adc}$, $V_{CE} = 4.0\text{ Vdc}$)	$V_{BE(on)}$	0.7	1.8	Vdc

DYNAMIC CHARACTERISTICS (Note 3)

Current-Gain – Bandwidth Product ($I_C = 1.0\text{ Adc}$, $V_{CE} = 4.0\text{ Vdc}$, $f = 1.0\text{ MHz}$)	2N3055A, MJ15015 MJ15016	f_T	0.8 2.2	6.0 18	MHz
Output Capacitance ($V_{CB} = 10\text{ Vdc}$, $I_E = 0$, $f = 1.0\text{ MHz}$)		C_{ob}	60	600	pF

SWITCHING CHARACTERISTICS (2N3055A only) (Note 3)

RESISTIVE LOAD					
Delay Time	(V _{CC} = 30 Vdc, I _C = 4.0 Adc, I _{B1} = I _{B2} = 0.4 Adc, t _p = 25 μs Duty Cycle ≤ 2%)	t _d	–	0.5	μs
Rise Time		t _r	–	4.0	μs
Storage Time		t _s	–	3.0	μs
Fall Time		t _f	–	6.0	μs

2. Pulse Test: Pulse Width = 300 μs, Duty Cycle ≤ 2%.

3. Indicates JEDEC Registered Data. (2N3055A)

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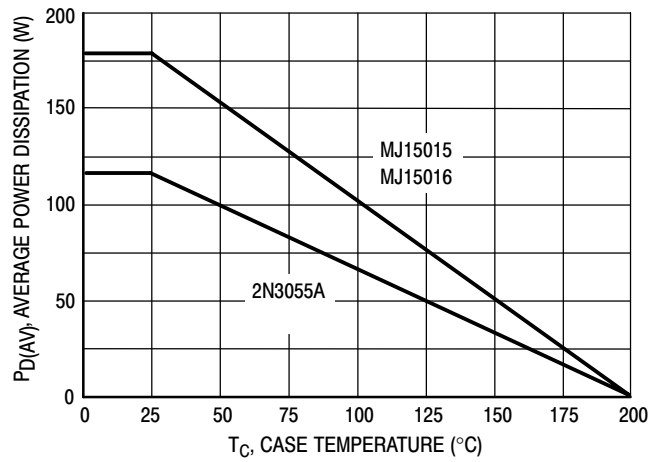


Figure 1. Power Derating

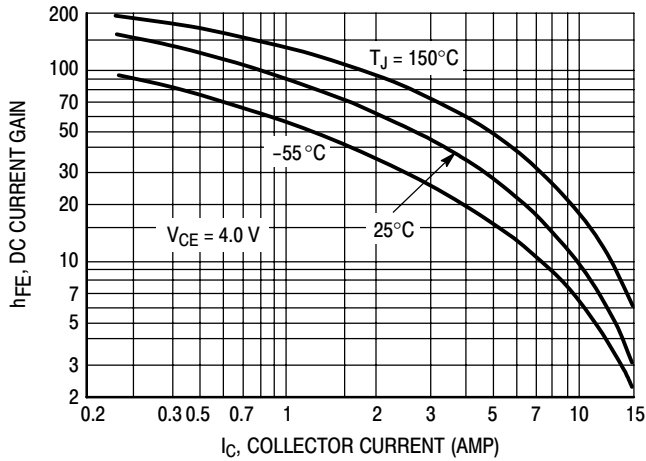


Figure 2. DC Current Gain

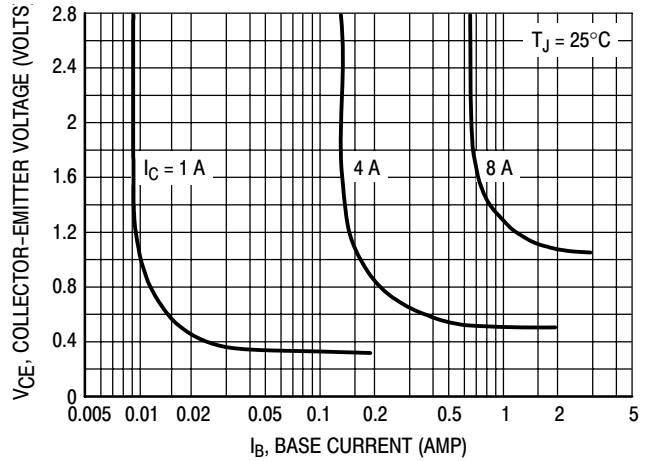


Figure 3. Collector Saturation Region

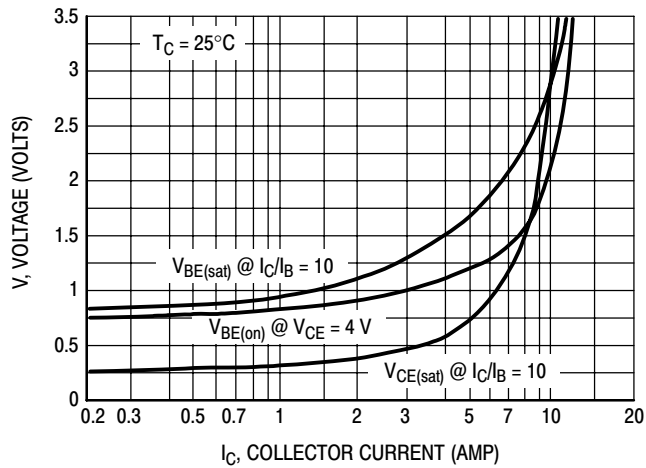


Figure 4. "On" Voltages

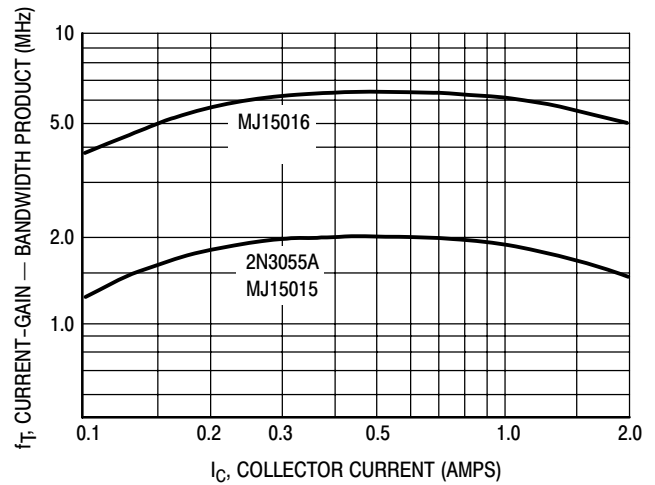


Figure 5. Current-Gain — Bandwidth Product

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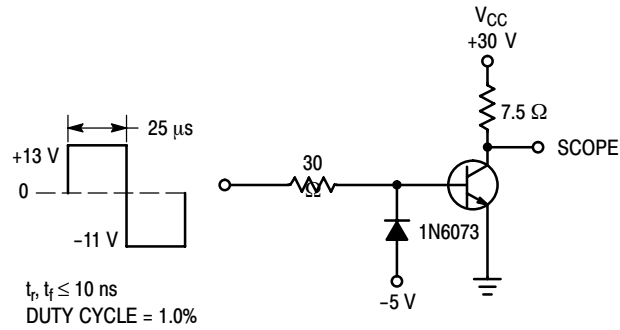


Figure 6. Switching Times Test Circuit
(Circuit shown is for NPN)

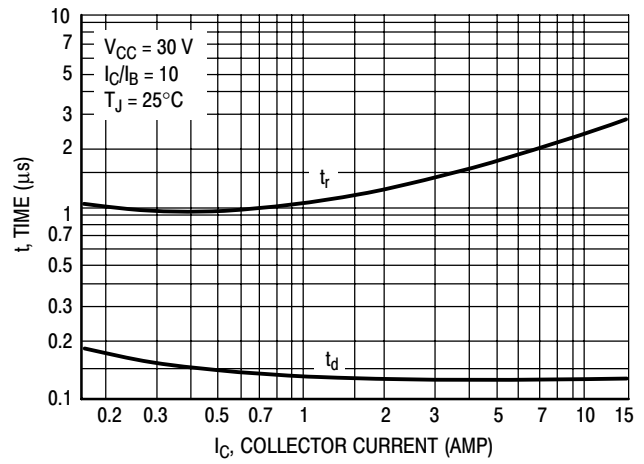


Figure 7. Turn-On Time

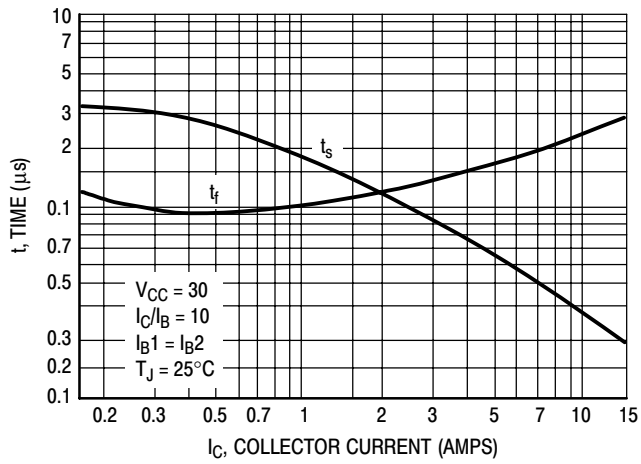


Figure 8. Turn-Off Times

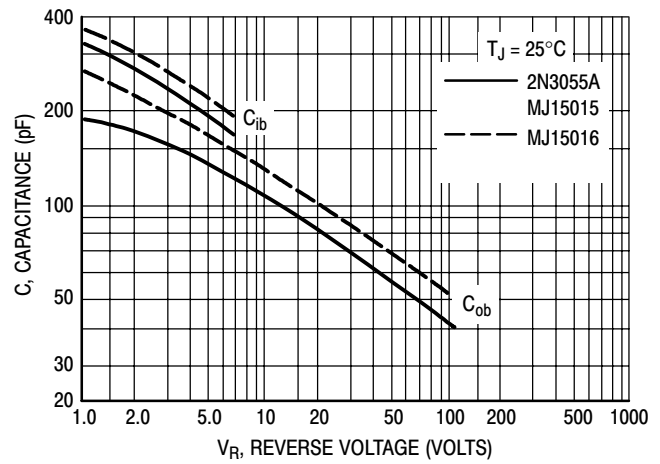


Figure 9. Capacitances

2N3055A (NPN), MJ15015 (NPN), MJ15016 (PNP)

COLLECTOR CUT-OFF REGION

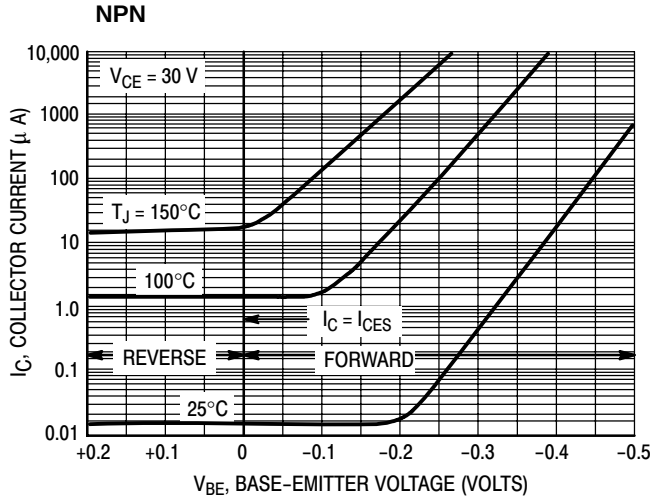


Figure 10. 2N3055A, MJ15015

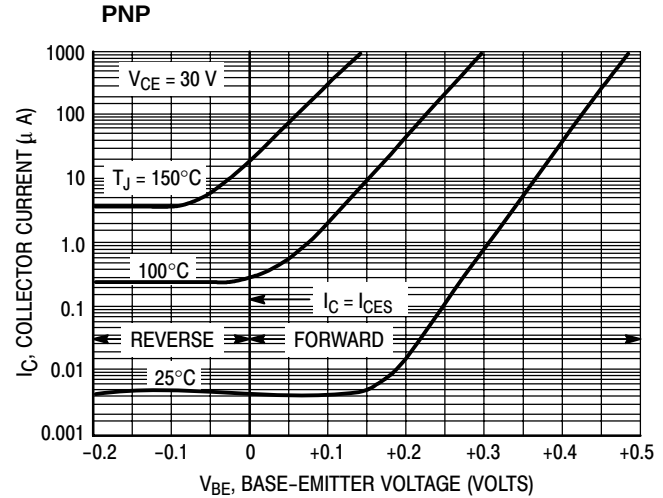


Figure 11. MJ15016

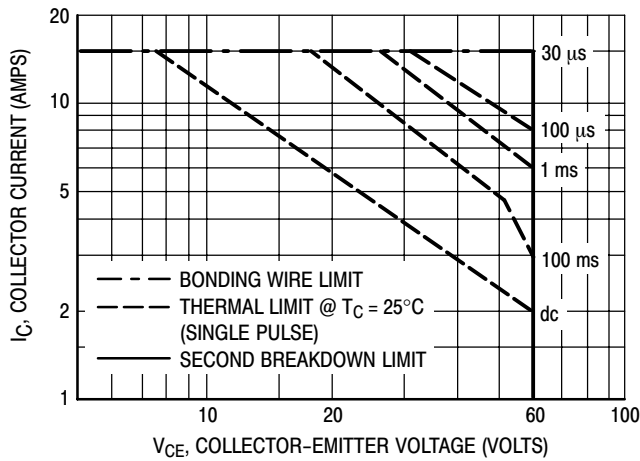


Figure 12. Forward Bias Safe Operating Area
2N3055A

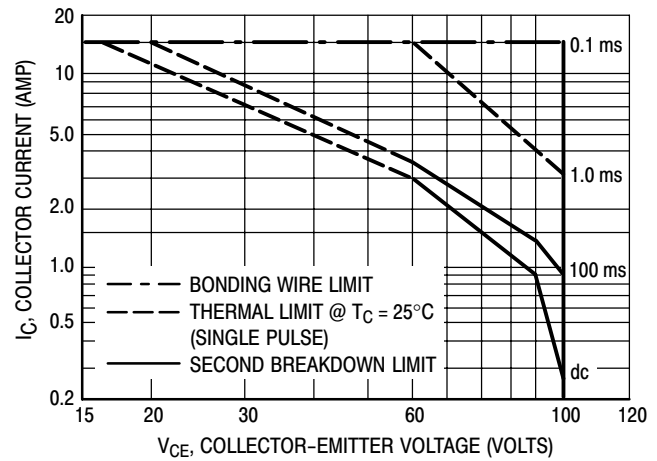


Figure 13. Forward Bias Safe Operating Area
MJ15015, MJ15016

There are two limitations 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 the curves indicate.

The data of Figures 12 and 13 is based on $T_C = 25^\circ C$; $T_{J(pk)}$ is variable depending on power level. Second breakdown pulse limits are valid for duty cycles to 10% but must be derated for temperature according to Figure 1.

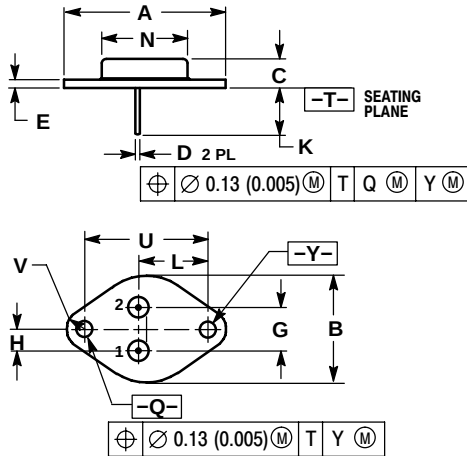
ORDERING INFORMATION

Device	Package	Shipping
2N3055A	TO-204	100 Units / Tray
2N3055AG	TO-204 (Pb-Free)	
MJ15015	TO-204	100 Units / Tray
MJ15015G	TO-204 (Pb-Free)	
MJ15016	TO-204	
MJ15016G	TO-204 (Pb-Free)	

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PACKAGE DIMENSIONS

TO-204 (TO-3) CASE 1-07 ISSUE Z



- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
 2. CONTROLLING DIMENSION: INCH.
 3. ALL RULES AND NOTES ASSOCIATED WITH REFERENCED TO-204AA OUTLINE SHALL APPLY.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	1.550 REF		39.37 REF	
B	---	1.050	---	26.67
C	0.250	0.335	6.35	8.51
D	0.038	0.043	0.97	1.09
E	0.055	0.070	1.40	1.77
G	0.430 BSC		10.92 BSC	
H	0.215 BSC		5.46 BSC	
K	0.440	0.480	11.18	12.19
L	0.665 BSC		16.89 BSC	
N	---	0.830	---	21.08
Q	0.151	0.165	3.84	4.19
U	1.187 BSC		30.15 BSC	
V	0.131	0.188	3.33	4.77

- STYLE 1:
1. BASE
 2. EMITTER
- CASE: COLLECTOR

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2N3055A/D