

## COMPLEMENTARY SILICON HIGH-POWER TRANSISTORS

.. Power Base complementary transistors designed for high power audio, stepping motor and other linear application. These devices can also be used in power switching circuits such as relay or solenoid drivers, inverter dc-to-dc converters, or for inductive loads requiring higher safe operating area than the 2N3055 and MJ2955.

\* Current-Gain - Bandwidth-Product@ $I_C=1.0A$

$f_T = 0.8$  MHz (Min)- NPN  
 $= 2.2$  MHz (Min)- PNP

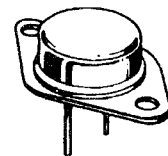
\* Safe Operating Area-Rated to 60 V and 120 V, Respectively

NPN	PNP
2N3055A	MJ2955A
MJ15015	MJ15016

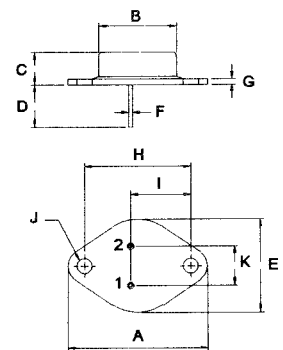
15 AMPERE  
 COMPLEMENTARY SILICON  
 POWER TRANSISTORS  
 60, 120 VOLTS  
 115, 180 WATTS

### MAXIMUM RATINGS

Characteristic	Symbol	2N3055A MJ2955A	MJ15015 MJ15016	Unit
Collector-Emitter Voltage	$V_{CEO}$	60	120	V
Collector-Base Voltage	$V_{CBO}$	100	200	V
Collector-Emitter Voltage Base Reversed Biased	$V_{CEV}$	100	200	V
Emitter-Base Voltage	$V_{EBO}$	7.0		V
Collector Current-Continuous	$I_C$	15		A
Base Current	$I_B$	7.0		A
Total Power Dissipation @ $T_C=25^\circ C$ Derate above $25^\circ C$	$P_D$	115 0.65	180 1.03	W W/ $^\circ C$
Operating and Storage Junction Temperature Range	$T_J, T_{STG}$	- 65 to +200		$^\circ C$



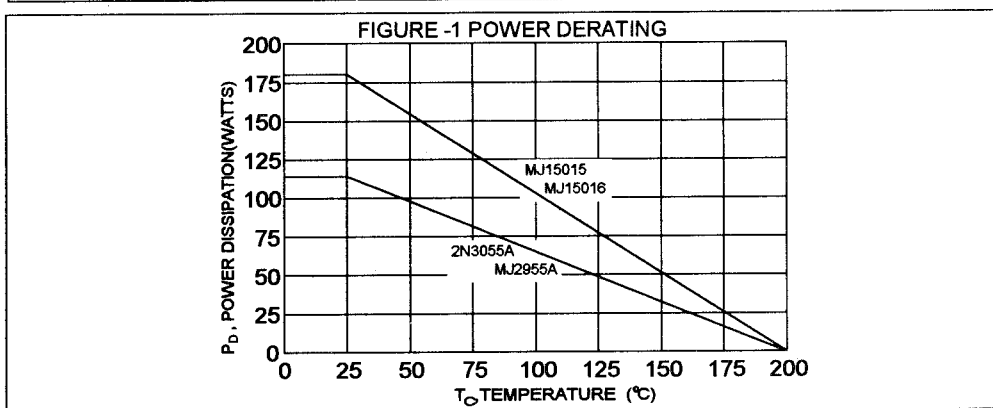
TO-3



PIN 1. BASE  
 2. EMITTER  
 COLLECTOR (CASE)

### THERMAL CHARACTERISTICS

Characteristic	Symbol	Max		Unit
Thermal Resistance Junction to Case	$R_{\theta jc}$	1.52	0.98	$^\circ C/W$



DIM	MILLIMETERS	
	MIN	MAX
A	38.75	39.96
B	19.28	22.23
C	7.96	9.28
D	11.18	12.19
E	25.20	26.67
F	0.92	1.09
G	1.38	1.62
H	29.90	30.40
I	16.64	17.30
J	3.88	4.36
K	10.43	11.18

**2N3055A, MJ15015 NPN / MJ2955A, MJ15016 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) ( $I_C = 200 \text{ mA}$ , $I_B = 0$ ) 2N3055A, MJ2955A MJ15015, MJ15016	$V_{CEO(SUS)}$	60 120		V
Collector Cutoff Current ( $V_{CE} = 30 \text{ V}$ , $I_B = 0$ ) ( $V_{CE} = 60 \text{ V}$ , $I_B = 0$ ) 2N3055A, MJ2955A MJ15015, MJ15016	$I_{CEO}$		0.7 0.1	mA
Collector Cutoff Current ( $V_{BE(off)} = 1.5 \text{ V}$ ) ( $V_{CEV} = \text{Rated Value}$ ) 2N3055A, MJ2955A MJ15015, MJ15016	$I_{CEV}$		5.0 1.0	mA
Collector Cutoff Current ( $V_{BE(off)} = 1.5 \text{ V}$ , $T_c = 150^\circ\text{C}$ ) ( $V_{CEV} = \text{Rated Value}$ ) 2N3055A, MJ2955A MJ15015, MJ15016	$I_{CEV}$		30 6.0	mA
Emitter Cutoff Current ( $V_{EB} = 7.0 \text{ V}$ , $I_C = 0$ ) 2N3055A, MJ2955A MJ15015, MJ15016	$I_{EBO}$		5.0 0.2	mA

**ON CHARACTERISTICS (1)**

DC Current Gain ( $I_C = 4.0 \text{ A}$ , $V_{CE} = 2.0 \text{ V}$ ) ( $I_C = 4.0 \text{ A}$ , $V_{CE} = 4.0 \text{ V}$ ) ( $I_C = 10 \text{ A}$ , $V_{CE} = 4.0 \text{ V}$ )	hFE	10 20 5.0	70 70	
Collector - Emitter Saturation Voltage ( $I_C = 4.0 \text{ A}$ , $I_B = 0.4 \text{ A}$ ) ( $I_C = 10 \text{ A}$ , $I_B = 3.3 \text{ A}$ ) ( $I_C = 15 \text{ A}$ , $I_B = 7.0 \text{ A}$ )	$V_{CE(sat)}$		1.1 3.0 5.0	V
Base - Emitter On Voltage ( $I_C = 4.0 \text{ A}$ , $V_{CE} = 4.0 \text{ V}$ )	$V_{BE(on)}$	0.7	1.8	V

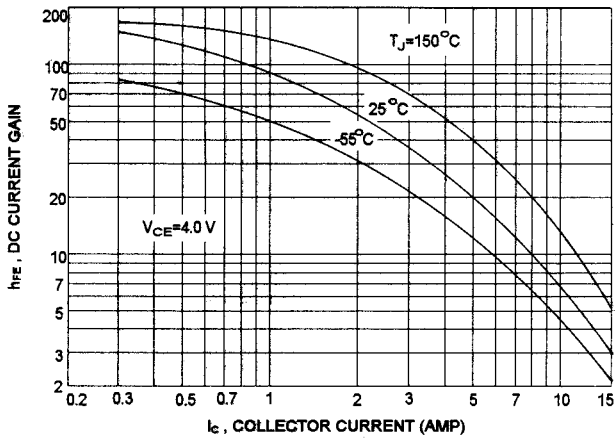
**DYNAMIC CHARACTERISTICS**

Current Gain - Bandwidth Product ( $I_C = 1.0 \text{ A}$ , $V_{CE} = 4.0 \text{ V}$ , $f = 1.0 \text{ MHz}$ ) 2N3055A, MJ15015 MJ2955A, MJ15016	$f_T$	0.8 2.2	6.0 18	MHz
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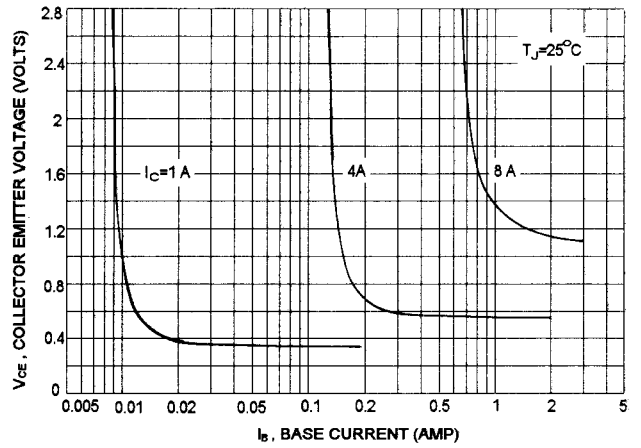
(1) Pulse Test: Pulse width = 300 us, Duty Cycle  $\leq 2.0\%$

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

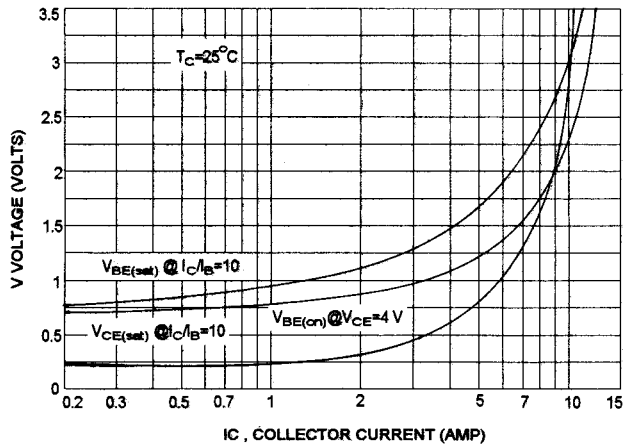
DC CURRENT GAIN



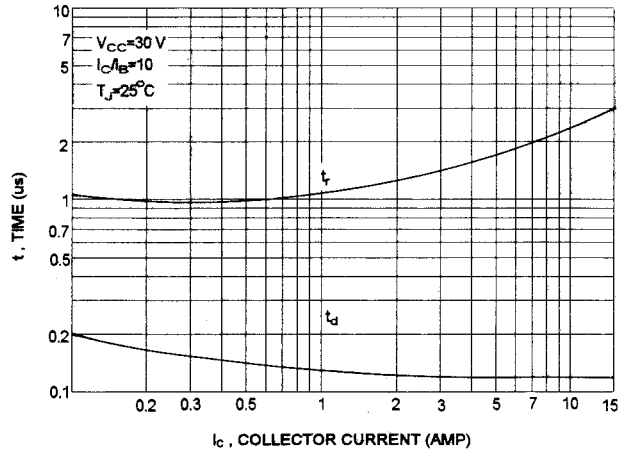
COLLECTOR SATURATION REGION



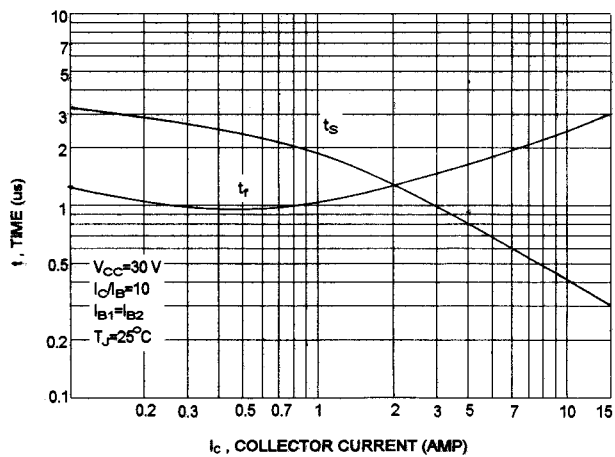
"ON" VOLTAGES



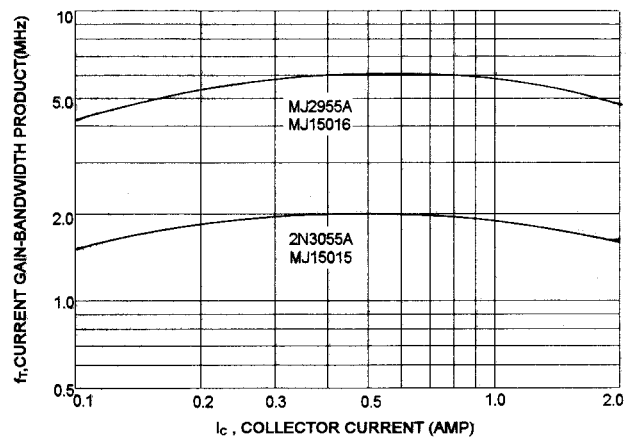
TURN-ON TIME



TURN-OFF TIME

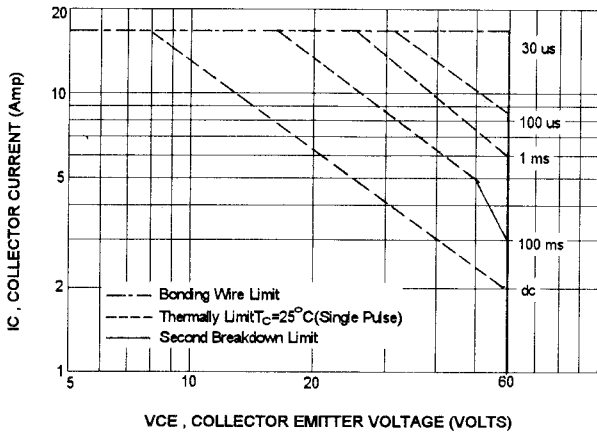


CURRENT GAIN-BANDWIDTH PRODUCT



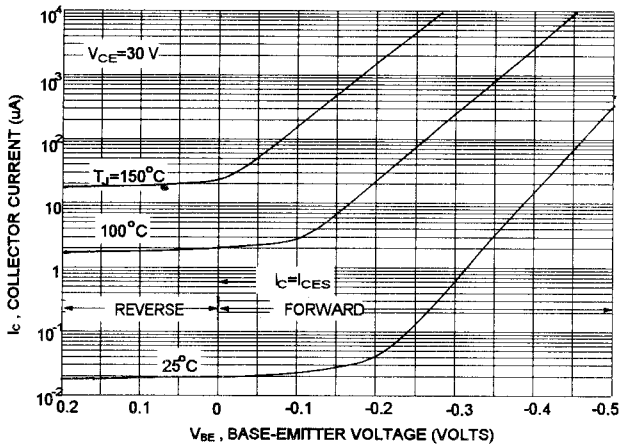
2N3055A, MJ2955A

ACTIVE REGION SAFE OPERATING AREA



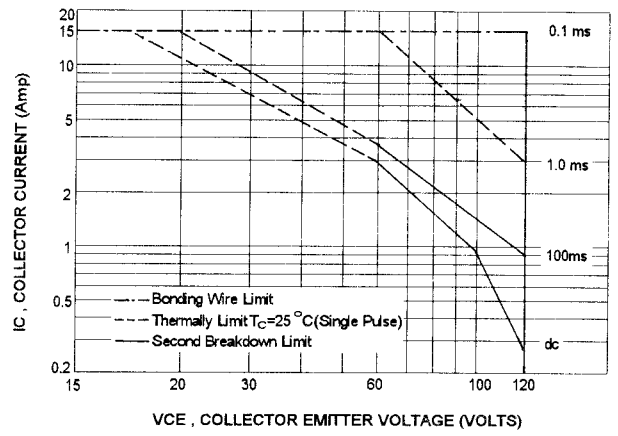
2N3055A, MJ15015

COLLECTOR CUT-OFF REGION



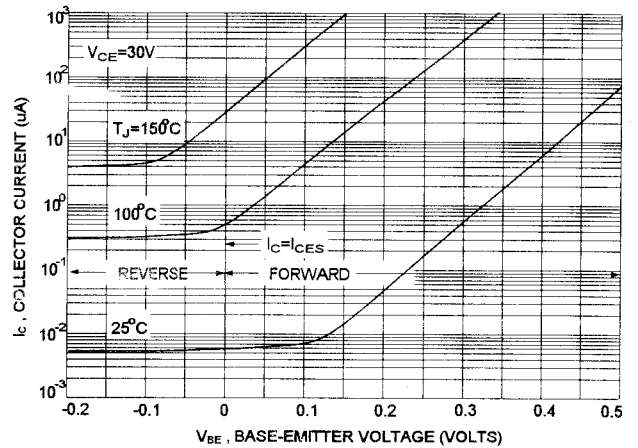
MJ15015, MJ15016

ACTIVE REGION SAFE OPERATING AREA



MJ2955A, MJ15016

COLLECTOR CUT-OFF REGION



CAPACITANCES

