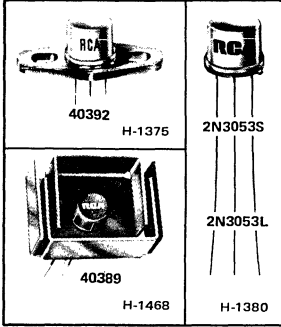




Power Transistors

2N3053 40389 40392



General-Purpose, Medium-Power Silicon N-P-N Planar Transistors

For Small-Signal Applications
In Industrial and Commercial Equipment

Features:

- Maximum safe-area-of-operation curve
- Forward- and reverse-bias operation without second breakdown
- Low leakage current

These devices are available with either 1½-inch leads (TO-5 package) or ½-inch leads (TO-39 package). The longer-lead versions are specified by suffix "L" after the type number; the shorter-lead versions are specified by suffix "S" after the type number.

RCA-2N3053 is a silicon n-p-n planar transistor useful up to 20 MHz in small-signal, medium-power applications. Type 40389 is a 2N3053 with a factory-attached diamond-shaped mounting flange.

Applications:

- Audio amplifiers
- Controlled amplifiers
- Power supplies
- Power oscillators

MAXIMUM RATINGS, Absolute-Maximum Values:

	2N3053	40389 40392	
COLLECTOR-TO-BASE VOLTAGE	60	60	V _{CBO} V
COLLECTOR-TO-EMITTER SUSTAINING VOLTAGE: With external base-to-emitter resistance (RBE) = 10 Ω	50	50	V _{CEr(sus)} V
With base open	40	40	V _{CEO(sus)} V
With base-emitter-junction reverse-biased	60	60	V _{CEV(sus)} V
EMITTER-TO-BASE VOLTAGE	5	5	V _{EB0} V
COLLECTOR CURRENT	0.7	0.7	I _C A
TRANSISTOR DISSIPATION: At case temperatures up to 25°C	5	7	P _T W
At free-air temperatures up to 25°C	1	3.5	W
At temperatures above 25°C		(40392) (40389)	See Figs.1, 2, and 3
TEMPERATURE RANGE: Storage and operating (Junction)	← -65 to +200 →		°C
LEAD TEMPERATURE (During soldering): At distance ≥ 1/32 in. (0.8 mm) from seating plane for 10 s max.	← 235 →		°C

ELECTRICAL CHARACTERISTICS, At Case Temperature (T_C) = 25°C

Characteristics	Symbol	TEST CONDITIONS							LIMITS		Units
		DC Collector Voltage V		DC Emitter or Base Voltage V		DC Current mA			Types 2N3053 40389 40392		
		V_{CB}	V_{CE}	V_{EB}	V_{BE}	I_C	I_E	I_B	Min.	Max.	
Collector-Cutoff Current	I_{CBO}	30					0		—	0.25	μA
Emitter-Cutoff Current	I_{EBO}			4		0			—	0.25	μA
DC Forward-Current Transfer Ratio	h_{FE}		10			150 ^a			50	250	
Collector-to-Base Breakdown Voltage	BV_{CBO}					0.1	0		60	—	V
Emitter-to-Base Breakdown Voltage	BV_{EBO}					0	0.1		5	—	V
Collector-to-Emitter Sustaining Voltage: With base open	$V_{CEO(sus)}$					100 ^a		0	40	—	V
With external base-to-emitter resistance (R_{BE}) = 10 Ω	$V_{CER(sus)}$					100 ^a			50	—	V
Base-to-Emitter Saturation Voltage	$V_{BE(sat)}$					150		15	—	1.7	V
Collector-to-Emitter Saturation Voltage	$V_{CE(sat)}$					150		15	—	1.4	V
Small-Signal, Forward Current Transfer Ratio (At 20 MHz)	h_{fe}		10			50			5	—	
Output Capacitance	C_{ob}	10					0		—	15	pF
Input Capacitance	C_{ib}			0.5		0			—	80	pF
Thermal Resistance:											
Junction-to-Case	θ_{J-C}								35(max.) 2N3053		°C/W
									25(max.) 40392		°C/W
Junction-to-Free Air	θ_{J-FA}								175(max.) 2N3053		°C/W
									50(max.) 40389		°C/W

^aPulsed; pulse duration = 300 μs , duty factor = 1.8%.

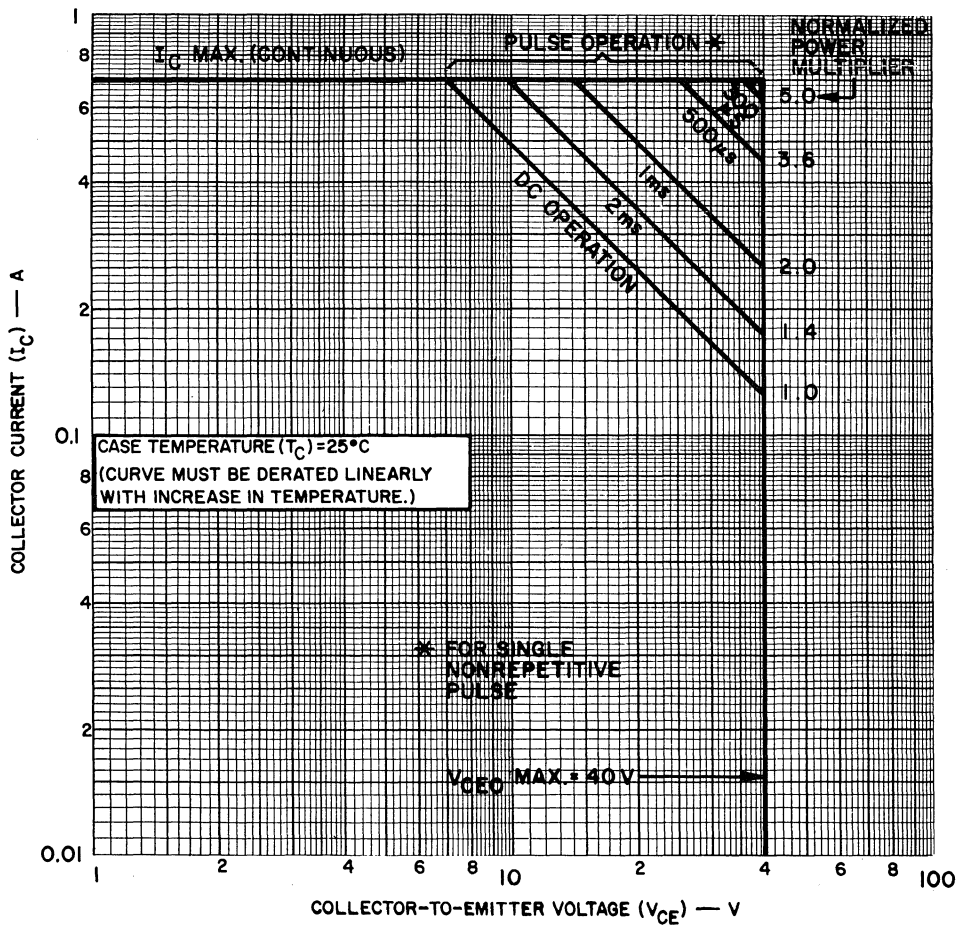
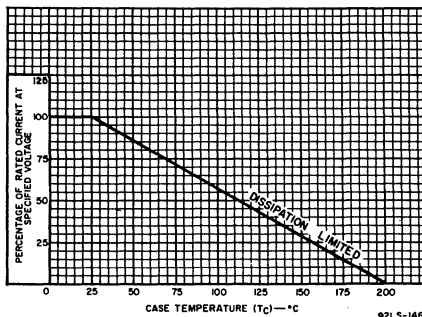


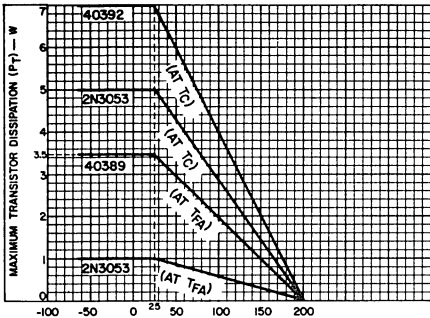
Fig.1 — Maximum operating areas for type 2N3053.

92SS-3362

Fig.2 — Derating curve for type 2N3053.

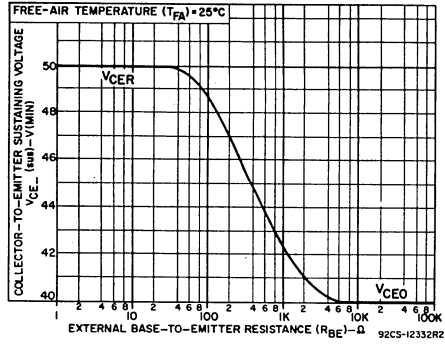


92LS-1469



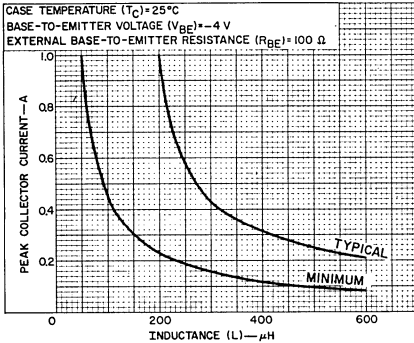
9255-3002

Fig. 3 - Dissipation derating curves for all types.



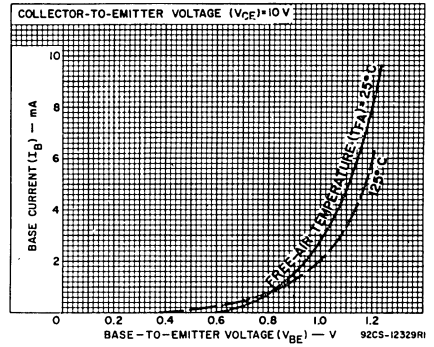
92CS-12332R2

Fig. 4 - Sustaining voltage vs. base-to-emitter resistance for all types.



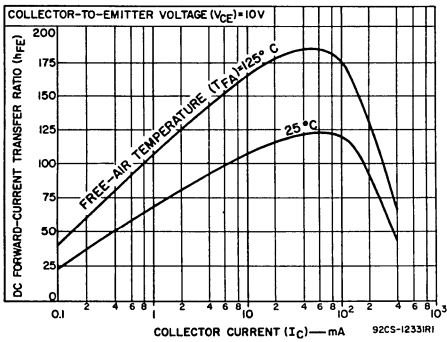
9255-3365

Fig. 5 - Reverse-bias, second-breakdown characteristics for all types.



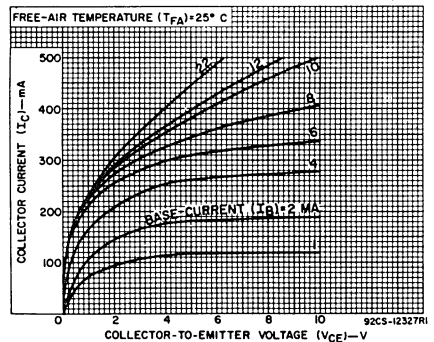
92CS-12332R1

Fig. 6 - Typical dc-beta characteristics for all types.



92CS-12331R1

Fig. 7 - Typical input characteristics for all types.



92CS-12327R1

Fig. 8 - Typical output characteristics for all types.

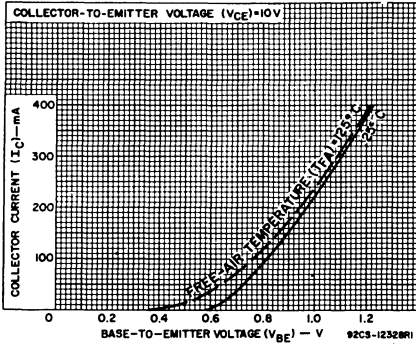


Fig. 9 - Typical transfer characteristics for all types.

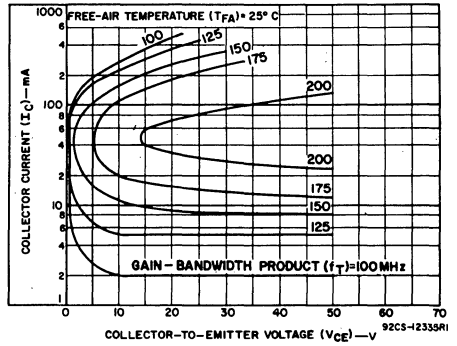


Fig. 10 - Typical variation of gain-bandwidth product with I_C and V_{CE} for all types.

TERMINAL CONNECTIONS

- Lead 1 - Emitter
- Lead 2 - Base
- Lead 3 - Collector