2N3054, 2N6260, 2N6261, 40250, 40372, 40910, 40911

Hometaxial-Base, Medium-Power Silicon N-P-N Transistors

Rugged Devices for Intermediate-Power Applications in Industrial and Commercial Equipment

These RCA types are hometaxial-base silicon n-p-n transistors intended for a wide variety of medium- to high-power applications. Types 2N3054, 2N6260, 2N6261, and 40250 are supplied in the JEDEC TO-66 hermetic package.

Types 40250V1, 40372, 40910, and 40911 are the 40250, 2N3054, 2N6260, and 2N6061 with factory-attached heat radiators intended for printed-circuit-board applications.

Features:

- f_T = 800 kHz at 0.2A (2N3064, 40372)
- Maximum safe-area-of-operation curves for dc and pulse operation
- V_{CEV}(sus) = 90 V min (2N3054, 2N6261)
- Low saturation voltage: V_{CE}(sat) = 1.0 V at I_C = 0.5 A (2N3054)

Applications:

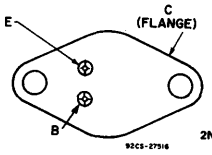
- Power switching circuits
- Series- and shunt-regulator driver and output stages
- High-fidelity amplifiers
- Solenoid drivers.

Maximum Ratings, *Absolute-Maximum Values:*

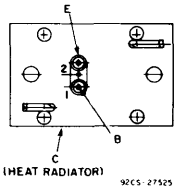
		40250 40250V1	2N6260 40910	2N3054 40372	2N6261 40911	
* COLLECTOR-TO-BASE VOLTAGE	V_{CBO}	50	50	90	90	V
COLLECTOR-TO-EMITTER VOLTAGE:						
* With base open	V_{CEO}	40	40	55	80	V
* With external base-to-emitter resistance (R_{BE}) = 100Ω	V_{CER}(sus)	–	45	60	85	V
With base reverse-biased (V_{BE} = -1.5 V)	V_{CEV}(sus)	50	50	90	90	V
* EMITTER-TO-BASE VOLTAGE	V_{EBO}	5	5	7	7	V
* CONTINUOUS COLLECTOR CURRENT	I_C	4	3	4	4	A
* CONTINUOUS BASE CURRENT	I_B	2	2	2	2	A
* TRANSISTOR DISSIPATION:	P_T					
* At case temperature up to 25°C.		29 (40250)	29 (2N6260)	25 (2N3054)	50 (2N6261)	W
At ambient temperatures up to 25°C.		5.8 (40250V1)	5.8 (40910)	5.8 (40372)	5.8 (40911)	W
* At temperatures above 25°C.		Derate linearly to 200 °C				
* TEMPERATURE RANGE:						
Storage & Operating (Junction)		-65 to 200				°C
PIN TEMPERATURE (During soldering):						
At distance ≥ 1/32 in. (0.8 mm) from seating plane for 10 s max.		235				°C

*In accordance with JEDEC registration data format JS-9 RDF-10 (2N3054), JS-6 RDF-2 (2N6260, 2N6261)

TERMINAL DESIGNATIONS



JEDEC TO-66
2N3054, 2N6260, 2N6261, 40250



JEDEC TO-66 with Heat Radiator
40250V1, 40372, 40910, 40911

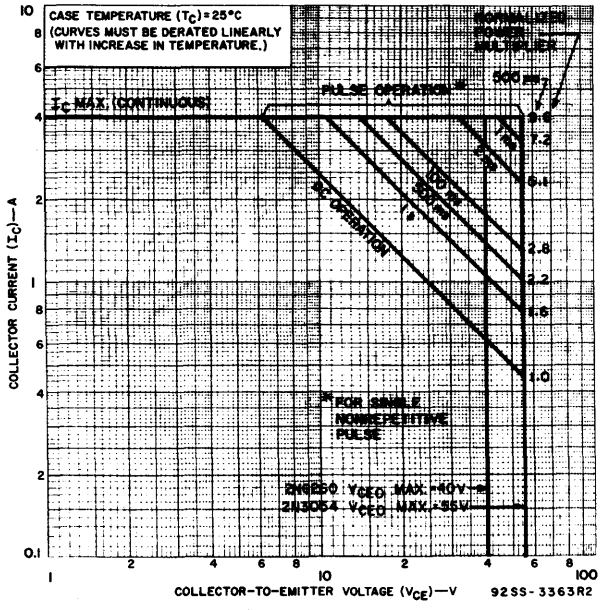


Fig. 1—Maximum operating areas for 2N3054 and 2N6260.

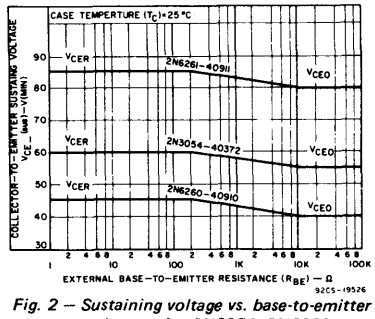


Fig. 2 — Sustaining voltage vs. base-to-emitter resistance for 2N3054, 2N6260, 2N6261, 40372, 40910 and 40911.

2N3054, 2N6260, 2N6261, 40250, 40372, 40910, 40911

ELECTRICAL CHARACTERISTICS, *At Case Temperature (T_C) = 25°C unless otherwise specified*

CHARACTERISTIC	SYMBOL	TEST CONDITIONS				LIMITS								UNITS
		VOLTAGE V dc		CURRENT A dc		2N6260 40910		2N3054 40372		2N6261 40911		40250 40250V1		
		V_{CE}	V_{BE}	I_C	I_B	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	
*Collector-Cutoff Current: With base open	I_{CBO}	V_{CB} = 30		I_E = 0		–	–	–	–	–	–	–	1	mA
	I_{CEO}	30			0	–	1	–	0.5	–	–	–	–	
		60			0	–	–	–	–	–	0.5	–	–	
With base-emitter junction reverse-biased	I_{CEV}	40	−1.5			–	5	–	–	–	–	–	–	
		80	−1.5			–	–	–	–	–	0.5	–	–	
		90	−1.5			–	–	–	1.0	–	–	–	–	
At T_C = 150°C	I_{CBO}	VCB = 30		I_E = 0		–	–	–	–	–	–	–	5	
	I_{CEV}	40	−1.5			–	25	–	–	–	–	–	–	
		80	−1.5			–	–	–	–	–	1.0	–	–	
		90	−1.5			–	–	–	6.0	–	–	–	–	
*Emitter-Cutoff Current	I_{EBO}		−5		0	–	5	–	–	–	–	–	5	mA
			−7		0	–	–	–	1.0	–	0.2	–	–	
Collector-to-Base Breakdown Voltage	$V_{(BR)CBO}$			0.05		–	–	–	–	–	–	50	–	V
Collector-to-Emitter Breakdown Voltage	$V_{(BR)CEV}$		−1.5	0.05		–	–	–	–	–	–	50	–	V
Collector-to-Emitter Sustaining Voltage: With base open	$V_{CEO(sus)}$			0.1[a]	0	40	–	55	–	80	–	40	–	V
With external base-to-emitter resistance (R_{BE}) = 100Ω	$V_{CER(sus)}$			0.1[a]		45	–	60	–	85	–	–	–	
Emitter-to-Base Breakdown Voltage I_E = 0.005 mA	$V_{(BR)EBO}$					–	–	–	–	–	–	5	–	V
*DC Forward-Current Transfer Ratio	h_{FE}	2		4[a]		3	–	–	–	5	–	–	–	
		2		1.5[a]		–	–	–	–	25	100	–	–	
		4		3[a]		–	–	5	–	–	–	–	–	
		4		0.5[a]		–	–	25	150	–	–	–	–	
		4		1.5[a]		20	100	–	–	–	–	25	100	
*Collector-to-Emitter Saturation Voltage	$V_{CE(sat)}$			0.5[a]	0.05[a]	–	–	–	1.0	–	–	–	–	V
				1.5[a]	0.15[a]	–	1.5	–	–	–	0.5	–	1.5	
				3[a]	1[a]	–	–	–	6.0	–	–	–	–	
*Base-to-Emitter Voltage	V_{BE}	2		1.5		–	–	–	–	–	1.5	–	–	V
		4		1.5		–	2.2	–	–	–	–	–	2.2	
		4		0.5		–	–	–	1.7	–	–	–	–	
*Common-Emitter Small-Signal Short-Circuit, Forward Current Transfer Ratio Cutoff Frequency	f_{hfe}	4		0.1		0.03	–	0.03	–	0.03	–	–	–	MHz
*Magnitude of Common-Emitter, Small-Signal, Short-Circuit Forward Current Transfer Ratio (f = 0.4 MHz)	$\|h_{fe}\|$	4		0.1		2	–	–	–	2	–	–	–	
*Common-Emitter, Small-Signal, Short-Circuit Forward Current Transfer Ratio (f = 1 kHz)	h_{fe}	4		0.1		25		25	–	25	–	–	–	
Forward-Bias Second Breakdown Collector Current (t - 1 s)	$I_{S/b}$	40				0.725	–	–	–	–	–	–	–	A
		80				–	–	–	–	0.625	–	–	–	
		55				–	–	0.455	–	–	–	–	–	
Thermal Resistance: Junction-to-Case	$R\theta_{JC}$					6 (max.) 2N6260		7 (max.) 2N3054		3.5 (max.) 2N6261		6 (max.) 40250		°C/W
Junction-to-Ambient	$R\theta_{JA}$					30 (max.) 40901		30 (max.) 40372		30 (max.) 40911		30 (max.) 40250V1		

[a]Pulsed: Pulse duration = 300 μs duty factor = 1.8%. *In accordance with JEDEC registration data format JS-9 RDF-10 (2N3054) JS-6 RDF-2 (2N6260-61)

2N3054, 2N6260, 2N6261, 40250, 40372, 40910, 40911

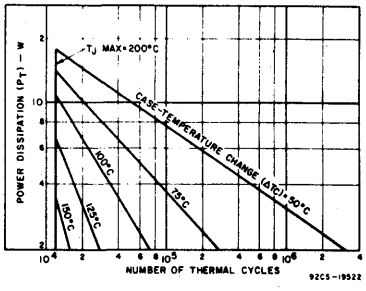


Fig. 3 - Thermal-cycling rating chart for 2N3054.

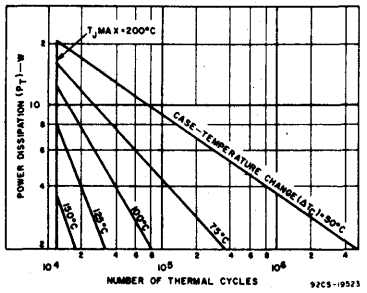


Fig. 4 - Thermal-cycling rating chart for 2N6260.

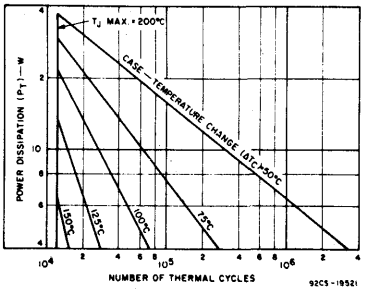


Fig. 5 - Thermal-cycling rating chart for 2N6261.

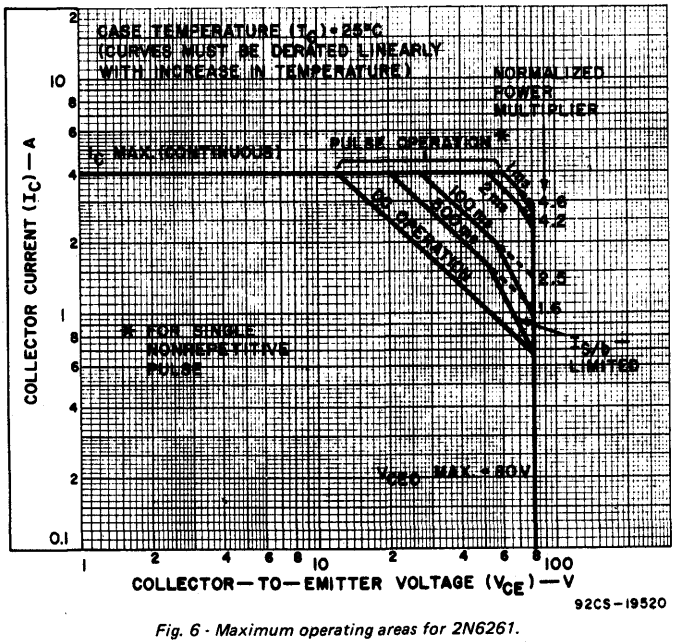


Fig. 6 - Maximum operating areas for 2N6261.

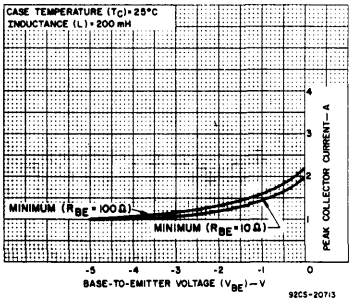


Fig. 7 - Reverse-bias second-breakdown characteristics for all types.

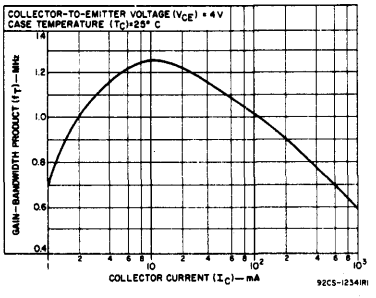


Fig. 8 - Typical gain-bandwidth product for all types.

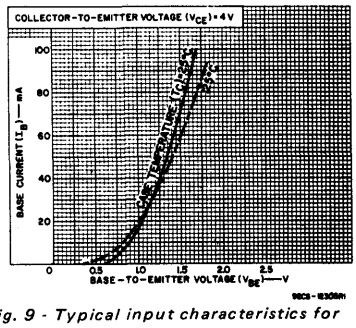


Fig. 9 - Typical input characteristics for 2N3054, 2N6260, 40250, 40250VI, 40372, and 40910.

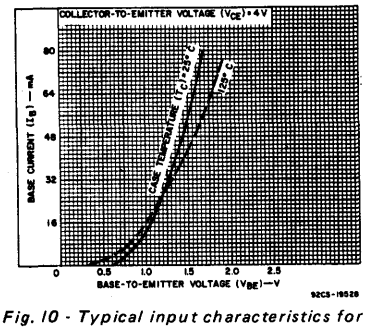


Fig. 10 - Typical input characteristics for 2N6261 and 40911.

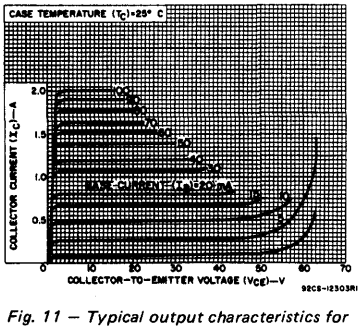


Fig. 11 — Typical output characteristics for 2N3054 and 40372.