

File Number 680

2N6477, 2N6478

## Medium-Power Silicon N-P-N Transistors

For Intermediate Power Applications  
in Industrial and Commercial Equipment

### Features:

- Maximum safe-area-of-operation curves for dc and pulse operation
- High voltage ratings
- Low saturation voltages

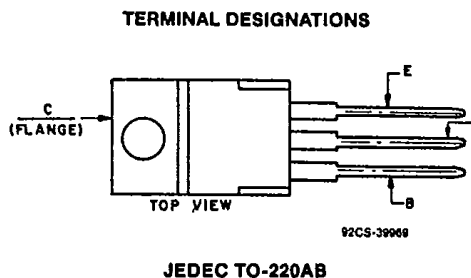
### Applications:

- Series and shunt regulators
- High-fidelity amplifiers
- Power switching circuits
- Solenoid drivers

RCA 2N6477 and 2N6478<sup>Δ</sup> are silicon n-p-n transistors intended for a wide variety of medium-to-high power, high-voltage applications. These devices, which are voltage extensions of the 2N5298 family, are especially useful in vertical output stages in color and black-and-white TV. The units differ in voltage ratings and in the currents at which parameters are controlled.

The 2N6477 and 2N6478 are supplied in the JEDEC TO-220AB plastic package.

<sup>Δ</sup>Formerly RCA Dev. Nos. TA8405 and TA8343.



### MAXIMUM RATINGS, Absolute-Maximum Values:

	2N6477	2N6478		
*COLLECTOR-TO-BASE VOLTAGE	$V_{CBO}$	140	160	V
COLLECTOR-TO-EMITTER SUSTAINING VOLTAGE:				
With base open	$V_{CEO(sus)}$	120	140	V
With external base-to-emitter resistance ( $R_{BE} = 100 \Omega$ )	$V_{CER(sus)}$	130	150	V
* With base reverse-biased ( $V_{BE} = -1.5 V$ )	$V_{CEV(sus)}$	140	160	V
*EMITTER-TO-BASE VOLTAGE	$V_{EBO}$	5	5	V
*CONTINUOUS COLLECTOR CURRENT	$I_C$	2.5	2.5	A
PEAK COLLECTOR CURRENT		4	4	A
*CONTINUOUS BASE CURRENT	$I_B$	1	1	A
TRANSISTOR DISSIPATION:	$P_T$			
* At case temperature up to 25°C		50	50	W
* At case temperatures above 25°C		See Fig. 2		
At ambient temperatures up to 25°C		1.8	1.8	W
At ambient temperatures above 25°C		Derate linearly at 0.0144		W/°C
*TEMPERATURE RANGE:				
Storage and Operating (Junction)		-65 to 150		°C
*PIN TEMPERATURE (During Soldering):				
At distances $\geq 1/32$ in. (0.8 mm) from seating plane for 10 s max.		235		°C

\* In accordance with JEDEC registration data format JS-6 RDF-2.

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01E 17446

DT-33-11

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

CHARACTERISTIC	SYMBOL	TEST CONDITIONS					LIMITS				UNITS
		VOLTAGE V dc			CURRENT A dc		2N6477		2N6478		
		V <sub>CE</sub>	V <sub>EB</sub>	V <sub>BE</sub>	I <sub>C</sub>	I <sub>B</sub>	MIN.	MAX.	MIN.	MAX.	
* Collector-Cutoff Current: With base open	I <sub>CEO</sub>	80 100				0 0	— —	2 —	— —	— 2	mA
With base-emitter junction reverse-biased	I <sub>CEV</sub>	130 150		-1.5 -1.5			— —	2 —	— 2		
At T <sub>C</sub> = 150°C	I <sub>CEV</sub>	120 140		-1.5 -1.5			— —	10 —	— 10		
* Emitter-Cutoff Current	I <sub>EBO</sub>		5			0	—	2	—	2	mA
* Collector-to-Emitter Sustaining Voltage: With base open	V <sub>CEO(sus)</sub>					0.1 <sup>a</sup> 0	120	—	140	—	V
With external base-to-emitter resistance (R <sub>BE</sub> ) = 100 Ω	V <sub>CER(sus)</sub>					0.1 <sup>a</sup>	130	—	150	—	
With base-emitter junction reverse-biased	V <sub>CEV(sus)</sub>			-1.5	0.1 <sup>a</sup>		140	—	160	—	
* DC Forward-Current Transfer Ratio	h <sub>FE</sub>	4 4				1 <sup>a</sup> 2.5 <sup>a</sup>	25 5	150 —	25 5	150 —	
* Collector-to-Emitter Saturation Voltage	V <sub>CE(sat)</sub>					1 <sup>a</sup> 2.5 <sup>a</sup>	0.1 0.5	— —	1 2	— 2	V
* Base-to-Emitter Voltage	V <sub>BE</sub>	4 4				1 <sup>a</sup> 2.5 <sup>a</sup>	— —	1.8 3	— —	1.8 3	V
* Magnitude of Common-Emitter, Small-Signal, Short-Circuit Forward-Current Transfer Ratio (f = 40 kHz)	h <sub>fe</sub>	4				0.5	5	—	5	—	
Gain-Bandwidth Product	f <sub>T</sub>	4				0.5	200	—	200	—	kHz
* Common-Emitter, Small-Signal, Short-Circuit Forward-Current Transfer Ratio (f = 1 kHz)	h <sub>fe</sub>	4				0.1	25	—	25	—	
Thermal Resistance: Junction-to-Case	R <sub>θJC</sub>						—	2.5	—	2.5	°C/W
Junction-to-Ambient	R <sub>θJA</sub>						—	70	—	70	

\* In accordance with JEDEC registration data format (JS-6 RDF-2).

<sup>a</sup> Pulsed: Pulse duration = 300 μs, duty factor = 1.8%.CAUTION: The sustaining voltage V<sub>CEO(sus)</sub>, V<sub>CER(sus)</sub>, and V<sub>CEV(sus)</sub> MUST NOT be measured on a curve tracer.

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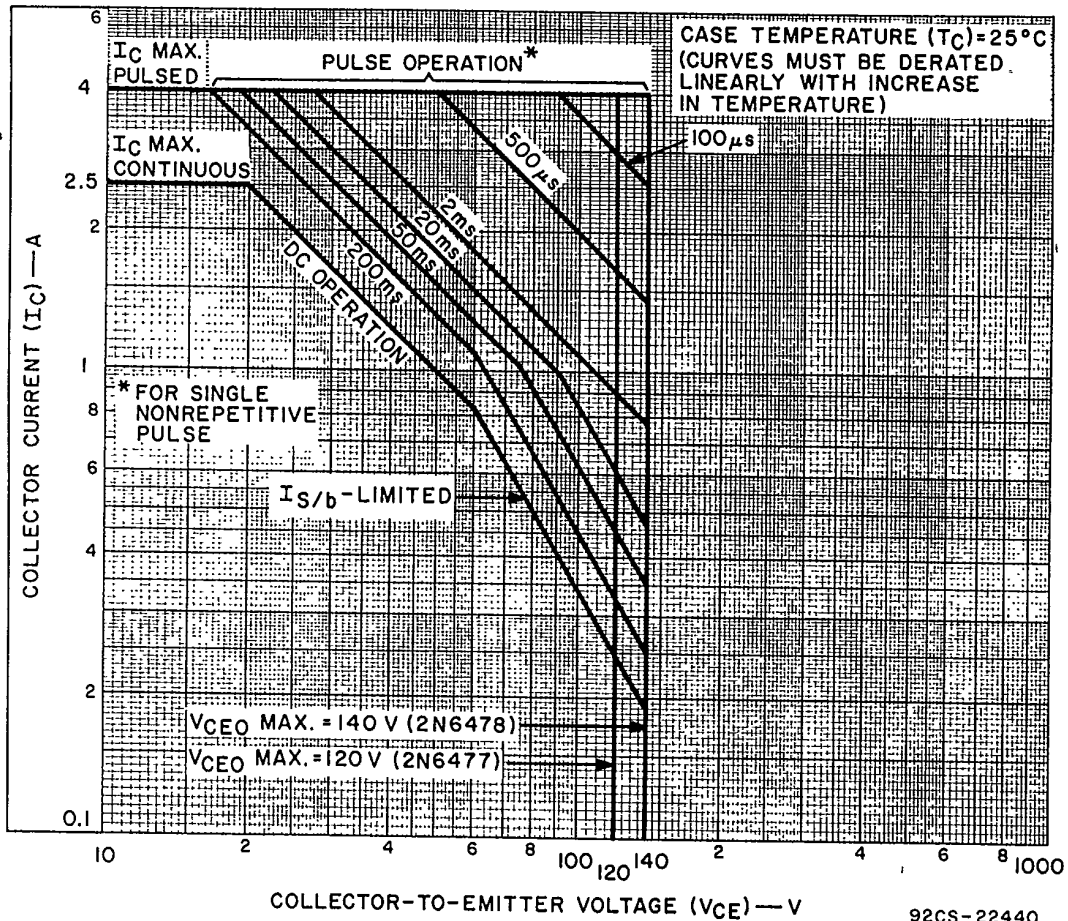


Fig. 1 — Maximum operating areas for both types.

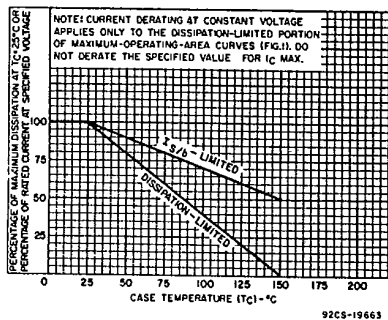


Fig. 2 — Current derating curve for both types.

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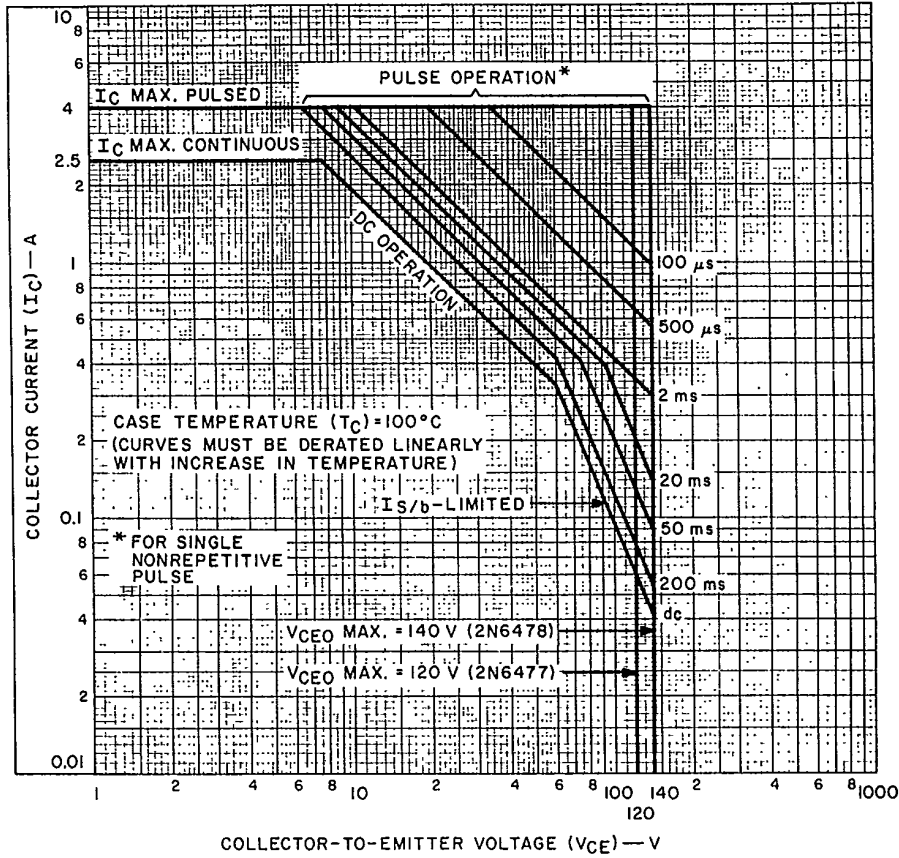


Fig. 3 — Maximum operating areas for both types.

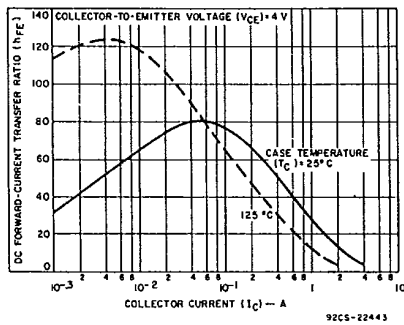


Fig. 4 — Typical dc beta characteristics for 2N6477.

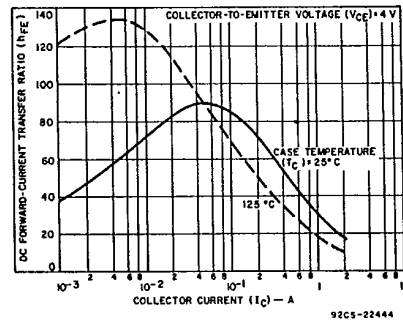


Fig. 5 — Typical dc beta characteristics for 2N6478.

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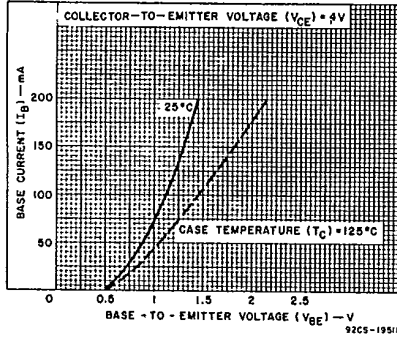


Fig. 6 — Typical input characteristics for 2N6477.

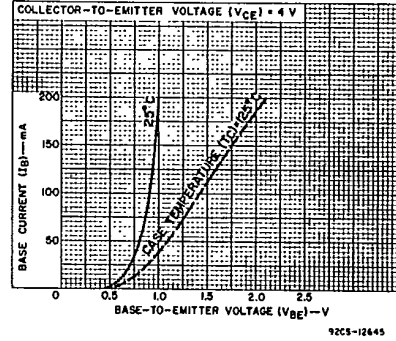


Fig. 7 — Typical input characteristics for 2N6478.

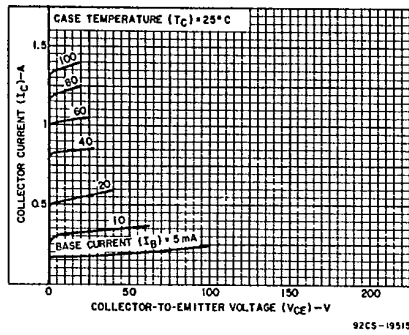


Fig. 8 — Typical output characteristics for 2N6477.

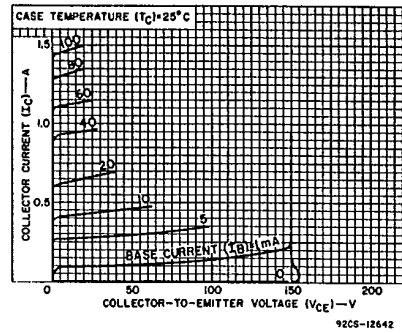


Fig. 9 — Typical output characteristics for 2N6478.

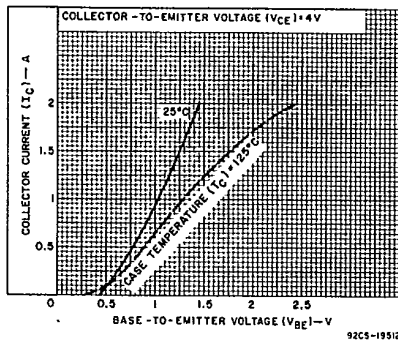


Fig. 10 — Typical transfer characteristics for 2N6477.

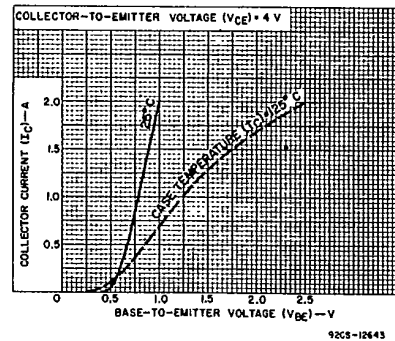


Fig. 11 — Typical transfer characteristics for 2N6478.