File Number 680

2N6477, 2N6478

Medium-Power Silicon N-P-N Transistors

For Intermediate Power Applications in Industrial and Commercial Equipment

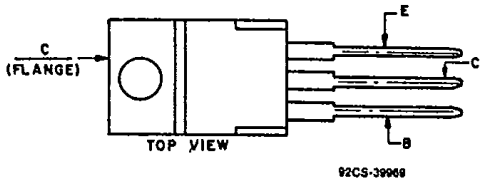
Features:

- *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*

TERMINAL DESIGNATIONS



JEDEC TO-220AB

RCA 2N6477 and 2N6478Δ 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.

ΔFormerly 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 Ω	$V_{CER(sus)}$	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 ≥ 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.

2N6477, 2N6478

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

	CHARACTERISTIC	SYMBOL	TEST CONDITIONS: VOLTAGE V dc V_{CE}	V_{EB}	V_{BE}	CURRENT A dc I_C	I_B	LIMITS: 2N6477 MIN.	2N6477 MAX.	2N6478 MIN.	2N6478 MAX.	UNITS
*	Collector-Cutoff Current: With base open	I_{CEO}	80				0	–	2	–	–	mA
			100				0	–	–	–	2	
	With base-emitter junction reverse-biased	I_{CEV}	130		−1.5			–	2	–	–	
			150		−1.5			–	–	–	2	
	At T_C = 150°C	I_{CEV}	120		−1.5			–	10	–	–	
			140		−1.5			–	–	–	10	
*	Emitter-Cutoff Current	I_{EBO}		5		0		–	2	–	2	mA
	Collector-to-Emitter Sustaining Voltage:											
*	With base open	$V_{CEO(sus)}$				0.1[a]	0	120	–	140	–	V
	With external base-to-emitter resistance (R_{BE}) = 100 Ω	$V_{CER(sus)}$				0.1[a]		130	–	150	–	
	With base-emitter junction reverse-biased	$V_{CEV(sus)}$			−1.5	0.1[a]		140	–	160	–	
*	DC Forward-Current Transfer Ratio	h_{FE}	4			1[a]		25	150	25	150	
			4			2.5[a]		5	–	5	–	
*	Collector-to-Emitter Saturation Voltage	$V_{CE(sat)}$				1[a]	0.1	–	1	–	1	V
						2.5[a]	0.5	–	2	–	2	
*	Base-to-Emitter Voltage	V_{BE}	4			1[a]		–	1.8	–	1.8	V
			4			2.5[a]		–	3	–	3	
*	Magnitude of Common-Emitter, Small-Signal, Short-Circuit Forward-Current Transfer Ratio (f = 40 kHz)	$\lvert h_{fe} \rvert$	4			0.5		5	–	5	–	
	Gain-Bandwidth Product	f_T	4			0.5		200	–	200	–	kHz
*	Common-Emitter, Small-Signal, Short-Circuit Forward-Current Transfer Ratio (f = 1 kHz)	h_{fe}	4			0.1		25	–	25	–	
	Thermal Resistance: Junction-to-Case	$R_{\theta JC}$						–	2.5	–	2.5	°C/W
	Junction-to-Ambient	$R_{\theta JC}$						–	70	–	70	

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

[a] Pulsed: Pulse duration = 300 μs, duty factor = 1.8%.

CAUTION: The sustaining voltage $V_{CEO(sus)}$, $V_{CER(sus)}$, and $V_{CEV(sus)}$ MUST NOT be measured on a curve tracer.

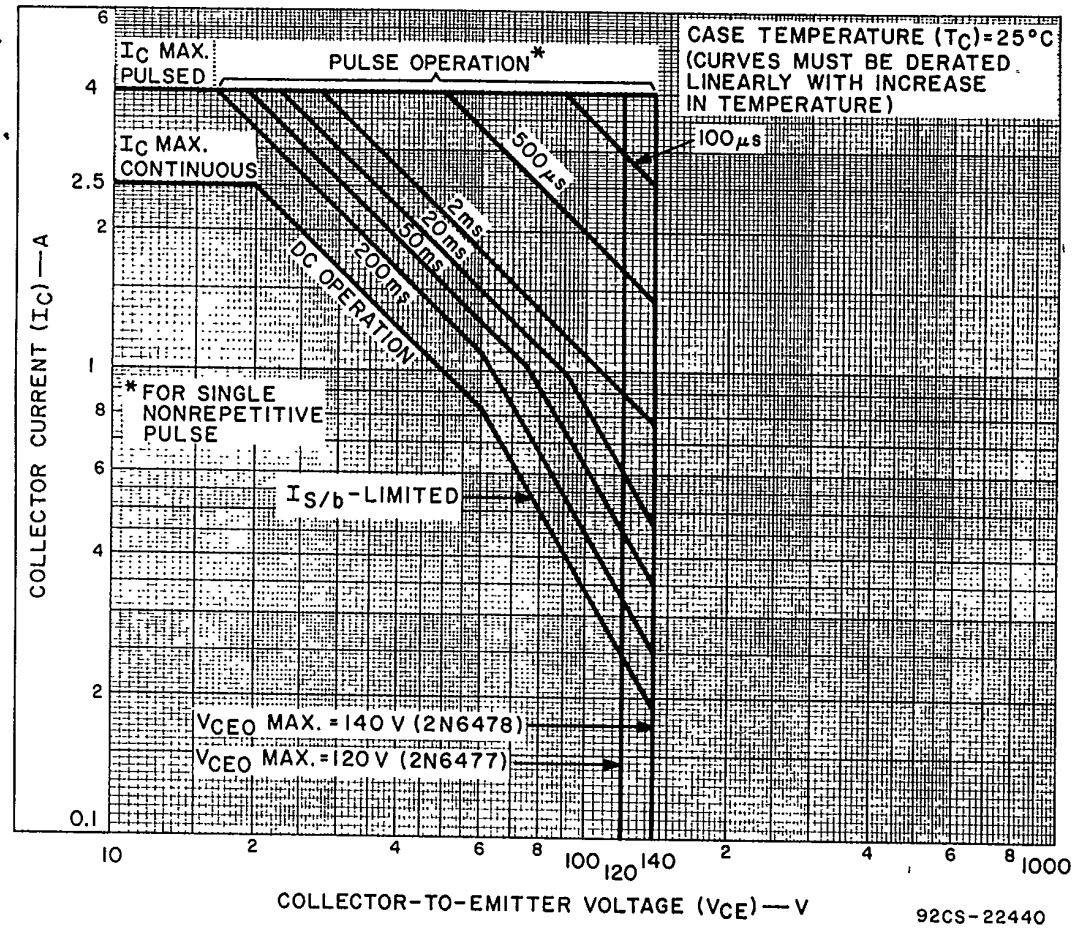


Fig. 1 — Maximum operating areas for both types.

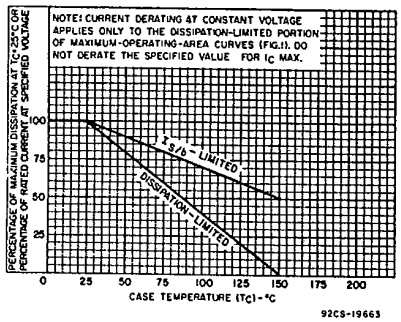


Fig. 2 — Current derating curve for both types.

2N6477, 2N6478

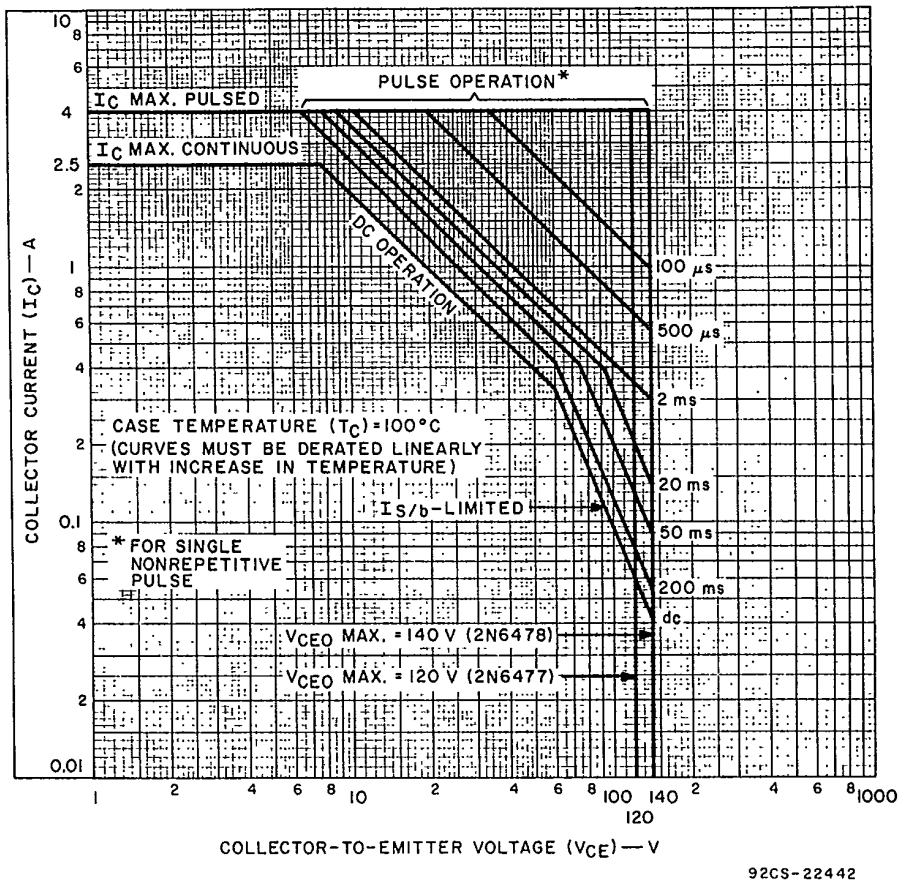


Fig. 3 — Maximum operating areas for both types.

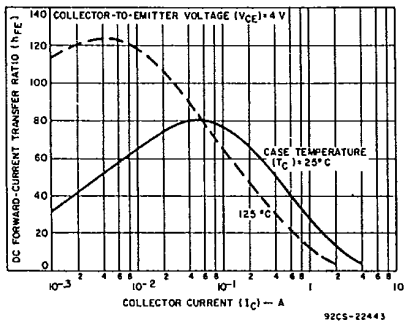


Fig. 4 — Typical dc beta characteristics for 2N6477.

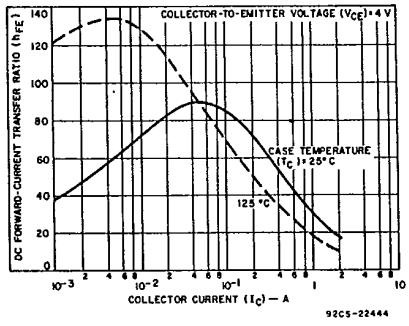


Fig. 5 — Typical dc beta characteristics for 2N6478.

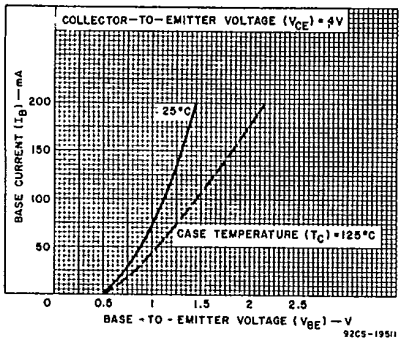


Fig. 6 — Typical input characteristics for 2N6477.

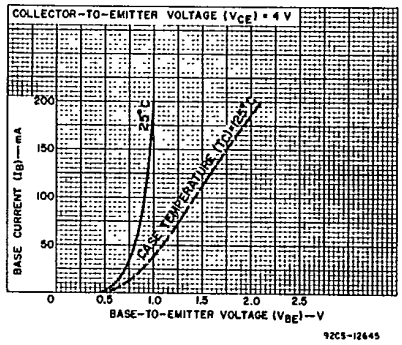


Fig. 7 — Typical input characteristics for 2N6478.

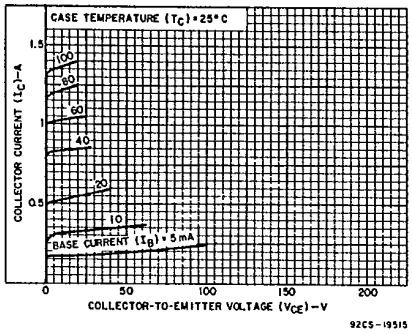


Fig. 8 — Typical output characteristics for 2N6477.

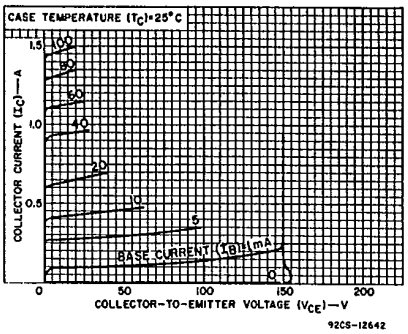


Fig. 9 — Typical output characteristics for 2N6478.

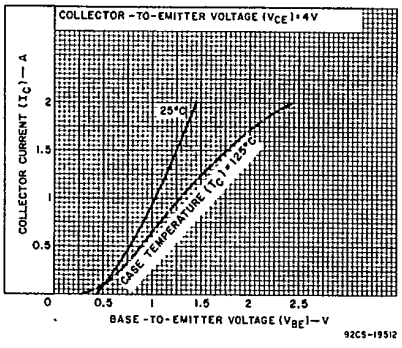


Fig. 10 — Typical transfer characteristics for 2N6477.

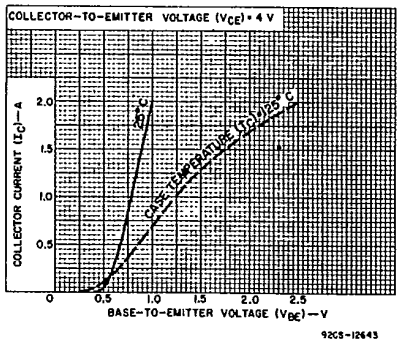


Fig. 11 — Typical transfer characteristics for 2N6478.