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2N6077-2N6079, 40851

High-Voltage, High-Power Silicon N-P-N Transistors

For Switching and Linear Applications

RCA 2N6077, 2N6078, 2N6079 and 40851 are multiple epitaxial silicon n-p-n power transistors utilizing a multiple-emitter-site structure. Multiple-epitaxial construction maximizes the volt-ampere characteristic of the device and provides fast switching speeds. Multiple-emitter-site design ensures uniform current flow throughout the structure, which produces a high $I_{S/b}$ and a large safe-operation area.

These devices use the popular JEDEC TO-66 package; they differ mainly in voltage ratings, leakage-current limits, and V_{CE}(sat) ratings.

The 2N6077 is characterized for switching applications with load lines in the active region. These applications include sweep circuits and all circuits using the transistor as an active voltage clamp.

Type 2N6078 is characterized for switching applications with the load line extending into the reverse-bias region. Its voltage ratings make this device useful for switching regulators operating directly from a rectified 110-V or 220-V power line. The unit is rated to take surge currents up to 5 A and maintain saturation.

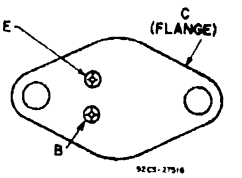
The 2N6079 is characterized for use in inverters operating directly from a rectified 110-V power line. The leakage current is specified at 450 volts; therefore the device can also be used in a series bridge configuration on a 220-V line. The V_{EBO} rating of 9 volts eases requirements on the drive transformer in inverter applications. Storage time, an important factor in the frequency stability of an inverter, is specified in Fig. 11, which shows variation in storage time with variation in load current from zero to maximum (4 A).

The 40851 is characterized for use in switching-regulator power supplies that operate directly from a 120-V or 240-V ac power line.

Features:

- Maximum safe-area-of-operation curves
- Low saturation voltages
- High voltage ratings:
  V_{CER}(sus) = 300 V (2N6077)
  275 V (2N6078)
  375 V (2N6079)
- High dissipation rating: P_T = 45 W

TERMINAL DESIGNATIONS



JEDEC TO-66

MAXIMUM RATINGS, *Absolute-Maximum Values:*

		2N6077	2N6078	2N6079	40851	
*COLLECTOR-TO-BASE VOLTAGE	V_{CBO}	300	275	375	450	V
COLLECTOR-TO-EMITTER SUSTAINING VOLTAGE:						
With base open	V_{CEO}(sus)	275	250 1	350	350	V
* With reverse bias (V_{BE}) of −1.5 V	V_{CEX}(sus)	300	275	375	–	V
With external base-to-emitter resistance (R_{BE}) ≤ 50 Ω	V_{CER}(sus)	300	275	375	375	V
*EMITTER-TO-BASE VOLTAGE	V_{EBO}	6	6	9	9	V
*COLLECTOR CURRENT:	I_C					
Continuous		7	7	7	7	A
Peak		10	10	10	10	A
*CONTINUOUS BASE CURRENT	I_B	4	4	4	4	A
*TRANSISTOR DISSIPATION:	P_T					
At case temperatures up to 25°C		45	45	45	45	W
At case temperatures above 25°C		Derate linearly to 200°C				
*TEMPERATURE RANGE:						
Storage & Operating (Junction)		−65 to +200				°C
*PIN TEMPERATURE (During Soldering):						
At distances ≥ 1/32 in. (0.8 mm) from case for 10 s max.		230				°C

* 2N-Series types in accordance with JEDEC registration data format (JS-6, RDF-1).

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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		2N6077			2N6078			2N6079			40851		
		V_{CE}	V_{BE}	I_C	I_B	Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Max.	
	I_{CEO}	250	−1.5		0	–	–	2	–	–	–	–	–	–	–	–	mA
*	I_{CEV}	250	−1.5			–	–	5	–	–	0.05	–	–	–	–	–	mA
		450	−1.5			–	–	–	–	–	–	–	–	0.5	–	0.5	
	(T_C = 125°C)	250	−1.5			–	–	8	–	–	0.2	–	–	–	–	–	mA
		450	−1.5			–	–	–	–	–	–	–	–	5	–	5	
*	I_{EBO}		−6	0		–	–	1	–	–	1	–	–	–	–	–	mA
			−9	0		–	–	–	–	–	–	–	–	1	–	–	
*	V_{CEO}(sus).			0.2[a]		275[b]	–	–	250[b]	–	–	350[b]	–	–	350[b]	–	V
	V_{CER}(sus) (R_{BE} = 50Ω)			0.2[a]		300[b]	–	–	275[b]	–	–	375[b]	–	–	375[b]	–	
*	V V_{EBO} (I_E = 1 mA)			0		6	–	–	6	–	–	9	–	–	9	–	V
*	h_{FE}	1		1.2[a]		12	28	70	12	28	70	12	28	50	12	–	
	V_{BE}(sat)			1.2[a]	0.2	–	1.0	1.6	–	1.0	1.6	–	1.0	1.6	–	–	V
*				3[a]	0.6	–	1.2	1.9	–	–	–	–	–	–	–	–	
				4[a]	0.8	–	–	–	–	–	–	–	1.3	2	–	2	
				5[a]	1	–	–	–	–	1.5	2	–	–	–	–	–	
	V_{CE}(sat)			1.2[a]	0.2	–	0.15	0.5	–	0.15	0.5	–	0.15	0.5	–	–	V
*				3[a]	0.6	–	0.25	1	–	–	–	–	–	–	–	–	
				4[a]	0.8	–	–	–	–	–	–	–	0.5	3	–	3	
				5[a]	1	–	–	–	–	0.8	3	–	–	–	–	–	
	C_{obo} (V_{CB}=10 V, f = 1 MHz)					–	–	150	–	–	150	–	–	150	–	–	pF
*	$\|h_{fe}\|$ (f = 1 MHz)	10		0.2		1	7	–	1	7	–	1	7	–	–	–	
	$I_{S/b}$ (Pulse duration (non-repetitive) = 1 s)	50				0.9	–	–	0.9	–	–	0.9	–	–	0.9	–	A
	$E_{S/b}$ (R_B = 50Ω, L=100μH)		−4	3●		0.45	–	–	0.45	–	–	0.45	–	–	0.45	–	mj
	t_d[c]			1.2	0.2	–	0.02	–	–	0.02	–	–	0.02	–	–	–	μs
*	t_r[c]			1.2	0.2	–	0.3	0.75	–	0.3	0.75	–	0.3	0.75	–	–	
*	t_s[c]			1.2	0.2	–	2.8	5	–	2.8	5	–	2.8	5	–	–	
*	t_f[c]			1.2	0.2	–	0.3	0.75	–	0.3	0.75	–	0.3	0.75	–	–	
	$R_{\theta JC}$	20		2.25		–	–	3.9	–	–	3.9	–	–	3.9	–	–	°C/W

*2N-series types in accordance with JEDEC registration data format (JS-6, RDF-1).

[a] Pulsed; pulse duration ≤ 350 μs, Duty factor = 2%.

[b] CAUTION: The sustaining voltages V_{CEO}(sus), and V_{CER}(sus), MUST NOT be measured on a curve tracer.

[c] V_{CC} = 250 V, I_{B1} = I_{B2}.

● I_{CM} for 40851