20 STERN AVE. SPRINGFIELD, NEW JERSEY 07081 U.S.A.

TELEPHONE: (973) 376-2922 (212) 227-6005

FAX: (973) 376-8960

## 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<sub>S/b</sub> 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  $V_{CE}(\text{sat})$  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 VEBO 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.

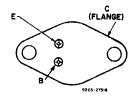
### Features:

- Maximum safe-area-of-operation curves
- Low saturation voltages
- High voltage ratings:

V<sub>CER</sub>(sus) = 300 V (2N6077) 275 V (2N6078) 375 V (2N6079)

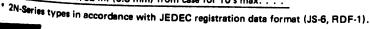
■ High dissipation rating: P<sub>T</sub> = 45 W

#### **TERMINAL DESIGNATIONS**



JEDEC TO-66

MAXIMUM RATINGS, Absolute-Maximum Values:		2N6077	2N6078	2N6079	40851	
*COLLECTOR-TO-BASE VOLTAGECOLLECTOR-TO-EMITTER SUSTAINING VOLTAGE:		300	275	375	450	V
With base open	VCEO(sus)	275	250 1	350	350	V
with reverse bias ( $V_{PE}$ ) of $-1.5 \text{ V}$	VCEV(sus)	300	275	375	-	v
with external base-to-emitter resistance (Rpc) ≤ 50 \2	Voraleus	300	275	375	375	v
*COLLECTOR CURRENT:	VEBO	6	6	9	9	v
Continuous	_	7	7	7	7	Α
T T T T T T T T T T T T T T T T T T T		10	10	10	10	A
*CONTINUOUS BASE CURRENT *TRANSISTOR DISSIPATION:	IB P⊤	4	4	4	4	Α
At case temperatures up to 25°C	' 1	45	45	45	45	w
At case temperatures above 25°C *TEMPERATURE RANGE:			Derate linea	rly to 200°C		
Storage & Operating (Junction)  *PIN TEMPERATURE (During Soldering)			65 to	+200		°C
At distances > 1/32 in. (0.8 mm) from case for 10 s max			23	0		°C





# 2N6077-2N6079, 40851

ELECTRICAL CHARACTERISTICS, At Case Temperature  $(T_C) = 25^{\circ}C$  unless otherwise specified

		TEST CONDITIONS				LIMITS											
	CHARACTERISTIC SYMBOL	VOLTAGE V dc		CURRENT A dc		2N6077		2N6078			2N6079			40851		UNITS	
		VCE	V <sub>BE</sub>	lc	I <sub>B</sub>	Min.	Тур.	Max.	Min.	Тур.	Max.	Min.	Тур.	Max.	Min.	Max.	1
	<sup>I</sup> CEO	250	-1.5		0	_	·_	2	_	-	_	- *	_	-	_	_	mA
*	<sup>I</sup> CEV	250 450	-1.5 -1.5			-	_	5 -	_	-	0.05	·_ _	=	 0.5	-	_ 0.5	mA
	(T <sub>C</sub> = 125°C)	250 450	-1.5 -1.5			_ _	_	8 –	-	-	0.2 _	-	-	_ 5	-	- 5	mA
*	<sup>I</sup> EBO		-6 -9	0		-	_	1 _	-	-	1 _	-	_	1	-	-	mA
*	V <sub>CEO</sub> (sus).			0.2ª		275 <sup>b</sup>	-	-	250b	-	_	350 <sup>b</sup>	T -	_	350 <sup>b</sup>	_	
	$V_{CER}(sus)$ $(R_{BE} = 50\Omega)$			0.2ª		300 <sup>b</sup>	_	-	275 <sup>b</sup>	-	-	375 <sup>b</sup>	-	_	375 <sup>b</sup>	-	\ \
*	V V <sub>EBO</sub> (I <sub>E</sub> = 1 mA)			0		6	_	_	6	-	_	9	-	_	9	_	V
*	h <sub>FE</sub>	1		1.2ª		12	28	70	12	28	70	12	28	50	12	_	
*	V <sub>BE</sub> (sat)			1.2 <sup>a</sup> 3 <sup>a</sup> 4 <sup>a</sup> 5 <sup>a</sup>	0.2 0.6 0.8 1		1.0 1.2 -	1.6 1.9 –	- - -	1.0 - - 1.5	1.6 - - 2	- - -	1.0 - 1.3	1.6 - 2 -		- - 2 -	V
*	V <sub>CE</sub> (sat)			1.2 <sup>a</sup> 3 <sup>a</sup> 4 <sup>a</sup> 5 <sup>a</sup>	0.2 0.6 0.8 1		0.15 0.25 -	0.5 1 -	- - -	0.15 - - 0.8	0.5 - - 3	- - -	0.15 — 0.5 —	0.5 - 3 -	- - -	- 3 -	v
	C <sub>obo</sub> (V <sub>CB</sub> =10 V, f = 1 MHz)					_	_	150	_	-	150	_	_	150	_	_	pF
*	h <sub>fe</sub>   (f = 1 MHz)	10		0.2		1	7	_	1	7	_	1	7		_	_	
	IS/b (Pulse duration (non- repetitive) = 1 s)	50				0.9	_	_	0.9	-	_	0.9	-	-	0.9	_	A
	$E_{S/b}$ (R <sub>B</sub> = 50 $\Omega$ , L=100 $\mu$ H)		-4	3●		0.45	-	-	0.45	-	-	0.45	-	_	0.45	-	mj
	<sup>t</sup> d <sup>c</sup>			1.2	0.2	-	0.02	_	_	0.02		_	0.02		- 1		
*	t <sub>r</sub> c			1.2	0.2	_	0.3	0.75	_	0.3	0.75	_	0.3	0.75	_		
*	t <sub>s</sub> °			1.2	0.2	-	2.8	5	-	2.8	5	_	2.8	5	_	_	μs
*	t <sub>f</sub> °			1.2	0.2	-	0.3	0.75		0.3	0.75	-	0.3	0.75	_	_	
L	$R_{ heta}$ JC	20		2.25				3.9	_	_	3.9	_		3.9		_	°C/W

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

<sup>&</sup>lt;sup>a</sup> Pulsed; pulse duration  $\leq$  350  $\mu$ s, Duty factor = 2%.

 $<sup>^{\</sup>rm b}$ CAUTION: The sustaining voltages  $V_{\mbox{CEO}}(\mbox{sus})$ , and  $V_{\mbox{CER}}(\mbox{sus})$ , MUST NOT be measured on a curve tracer.

 $<sup>^{</sup>c}V_{CC} = 250 \text{ V}, I_{B1} = I_{B2}.$ 

<sup>•</sup> I<sub>CM</sub> for 40851