New Jersey Semi-Conductor Products, Inc.

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PNP
2N5875, 2N5876
NPN
2N5877, 2N5878

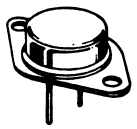
COMPLEMENTARY SILICON HIGH-POWER TRANSISTORS

. . . designed for general-purpose power amplifier and switching applications.

- Low Collector-Emitter Saturation Voltage —
  $V_{CE(sat)}$ = 1.0 Vdc (Max) @ I_C = 5.0 Adc
- Low Leakage Current —
  I_{CEX} = 0.5 mAdc (Max) @ Rated Voltage
- Excellent DC Current Gain —
  h_{FE} = 20 (Min) @ I_C = 4.0 Adc
- High Current Gain — Bandwidth Product —
  f_T = 4.0 MHz (Min) @ I_C = 0.5 A

10 AMPERE COMPLEMENTARY SILICON POWER TRANSISTORS

60-80 VOLTS
150 WATTS



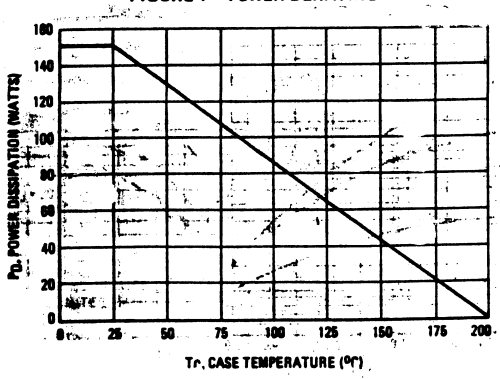
***MAXIMUM RATINGS**

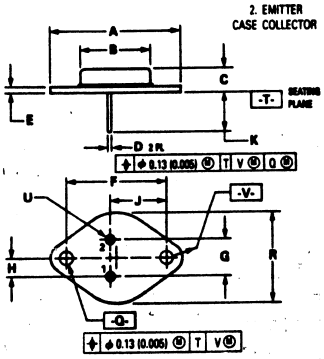
Rating	Symbol	2N5875 2N5877	2N5876 2N5878	Unit
Collector-Emitter Voltage	V_{CEO}	60	80	Vdc
Collector-Base Voltage	V_{CB}	60	80	Vdc
Emitter-Base Voltage	V_{EB}	5.0		Vdc
Collector Current — Continuous Peak	I_C	10 20		Adc
Base Current	I_B	4.0		Adc
Total Device Dissipation @ T_C = 25°C Derate above 25°C	P_D	150 0.857		Watts W/°C
Operating and Storage Junction Temperature Range	T_J, T_{stg}	-65 to +200		°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	θ_{JC}	1.17	°C/W

FIGURE 1 — POWER DERATING





NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. ALL RULES AND NOTES ASSOCIATED WITH REFERENCED TO-204AA OUTLINE SHALL APPLY.

DIM	MILLIMETERS MIN	MILLIMETERS MAX	INCHES MIN	INCHES MAX
A	—	39.37	—	1.550
B	—	21.08	—	0.830
C	6.35	8.25	0.250	0.325
D	0.97	1.09	0.038	0.043
E	1.40	1.77	0.055	0.070
F	30.15 BSC		1.187 BSC	
G	10.92 BSC		0.430 BSC	
H	5.46 BSC		0.215 BSC	
J	16.89 BSC		0.665 BSC	
K	11.18	12.19	0.440	0.480
Q	3.84	4.19	0.151	0.165
R	—	26.67	—	1.050
U	4.83	5.33	0.190	0.210
V	3.84	4.19	0.151	0.165

CASE 1-06
TO-204AA
(TO-3)

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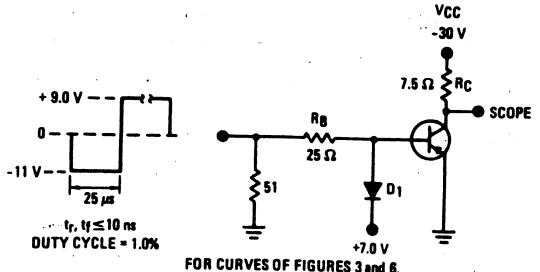
2N5875, 2N5876 PNP, 2N5877, 2N5878 NPN

*ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted)

Characteristic		Symbol	Min	Max	Unit
OFF CHARACTERISTICS					
Collector-Emitter Sustaining Voltage (1) (I_C = 200 mAdc, I_B = 0)	2N5875, 2N5877	$V_{CEO(sus)}$	60		Vdc
	2N5876, 2N5878		80		
Collector Cutoff Current (V_{CE} = 30 Vdc, I_B = 0)	2N5875, 2N5877	I_{CEO}		1.0	mAdc
(V_{CE} = 40 Vdc, I_B = 0)	2N5876, 2N5878			1.0	
Collector Cutoff Current (V_{CE} = 60 Vdc, $V_{BE(off)}$ = 1.5 Vdc)	2N5875, 2N5877	I_{CEX}		0.5	mAdc
(V_{CE} = 80 Vdc, $V_{BE(off)}$ = 1.5 Vdc)	2N5876, 2N5878			0.5	
(V_{CE} = 60 Vdc, $V_{BE(off)}$ = 1.5 Vdc, T_C = 150°C)	2N5875, 2N5877			5.0	
(V_{CE} = 80 Vdc, $V_{BE(off)}$ = 1.5 Vdc, T_C = 150°C)	2N5876, 2N5878			5.0	
Collector Cutoff Current (V_{CB} = 60 Vdc, I_E = 0)	2N5875, 2N5877	I_{CBO}		1.0	mAdc
(V_{CB} = 80 Vdc, I_E = 0)	2N5876, 2N5878			0.5	
Emitter Cutoff Current (V_{EB} = 5.0 Vdc, I_E = 0)		I_{EBO}	–	1.0	mAdc
ON CHARACTERISTICS					
DC Current Gain (1) (I_C = 1.0 Adc, V_{CE} = 4.0 Vdc)		h_{FE}	35	–	–
(I_C = 4.0 Adc, V_{CE} = 4.0 Vdc)			20	100	
(I_C = 10 Adc, V_{CE} = 4.0 Vdc)			4.0	–	
Collector-Emitter Saturation Voltage (1) (I_C = 5.0 Adc, I_B = 0.5 Adc)		$V_{CE(sat)}$		1.0	Vdc
(I_C = 10 Adc, I_B = 2.5 Adc)			–	3.0	
Base-Emitter Saturation Voltage (1) (I_C = 10 Adc, I_B = 2.5 Adc)		$V_{BE(sat)}$	–	2.5	Vdc
Base-Emitter On Voltage (1) (I_C = 4.0 Adc, V_{CE} = 4.0 Vdc)		$V_{BE(on)}$		1.5	Vdc
DYNAMIC CHARACTERISTICS					
Current-Gain – Bandwidth Product (2) (I_C = 0.5 Adc, V_{CE} = 10 Vdc, f_{test} = 1.0 MHz)		f_T	4.0	–	MHz
Output Capacitance (V_{CB} = 10 Vdc, I_E = 0, f = 1.0 MHz)	2N5875, 2N5876	C_{ob}	–	500	pF
	2N5877, 2N5878		–	300	
Small-Signal Current Gain (I_C = 1.0 Adc, V_{CE} = 4.0 Vdc, f = 1.0 kHz)		h_{fe}	20	–	–
SWITCHING CHARACTERISTICS					
Rise Time	(V_{CC} = 30 Vdc, I_C = 4.0 Adc, I_{B1} = I_{B2} = 0.4 Adc, See Figure 2)	t_r	–	0.7	μs
Storage Time		t_s	–	1.0	μs
Fall Time		t_f	–	0.8	μs

*Indicates JEDEC Registered Data.
(1) Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2.0%.
(2) $f_T = |h_{fe}| \cdot f_{test}$

FIGURE 2 – SWITCHING TIME TEST CIRCUIT



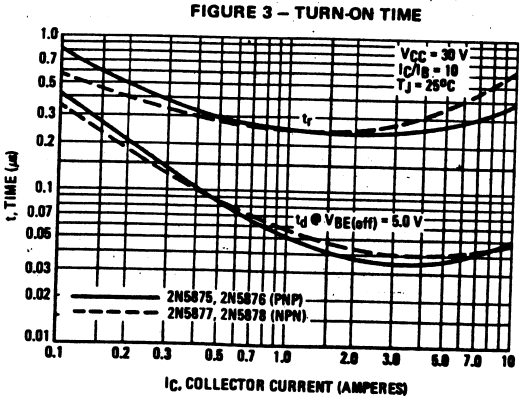
t_r, $t_f \leq 10$ ns
DUTY CYCLE = 1.0%

FOR CURVES OF FIGURES 3 and 6, R_B and R_C ARE VARIED TO OBTAIN DESIRED CURRENT LEVELS

For NPN test circuit, reverse all polarities.

D_1 MUST BE FAST RECOVERY TYPE, e.g.
MBD5300 USED ABOVE $I_B \approx 100$ mA
MSD6100 USED BELOW $I_B \approx 100$ mA

FIGURE 3 – TURN-ON TIME



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