



# NPN High Power Silicon Transistors

## 2N6676 & 2N6678

### Features

- Available in JAN, JANTX, and JANTXV per MIL-PRF-19500/538
- TO-3 (TO-204AA) Package



### Maximum Ratings

Ratings	Symbol	2N6676	2N6678	Units
Collector - Emitter Voltage	$V_{CEO}$	300	400	Vdc
Collector - Base Voltage	$V_{CBO}$	450	650	Vdc
Collector - Base Voltage	$V_{CBX}$	450	650	Vdc
Emitter - Base Voltage	$V_{EBO}$	8.0		Vdc
Base Current	$I_B$	5.0		Adc
Collector Current	$I_C$	15		Adc
Total Power Dissipation @ $T_A = +25^\circ\text{C}$ (1) @ $T_A = +25^\circ\text{C}$	$P_T$	6.0(2) 175	3.0(3) 175	W W
Operating & Storage Temperature Range	$T_{op}, T_{stg}$	-65 to +200		$^\circ\text{C}$

### Thermal Characteristics

Characteristics	Symbol	Maximum	Units
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	1.0	$^\circ\text{C}/\text{W}$

1) Derate linearly @ 1.0 mW/ $^\circ\text{C}$  for  $T_A > +25^\circ\text{C}$

2) Derate linearly @ 34.2 mW/ $^\circ\text{C}$  for  $T_A > +25^\circ\text{C}$

3) Derate linearly @ 17.1 mW/ $^\circ\text{C}$  for  $T_A > +25^\circ\text{C}$

### Electrical Characteristics

OFF Characteristics	Symbol	Mimimum	Maximum	Units
Collector - Emitter Breakdown Voltage $I_C = 200 \text{ mAdc}$ 2N6676 2N6678	$V_{(BR)CEO}$	300 400	---	Vdc
Collector - Emitter Cutoff Current $V_{CE} = 450 \text{ Vdc}, V_{BE} = -1.5 \text{ Vdc}$ $V_{CE} = 650 \text{ Vdc}, V_{BE} = -1.5 \text{ Vdc}$ 2N6676 2N6678	$I_{CEX}$	---	0.1 0.1	Adc
Emitter - Base Cutoff Current $V_{EB} = 7.0 \text{ Vdc}$	$I_{EBO}$	---	2.0	mAdc
Collector - Base Cutoff Current $V_{CB} = 450 \text{ Vdc}$ $V_{CB} = 650 \text{ Vdc}$ 2N6676 2N6678	$I_{CBO}$	---	1.0 1.0	mAdc

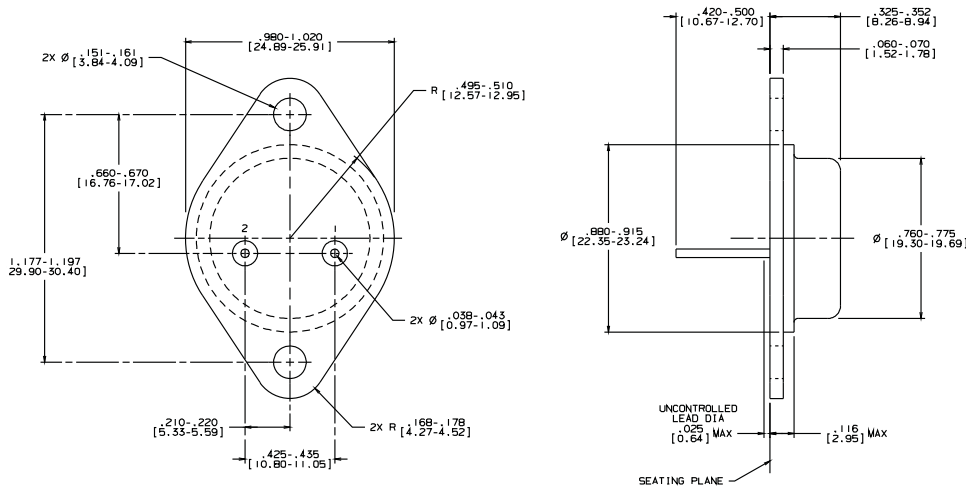


Electrical Characteristics -con't

ON Characteristics (2)		Symbol	Minimum	Maximum	Unit
Forward Current Transfer Ratio $I_C = 1.0 \text{ Adc}, V_{CE} = 3.0 \text{ Vdc}$ $I_C = 15.0 \text{ Adc}, V_{CE} = 3.0 \text{ Vdc}$		$H_{FE}$	15 8	40 20	
Collector - Emitter Saturation Voltage $I_C = 15.0 \text{ Adc}, I_B = 3.0 \text{ Adc}$		$V_{CE(sat)}$	- - -	1.0	Vdc
Base - Emitter Saturation Voltage $I_C = 15.0 \text{ Adc}, I_B = 3.0 \text{ Vdc}$		$V_{BE(sat)}$	- - -	1.5	Vdc
<b>DYNAMIC Characteristic</b>					
Small-Signal Short-Circuit Forward Current Transfer Ratio $I_C = 1.0 \text{ Adc}, V_{CE} = 10 \text{ Vdc}, f = 5.0 \text{ kHz}$		$ h_{fe} $	3.0	10	
Output Capacitance $V_{CB} = 10 \text{ Vdc}, I_E = 0, 100 \text{ kHz} \leq f \leq 1.0 \text{ MHz}$		$C_{obo}$	150	500	pF
<b>Switching Characteristic</b>					
Delay Time		$t_d$		0.1	$\mu\text{s}$
Rise Time		$t_r$		0.6	$\mu\text{s}$
Storage Time	See Figure 3 of MIL-PRF-19500/538	$t_s$		2.5	$\mu\text{s}$
Fall Time		$t_f$		0.5	$\mu\text{s}$
Cross-Over Time		$t_c$		0.5	$\mu\text{s}$
<b>SAFE OPERATING AREA</b>					
<b>DC Tests:</b>	$T_C = +25 \text{ }^\circ\text{C}, 1 \text{ Cycle}, t = 1.0 \text{ s}$ (See Figure 4 of MIL-PRF-19500/537)				
<b>Test 1:</b>	$V_{CE} = 11.7 \text{ Vdc}, I_C = 15 \text{ Adc}$				
<b>Test 2:</b>	$V_{CE} = 30 \text{ Vdc}, I_C = 5.9 \text{ Adc}$				
<b>TEST 3:</b>	$V_{CE} = 100 \text{ Vdc}, I_C = 0.25 \text{ Adc}$				
<b>TEST 4:</b>	$V_{CE} = 25 \text{ Vdc}, I_C = 7.0 \text{ Adc}$				
<b>TEST 5:</b>	$V_{CE} = 300 \text{ Vdc}, I_C = 20 \text{ mAdc}$				2N6676
	$V_{CE} = 400 \text{ Vdc}, I_C = 10 \text{ mAdc}$				2N6678
<b>Clamped Switching</b>					
$T_A = 25 \text{ }^\circ\text{C}, V_{CC} = 15 \text{ Vdc}$					
$I_C = 15 \text{ Adc}, \text{Clamp Voltage} = 350$					2N6676
$I_C = 15 \text{ Adc}, \text{Clamp Voltage} = 450$					2N6678

(2) Pulse Test: Pulse Width = 300  $\mu\text{s}$ , Duty Cycle  $\leq 2.0\%$ .

Outline Drawing



- NOTES:
1. STANDARD HEADER TYPE SOLID BASE.
  2. STANDARD LEAD FINISH PER MIL-M-58510 TYPE X OR EQUIVALENT.
  3. LEAD NOT BENT GREATER THAN 15°.
  4. DIMENSIONS BASED ON JEDEC STANDARD TO-3 PUBLICATION 95, PA

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