

## NPN POWER SILICON SWITCHING TRANSISTOR

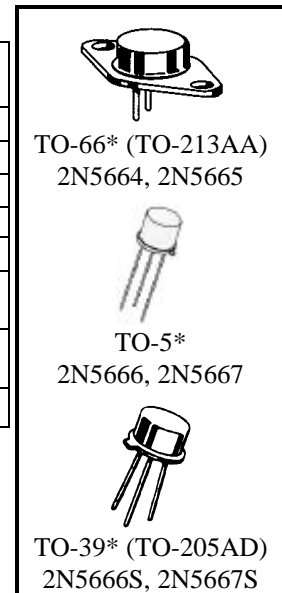
Qualified per MIL-PRF-19500/455

Devices	Qualified Level	Devices	Qualified Level
2N5664 2N5665	JAN JANTX JANTXV	2N5666 2N5667 2N5666S 2N5667S	JAN JANTX JANTXV JANS

### MAXIMUM RATINGS

Ratings	Symbol	2N5664 2N5666, S	2N5665 2N5667, S	Unit	
Collector-Emitter Voltage	$V_{CEO}$	200	300	Vdc	
Collector-Base Voltage	$V_{CBO}$	250	400	Vdc	
Emitter-Base Voltage	$V_{EBO}$	6.0		Vdc	
Base Current	$I_B$	1.0		Adc	
Collector Current	$I_C$	5.0		Adc	
Total Power Dissipation	@ $T_A = +25^{\circ}\text{C}$ @ $T_C = +100^{\circ}\text{C}$	$P_T$	2N5664 2N5665	2N5666, S 2N5667, S	W
			2.5 <sup>(1)</sup> 30 <sup>(3)</sup>	1.2 <sup>(2)</sup> 15 <sup>(4)</sup>	W
Operating & Storage Junction Temperature Range	$T_J, T_{STG}$	-65 to +200		$^{\circ}\text{C}$	

- 1) Derate linearly 14.3 mW/ $^{\circ}\text{C}$  for  $T_A > +25^{\circ}\text{C}$
- 2) Derate linearly 6.9 mW/ $^{\circ}\text{C}$  for  $T_A > +25^{\circ}\text{C}$
- 3) Derate linearly 300 mW/ $^{\circ}\text{C}$  for  $T_C > +100^{\circ}\text{C}$
- 4) Derate linearly 150 mW/ $^{\circ}\text{C}$  for  $T_C > +100^{\circ}\text{C}$



\*See appendix A for package outline

### ELECTRICAL CHARACTERISTICS ( $T_C = 25^{\circ}\text{C}$ unless otherwise noted)

Characteristics	Symbol	Min.	Max.	Unit
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#### OFF CHARACTERISTICS

Collector-Emitter Breakdown Voltage $I_C = 10 \text{ mAdc}$	2N5664, 2N5666, S 2N5665, 2N5667, S	$V_{(BR)CER}$	250 400	Vdc
Emitter-Base Breakdown Voltage $I_E = 10 \mu\text{Adc}$		$V_{(BR)EBO}$	6.0	Vdc
Collector-Emitter Cutoff Current $V_{CE} = 200 \text{ Vdc}$ $V_{CE} = 300 \text{ Vdc}$	2N5664, 2N5666, S 2N5665, 2N5667, S	$I_{CES}$	0.2 0.2	$\mu\text{Adc}$

**ELECTRICAL CHARACTERISTICS (con't)**

Characteristics	Symbol	Min.	Max.	Unit
Collector-Base Cutoff Current				
$V_{CB} = 200 \text{ Vdc}$ 2N5664, 2N5666, S	$I_{CBO}$		0.1	$\mu\text{Adc}$
$V_{CB} = 250 \text{ Vdc}$			1.0	$\text{mAdc}$
$V_{CB} = 300 \text{ Vdc}$ 2N5665, 2N5667, S			0.1	$\mu\text{Adc}$
$V_{CB} = 400 \text{ Vdc}$			1.0	$\text{mAdc}$

**ON CHARACTERISTICS <sup>(5)</sup>**

Forward-Current Transfer Ratio				
$I_C = 0.5 \text{ Adc}, V_{CE} = 2.0 \text{ Vdc}$ 2N5664, 2N5666, S	$h_{FE}$		40	
			25	
$I_C = 1.0 \text{ Adc}, V_{CE} = 5.0 \text{ Vdc}$ 2N5664, 2N5666, S			40	120
			25	75
$I_C = 3.0 \text{ Adc}, V_{CE} = 5.0 \text{ Vdc}$ 2N5664, 2N5666, S			15	
		10		
$I_C = 5.0 \text{ Adc}, V_{CE} = 5.0 \text{ Vdc}$ All Types		5.0		
Collector-Emitter Saturation Voltage				
$I_C = 3.0 \text{ Adc}, I_B = 0.3 \text{ Adc}$ 2N5664, 2N5666, S	$V_{CE(sat)}$		0.4	$\text{Vdc}$
$I_C = 3.0 \text{ Adc}, I_B = 0.6 \text{ Adc}$ 2N5665, 2N5667, S			0.4	
$I_C = 5.0 \text{ Adc}, I_B = 1.0 \text{ Adc}$ All Types			1.0	
Base-Emitter Saturation Voltage				
$I_C = 3.0 \text{ Adc}, I_B = 0.3 \text{ Adc}$ 2N5664, 2N5666, S	$V_{BE(sat)}$		1.2	$\text{Vdc}$
$I_C = 3.0 \text{ Adc}, I_B = 0.6 \text{ Adc}$ 2N5665, 2N5667, S			1.2	
$I_C = 5.0 \text{ Adc}, I_B = 1.0 \text{ Adc}$ All Types			1.5	

**DYNAMIC CHARACTERISTICS**

Forward Current Transfer Ratio				
$I_C = 0.5 \text{ Adc}, V_{CE} = 5.0 \text{ Vdc}, f = 10 \text{ MHz}$	$ h_{fe} $	2.0	7.0	
Output Capacitance				
$V_{CB} = 10 \text{ Vdc}, I_E = 0, 100 \text{ kHz} \leq f \leq 1.0 \text{ MHz}$	$C_{obo}$		120	$\text{pF}$

**SWITCHING CHARACTERISTICS**

Turn-On Time				
$V_{CC} = 100 \text{ Vdc}; I_C = 1.0 \text{ Adc}; I_{B1} = 30 \text{ mAdc}$	$t_{on}$		0.25	$\mu\text{s}$
Turn-Off Time				
$V_{CC} = 30 \text{ Vdc}; I_C = 1.0 \text{ Adc}; I_{B1} = -I_{B2} = 50 \text{ mAdc}$ 2N5664, 2N5666, S	$t_{off}$		1.5	$\mu\text{s}$
2N5665, 2N5667, S			2.0	

**SAFE OPERATING AREA**

<b>DC Tests (2N5664 and 2N5665 only)</b>	
$T_C = 100^\circ\text{C}, 1 \text{ Cycle}, t \geq 1.0 \text{ s}, t_r + t_f = 10 \mu\text{s}$	
<b>Test 1</b>	
$V_{CE} = 6.0 \text{ Vdc}, I_C = 5.0 \text{ Adc}$	2N5664 and 2N5665
$V_{CE} = 3.0 \text{ Vdc}, I_C = 5.0 \text{ Adc}$	2N5666 and 2N5667
<b>Test 2</b>	
$V_{CE} = 40 \text{ Vdc}, I_C = 0.75 \text{ Adc}$	2N5664 and 2N5665
$V_{CE} = 37.5 \text{ Vdc}, I_C = 0.4 \text{ Adc}$	2N5666 and 2N5667
<b>Test 3</b>	
$V_{CE} = 200 \text{ Vdc}, I_C = 43 \text{ mAdc}$	2N5664
$V_{CE} = 200 \text{ Vdc}, I_C = 27 \text{ mAdc}$	2N5666
<b>Test 4</b>	
$V_{CE} = 300 \text{ Vdc}, I_C = 21 \text{ mAdc}$	2N5665
$V_{CE} = 300 \text{ Vdc}, I_C = 14 \text{ mAdc}$	2N5667

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