

NPN POWER SILICON TRANSISTOR

Qualified per MIL-PRF-19500/537

Devices

2N6674 2N6675 2N6689 2N6690

Qualified Level

JAN
JANTX
JANTXV

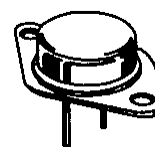
MAXIMUM RATINGS

Ratings	Symbol	2N6674 2N6689	2N6675 2N6690	Unit
Collector-Emitter Voltage	V_{CEO}	300	400	Vdc
Collector-Base Voltage	V_{CBO}	450	650	Vdc
Collector-Base Voltage	V_{CEX}	450	650	Vdc
Emitter-Base Voltage	V_{EBO}	7.0		Vdc
Base Current	I_B	5.0		Adc
Collector Current	I_C	15		Adc
		2N6674 2N6675	2N6689 2N6690	
Total Power Dissipation @ $T_A = +25^{\circ}\text{C}$ @ $T_C = +25^{\circ}\text{C}^{(1)}$	P_T	6.0 ⁽²⁾	3.0 ⁽³⁾	W
		175	175	W
Operating & Storage Temperature Range	$T_{op}; T_{stg}$	-65 to +200		$^{\circ}\text{C}$

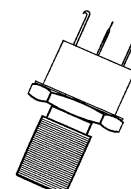
THERMAL CHARACTERISTICS

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

- 1) Derate linearly 1.0 W/ $^{\circ}\text{C}$ for $T_C > 25^{\circ}\text{C}$
- 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 $T_A > 25^{\circ}\text{C}$



2N6674, 2N6675
TO-3 (TO-204AA)*



2N6689, 2N6690
TO-61*

* 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 $I_C = 200 \text{ mAdc}$	2N6674, 2N6689 2N6675, 2N6690	$V_{(BR)CEO}$	300 400	Vdc
Collector-Emitter Cutoff Current $V_{CE} = 450 \text{ Vdc}, V_{BE} = -1.5 \text{ Vdc}$ $V_{CE} = 650 \text{ Vdc}, V_{BE} = -1.5 \text{ Vdc}$	2N6674, 2N6689 2N6675, 2N6690	I_{CEX}	0.1 0.1	mAdc

ELECTRICAL CHARACTERISTICS (con't)

Characteristics	Symbol	Min.	Max.	Unit
Emitter-Base Cutoff Current $V_{EB} = 7.0 \text{ Vdc}$	I_{EBO}		2.0	mAdc
Collector-Base Cutoff Current $V_{CB} = 450 \text{ Vdc}$ 2N6674, 2N6689 $V_{CB} = 650 \text{ Vdc}$ 2N6675, 2N6690	I_{CBO}		1.0 1.0	mAdc

ON CHARACTERISTICS ⁽⁴⁾

Forward-Current Transfer Ratio $I_C = 1 \text{ Adc}; V_{CE} = 3.0 \text{ Vdc}$ $I_C = 10 \text{ Adc}; V_{CE} = 2.0 \text{ Vdc}$	h_{FE}	15 8	40 20	
Collector-Emitter Saturation Voltage $I_C = 10 \text{ Adc}; I_B = 2 \text{ Adc}$ $I_C = 15 \text{ Adc}; I_B = 5 \text{ Adc}$	$V_{CE(sat)}$		1.0 5.0	Vdc
Base-Emitter Saturation Voltage $I_C = 10 \text{ Adc}; I_B = 2 \text{ Adc}$	$V_{BE(sat)}$		1.5	Vdc

DYNAMIC CHARACTERISTICS

Small-Signal Short-Circuit Forward Current Transfer Ratio $I_C = 1.0 \text{ Adc}, V_{CE} = 10 \text{ Vdc}, f = 5 \text{ MHz}$	$ 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

SWITCHING CHARACTERISTICS

Delay Time	See Figure 3 of MIL-PRF-19500/537	t_d		0.1	μs
Rise Time		t_r		0.6	μs
Storage Time		t_s		2.5	μs
Fall Time		t_f		0.5	μs
Cross-Over Time		t_c		0.5	μs

SAFE OPERATING AREA**DC Tests (continuous dc)**

$T_C = +25^\circ\text{C}$, power application time = 1.0 s; 1 Cycle, (See Figure 4 of MIL-PRF-19500/537)

Test 1

$V_{CE} = 11.7 \text{ Vdc}, I_C = 15 \text{ Adc}$ All Types

Test 2

$V_{CE} = 30 \text{ Vdc}, I_C = 5.9 \text{ Adc}$ 2N6674, 2N6675

Test 3

$V_{CE} = 100 \text{ Vdc}, I_C = 0.25 \text{ Adc}$ All Types

Test 4

$V_{CE} = 25 \text{ Vdc}, I_C = 7.0 \text{ Adc}$ 2N6689, 2N6690

Test 5

$V_{CE} = 300 \text{ Vdc}, I_C = 20 \text{ mAdc}$ 2N6674, 2N6689

$V_{CE} = 400 \text{ Vdc}, I_C = 10 \text{ mAdc}$ 2N6675, 2N6690

Clamped Switching

$T_A = 25^\circ\text{C}; V_{CC} = 15 \text{ Vdc}$; Load condition B; $R_{BB1} = 5 \Omega; R_{BB2} = 1.5 \Omega$;

$V_{BB2} = 5 \text{ Vdc}; L = 50 \mu\text{H}; R \text{ of inductor} = .05\Omega; R_L = R \text{ of inductor.}$ (See Figure 6 of MIL-PRF-19500/537)

Clamp Voltage = 350; $I_C = 10 \text{ Adc}$ 2N6674, 2N6689

Clamp Voltage = 450; $I_C = 10 \text{ Adc}$ 2N6675, 2N6690

(4) Pulse Test: Pulse Width = 300 μs , Duty Cycle $\leq 2.0\%$.