

NPN POWER SILICON TRANSISTOR

Qualified per MIL-PRF-19500/454

Devices

2N5660 2N5661 2N5662 2N5663

Qualified Level

JAN, JANTX
JANTXV

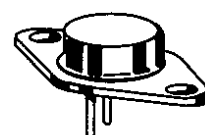
MAXIMUM RATINGS

Ratings	Symbol	2N5660 2N5662	2N5661 2N5663	Unit
Collector-Emitter Voltage	V_{CEO}	200	300	Vdc
Collector-Base Voltage	V_{CBO}	250	400	Vdc
Collector-Emitter Voltage	V_{CER}	250	400	Vdc
Emitter-Base Voltage	V_{EBO}	6.0		Vdc
Base Current	I_B	0.5		Adc
Collector Current	I_C	2.0		Adc
		2N5660 2N5661	2N5662 2N5663	
Total Power Dissipation @ $T_A = +25^{\circ}\text{C}$ @ $T_C = +100^{\circ}\text{C}$	P_T	2.0 ⁽¹⁾	1.0 ⁽²⁾	W
		20 ⁽³⁾	15 ⁽⁴⁾	W
Operating & Storage Junction Temperature Range	T_J, T_{stg}	-65 to +200		$^{\circ}\text{C}$

THERMAL CHARACTERISTICS

Characteristics	Symbol	2N5660 2N5661	2N5662 2N5663	Unit
Thermal Resistance, Junction-to-Case Junction-to-Ambient	$R_{\theta JC}$	5.0	6.67	$^{\circ}\text{C}/\text{W}$
	$R_{\theta JA}$	87.5	145.8	

- 1) Derate linearly 11.4 mW/ $^{\circ}\text{C}$ for $T_A > +25^{\circ}\text{C}$
- 2) Derate linearly 5.7 mW/ $^{\circ}\text{C}$ for $T_A > +25^{\circ}\text{C}$
- 3) Derate linearly 200 mW/ $^{\circ}\text{C}$ for $T_C > +100^{\circ}\text{C}$
- 4) Derate linearly 150 mW/ $^{\circ}\text{C}$ for $T_C > +100^{\circ}\text{C}$



TO-66*
(TO-213AA)
2N5660, 2N5661



TO-5*
2N5662, 2N5663

*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 $I_C = 10 \text{ mAdc}$	2N5660, 2N5662 2N5661, 2N5663	$V_{(BR)CEO}$	200 300	Vdc
Collector-Base Breakdown Voltage $I_C = 10 \text{ mAdc}, R_{BE} = 100\Omega$	2N5660, 2N5662 2N5661, 2N5663	$V_{(BR)CER}$	250 400	Vdc
Emitter-Base Breakdown Voltage $I_E = 10 \mu\text{Adc}$		$V_{(BR)EBO}$	6.0	Vdc

ELECTRICAL CHARACTERISTICS (con't)

Characteristics	Symbol	Min.	Max.	Unit
Collector-Emitter Cutoff Current V _{CE} = 200 Vdc V _{CE} = 300 Vdc	I _{CES}		0.2 0.2	μAdc μAdc
Collector-Base Cutoff Current V _{CB} = 200 Vdc V _{CB} = 250 Vdc V _{CB} = 300 Vdc V _{CB} = 400 Vdc	I _{CBO}		0.1 1.0 0.1 1.0	μAdc mAdc μAdc mAdc
V _{CB} = 200 Vdc			0.1	μAdc
V _{CB} = 250 Vdc			1.0	mAdc
V _{CB} = 300 Vdc			0.1	μAdc
V _{CB} = 400 Vdc			1.0	mAdc

ON CHARACTERISTICS ⁽⁵⁾

Forward-Current Transfer Ratio I _C = 50 mAdc, V _{CE} = 2.0 Vdc I _C = 0.5 Adc, V _{CE} = 5.0 Vdc I _C = 1.0 Adc, V _{CE} = 5.0 Vdc I _C = 2.0 Adc, V _{CE} = 5.0 Vdc	2N5660, 2N5662 2N5661, 2N5663 2N5660, 2N5662 2N5661, 2N5663 All Types All Types	h _{FE}	40 25 40 25 15 5.0	120 75	
Collector-Emitter Saturation Voltage I _C = 1.0 Adc, I _B = 0.1 Adc I _C = 2.0 Adc, I _B = 0.4 Adc				0.4 0.8	Vdc
Base-Emitter Saturation Voltage I _C = 1.0 Adc, I _B = 0.1 Adc I _C = 2.0 Adc, I _B = 0.4 Adc				1.2 1.5	Vdc

DYNAMIC CHARACTERISTICS

Magnitude of Common Emitter Small-Signal Short-Circuit Forward Current Transfer Ratio I _C = 0.1 Adc, V _{CE} = 5.0 Vdc, f = 10 MHz	h _{fe}	2.0	7.0	
Output Capacitance V _{CB} = 10 Vdc, I _E = 0, 100 kHz ≤ f ≤ 1.0 MHz	C _{obo}		45	pF

SWITCHING CHARACTERISTICS

Turn-On Time V _{CC} = 100 Vdc; I _C = 0.5 Adc; I _{B1} = 15 Adc V _{CC} = 100 Vdc; I _C = 0.5 Adc; I _{B1} = 25 Adc	2N5660, 2N5662 2N5661, 2N5663	t _{on}	0.25 0.25	μs
Turn-Off Time V _{CC} = 100 Vdc; I _C = 0.5 Adc; I _{B1} = -I _{B2} = 15 Adc V _{CC} = 100 Vdc; I _C = 0.5 Adc; I _{B1} = -I _{B2} = 25 Adc	2N5660, 2N5662 2N5661, 2N5663		0.85 1.2	μs

SAFE OPERATING AREA

DC Tests T _C = +100°C, 1 Cycle, t ≥ 1.0 s				
Test 1 V _{CE} = 10 Vdc, I _C = 2.0 Adc V _{CE} = 7.5 Vdc, I _C = 2.0 Adc				
Test 2 V _{CE} = 40 Vdc, I _C = 500 mAdc V _{CE} = 25 Vdc, I _C = 600 mAdc				
Test 3 V _{CE} = 200 Vdc, I _C = 36 mAdc V _{CE} = 200 Vdc, I _C = 27 mAdc				
Test 4 V _{CE} = 300 Vdc, I _C = 19 mAdc V _{CE} = 300 Vdc, I _C = 14 mAdc				

(5) Pulse Test: Pulse Width = 300μs, Duty Cycle ≤ 2.0%.