TECHNICAL DATA SHEET

NPN POWER SILICON TRANSISTOR
Qualified per MIL-PRF-19500/534

DEVICES		LEVELS
2N5002 2N5004		**JAN** **JANTX** **JANTXV** **JANS**

ABSOLUTE MAXIMUM RATINGS *(T_C = +25°C unless otherwise noted)*
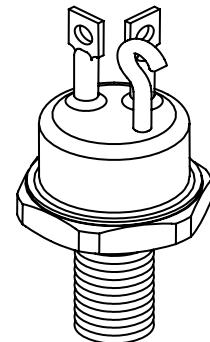
Parameters / Test Conditions	Symbol	Value	Unit
Collector-Emitter Voltage	V_{CEO}	80	V
Collector-Base Voltage	V_{CBO}	100	V
Emitter-Base Voltage	V_{EBO}	5.5	V
Collector Current	I_C I_C [3]	5.0 10	A
Total Power Dissipation @ T_A = +25°C [1] @ T_C = +25°C [2]	P_T	2.0 58	W
Operating & Storage Junction Temperature Range	T_J, T_{stg}	-65 to +200	°C
Thermal Resistance, Junction-to Case	$R_{\theta JC}$	3.0	°C/W
Thermal Resistance, Junction-to Ambient	$R_{\theta JA}$	88	°C/W

TO-59

Note:
1) Derate linearly 11.4 mW/°C for T_A > +25°C
2) Derate linearly 331 mW/°C for T_C > +25°C
3) This value applies for $P_W \leq$ 8.3 ms, duty cycle $\leq$ 1%

ELECTRICAL CHARACTERISTICS *(T_A = +25°C, unless otherwise noted)*

Parameters / Test Conditions	Symbol	Min.	Max.	Unit
OFF CHARACTERISTICS				
Collector-Emitter Breakdown Voltage I_C = 100mAdc	$V_{(BR)CEO}$	80		Vdc
Collector-Emitter Cutoff Current V_{CE} = 40Vdc, I_B = 0	I_{CEO}		50	μAdc
Collector-Emitter Cutoff Current V_{CE} = 60Vdc, V_{BE} = 0Vdc V_{CE} = 100Vdc, V_{BE} = 0Vdc	I_{CES}		1.0 1.0	μAdc mAdc
Emitter-Base Cutoff Current V_{BE} = 4.0Vdc, I_C = 0 V_{BE} = 5.5Vdc, I_C = 0	I_{EBO}		1.0 1.0	mAdc

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DYNAMIC CHARACTERISTICS

Parameters / Test Conditions	Symbol	Min.	Max.	Unit
Forward-Current Transfer Ratio $I_C = 50mAdc$, $V_{CE} = 5.0Vdc$ 2N5002 $I_C = 2.5Adc$, $V_{CE} = 5.0Vdc$ $I_C = 5.0Adc$, $V_{CE} = 5.0Vdc$ $I_C = 50mAdc$, $V_{CE} = 5.0Vdc$ 2N5004 $I_C = 2.5Adc$, $V_{CE} = 5.0Vdc$ $I_C = 5.0Adc$, $V_{CE} = 5.0Vdc$	h_{FE}	20 30 20 50 70 40	--- 90 --- --- 200 ---	
Base-Emitter Voltage Non-Saturated $V_{CE} = 5.0Vdc$, $I_C = 2.5Adc$	V_{BE}		1.45	Vdc
Collector-Emitter Saturation Voltage $I_C = 2.5Adc$, $I_B = 250mAdc$ $I_C = 5.0Adc$, $I_B = 500mAdc$	$V_{CE(sat)}$		0.75 1.5	Vdc
Base-Emitter Saturation Voltage $I_C = 2.5Adc$, $I_B = 250mAdc$ $I_C = 5.0Adc$, $I_B = 500mAdc$	$V_{BE(sat)}$		1.45 2.2	Vdc

DYNAMIC CHARACTERISTICS

Parameters / Test Conditions	Symbol	Min.	Max.	Unit
Magnitude of Common Emitter Small-Signal Short-Circuit. Forward Current Transfer Ratio $I_C = 500mA$, $V_{CE} = 5.0Vdc$, $f = 10MHz$ 2N5002 2N5004	$\lvert h_{fe} \rvert$	6.0 7.0		
Output Capacitance $V_{CB} = 10Vdc$	C_{obo}		250	pF

SWITCHING CHARACTERISTICS

Parameters / Test Conditions		Symbol	Min.	Max.	Unit
Turn-On Time	$I_C = 5Adc$; $I_{B1} = 500mAdc$	t_{on}		0.5	μs
Storage Time	$I_{B2} = -500mAdc$	t_s		1.4	μs
Fall Time	$V_{BE(OFF)} = 3.7Vdc$	t_f		0.5	μs
Turn-Off Time	$R_L = 6\Omega$	t_{off}		1.5	μs

SAFE OPERATING AREA

DC Tests

$T_C = +25°C$, $V_{CE} = 0$, tp = 1s, 1 Cycle

Test 1

$V_{CE} = 12Vdc$, $I_C = 5.0Adc$

Test 2

$V_{CE} = 32Vdc$, $I_C = 1.7Adc$

Test 3

$V_{CE} = 80Vdc$, $I_C = 100mAdc$

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