Microsemi LAWRENCE

TECHNICAL DATA

NPN POWER SILICON TRANSISTOR

Qualified per MIL-PRF-19500/534

Devices		*Qualified Level*
2N5002	**2N5004**	**JAN JANTX JANTXV**

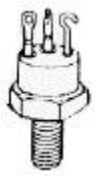
MAXIMUM RATINGS

Ratings	Symbol	Value	Units
Collector-Emitter Voltage	V_{CEO}	80	Vdc
Collector-Base Voltage	V_{CBO}	100	Vdc
Emitter-Base Voltage	V_{EBO}	5.5	Vdc
Collector Current	I_C I_C (3)	5.0 10	Adc
Total Power Dissipation @ $T_A = 25^0C$ (1) @ $T_C = 25^0C$ (2)	P_T	2.0 58	W
Operating & Storage Junction Temperature Range	T_J, T_{stg}	-65 to +200	^0C

THERMAL CHARACTERISTICS

Characteristics	Symbol	Max.	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	3.0	$^0C/W$
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	88	$^0C/W$

1) Derate linearly 11.4 mW/^{0}C for $T_A > 25^0C$
2) Derate linearly 331 mW/^{0}C for $T_C > 25^0C$
3) This value applies for $P_W \leq 8.3$ ms, duty cycle $\leq 1\%$



TO-59*

*See appendix A for package outline

ELECTRICAL CHARACTERISTICS ($T_C = 25^0C$ unless otherwise noted)

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

ELECTRICAL CHARACTERISTICS (Con't)

Characteristics		Symbol	Min.	Max.	Unit
ON CHARACTERISTICS					
Forward-Current Transfer Ratio					
I_C = 50 mAdc, V_{CE} = 5.0 Vdc	2N5002	h_{FE}	20		
I_C = 2.5 Adc, V_{CE} = 5.0 Vdc			30	90	
I_C = 5.0 Adc, V_{CE} = 5.0 Vdc			20		
I_C = 50 mAdc, V_{CE} = 5.0 Vdc	2N5004		50		
I_C = 2.5 Adc, V_{CE} = 5.0 Vdc			70	200	
I_C = 5.0 Adc, V_{CE} = 5.0 Vdc			40		
Base-Emitter Voltage Non-saturated					
V_{CE} = 5.0 Adc, I_C =2.5 Adc		V_{BE}		1.45	Vdc
Collector-Emitter Saturation Voltage					
I_C = 2.5 Adc, I_B = 250 mAdc		$V_{CE(sat)}$		0.25	Vdc
I_C = 5.0 Adc, I_B = 500 mAdc				1.5	
Base-Emitter Saturation Voltage					
I_C = 2.5 Adc, I_B = 250 mAdc		$V_{BE(sat)}$		1.45	Vdc
I_C = 5.0 Adc, I_B = 500 mAdc				2.2	
DYNAMIC CHARACTERISTICS					
Magnitude of Common Emitter Small-Signal Short-Circuit Forward Current Transfer Ratio					
I_C = 500 mAdc, V_{CE} = 5.0 Vdc, f = 10 MHz	2N5002	$\lvert h_{fe} \rvert$	6.0		
	2N5004		7.0		
Output Capacitance					
V_{CB} = 10 Vdc		C_{obo}		250	pF
SWITCHING CHARACTERISTICS					
Turn-On Time					
I_C = 5 Adc; I_{B1}= 500 mAdc		t_{on}		0.5	µs
Storage Time	I_{B2}= -500 mAdc	t_s		1.4	µs
Fall Time	$V_{BE(OFF)}$ = 3.7 Vdc	t_f		0.5	µs
Turn-Off Time					
R_L = 6 Ω		t_{off}		1.5	µs

SAFE OPERATING AREA

DC Tests

T_C = +25^{0}C, V_{CE} = 0, t_P = 1 second 1 Cycle

Test 1

V_{CE} = 12 Vdc, I_C = 5 Adc

Test 2

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

Test 3

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