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Tel: +86-755-8981 8866 Fax: +86-755-8427 6832
Email & Skype: info@chipsmall.com Web: www.chipsmall.com
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Microsemi LAWRENCE

6 Lake Street, Lawrence, MA 01841
1-800-446-1158 / (978) 620-2600 / Fax: (978) 689-0803
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TECHNICAL DATA SHEET

NPN POWER SILICON TRANSISTOR

Qualified per MIL-PRF-19500/394

DEVICES

2N4150 **2N5237** **2N5238**
2N4150S **2N5237S** **2N5238S**

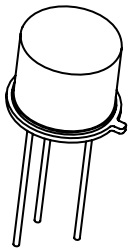
LEVELS

JAN
JANTX
JANTXV
JANS

ABSOLUTE MAXIMUM RATINGS (T_C = +25°C unless otherwise noted)

Parameters / Test Conditions	Symbol	2N4150 2N4150S	2N5237 2N5237S	2N5238 2N5238S	Unit
Collector-Emitter Voltage	V_{CEO}	70	120	170	Vdc
Collector-Base Voltage	V_{CBO}	100	150	200	Vdc
Emitter-Base Voltage	V_{EBO}	10			Vdc
Collector Current	I_C	10			Adc
Total Power Dissipation @ T_A = +25°C (1) @ T_C = +25°C (2)	P_T	1.0 15			W
Operating & Storage Junction Temperature Range	T_j , T_{stg}	-65 to +200			°C
Thermal Resistance, Junction-to Case Junction- to Ambient	$R_{\theta JC}$ $R_{\theta JA}$	10 175			°C/W

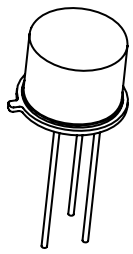
1) Derate linearly @ 5.7mW/°C for T_A > +25°C
2) Derate linearly @ 100mW/°C for T_C > +25°C



TO-5
2N4150, 2N5237, 2N5238

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

Parameters / Test Conditions		Symbol	Min.	Max.	Unit
OFF CHARACTERISTICS					
Collector-Emitter Breakdown Voltage I_C = 0.1mAdc	2N4150, 2N4150S 2N5237, 2N5237S 2N5238, 2N5238S	$V_{(BR)CEO}$	70 120 170		Vdc
Collector-Emitter Cutoff Current V_{BE} = 0.5Vdc, V_{CE} = 60Vdc V_{BE} = 0.5Vdc, V_{CE} = 110Vdc V_{BE} = 0.5Vdc, V_{CE} = 160Vdc	2N4150, 2N4150S 2N5237, 2N5237S 2N5238, 2N5238S	I_{CEX}		10 10 10	µAdc
Collector-Emitter Cutoff Current V_{CE} = 60Vdc V_{CE} = 110Vdc V_{CE} = 160Vdc	2N4150, 2N4150S 2N5237, 2N5237S 2N5238, 2N5238S	I_{CEO}		10 10 10	µAdc
Emitter-Base Cutoff Current V_{EB} = 7.0Vdc V_{EB} = 5.0Vdc		I_{EBO}		10 0.1	µAdc



TO-39
(TO-205AD)
2N4150S, 2N5237S, 2N5238S

6 Lake Street, Lawrence, MA 01841
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TECHNICAL DATA SHEET

NPN POWER SILICON TRANSISTOR

Qualified per MIL-PRF-19500/394

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

Parameters / Test Conditions		Symbol	Min.	Max.	Unit
Collector-Base Cutoff Current					
V_{CB} = 100Vdc	2N4150, 2N4150S	I_{CBO}		10	µAdc
V_{CB} = 150Vdc	2N5237, 2N5237S			10	
V_{CB} = 200Vdc	2N5238, 2N5238S			10	
V_{CB} = 80Vdc	All Types			0.1	
ON CHARACTERISTICS (3)					
Forward-Current Transfer Ratio					
I_C = 1.0Adc, V_{CE} = 5.0Vdc	2N4150, 2N4150S	h_{FE}	50	200	
	2N5237, 2N5237S		50	225	
	2N5238, 2N5238S		50	225	
I_C = 5.0Adc, V_{CE} = 5.0Vdc	All Types		40	120	
I_C = 10Adc, V_{CE} = 5.0Vdc	All Types		10	-	
Collector-Emitter Saturation Voltage					
I_C = 5.0Adc, I_B = 0.5Adc		$V_{CE(sat)}$		0.6	Vdc
I_C = 10Adc, I_B = 1.0Adc				2.5	
Base-Emitter Saturation Voltage					
I_C = 5.0Adc, I_B = 0.5Adc		$V_{BE(sat)}$		1.5	Vdc
I_C = 10Adc, I_B = 1.0Adc				25	

DYNAMIC CHARACTERISTICS

Parameters / Test Conditions		Symbol	Min.	Max.	Unit
Magnitude of Common Emitter Small-Signal Short-Circuit Forward Current Transfer Ratio		$\|h_{fe}\|$	1.5	7.5	
I_C = 0.2Adc, V_{CE} = 10Vdc, f = 10MHz					
Forward Current Transfer Ratio					
I_C = 50mAdc, V_{CE} = 5.0V, f = 1.0kHz	2N4150, 2N4150S	h_{fe}	40	160	
	2N5237, 2N5237S		40	160	
	2N5238, 2N5238S		40	250	
Output Capacitance		C_{obo}		350	pF
V_{CB} = 10Vdc, I_E = 0, 100kHz ≤ f ≤ 1.0MHz					

SWITCHING CHARACTERISTICS

Parameters / Test Conditions		Symbol	Min.	Max.	Unit
Delay Time	V_{CC} = 20Vdc, V_{BB} = 5.0Vdc	t_d		50	ns
Rise Time	I_C = 5.0Adc, I_{B1} = 0.5Adc	t_r		500	ns
Storage Time	V_{CC} = 20Vdc, V_{BB} = 5.0Vdc	t_s		1.5	µs
Fall Time	I_C = 5.0Adc, I_{B1} = -I_{B2} = -0.5Adc	t_f		500	ns

SAFE OPERATING AREA

DC Tests
T_C = +25°C, 1 Cycle, t = 1.0s
Test 1
V_{CE} = 40Vdc, I_C = 0.22Adc
Test 2
V_{CE} = 70Vdc, I_C = 90mAdc
Test 3

V_{CE} = 120Vdc, I_C = 15mAdc	2N5237, 2N5237S
V_{CE} = 170Vdc, I_C = 3.5mAdc	2N5238, 2N5238S

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