

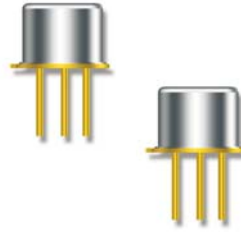
NPN Power Silicon Transistor

2N4150, 2N5237 & 2N5238



Features

- Available in JAN, JANTX, and JANTXV per MIL-PRF-19500/384
- TO-5 Package



Maximum Ratings

Ratings	Symbol	2N4150	2N5237	2N5238	Units
Collector - Emitter Voltage	V_{CEO}	70	120	170	Vdc
Collector - Base Voltage	V_{CBO}	100	150	200	Vdc
Emitter - Base Voltage	V_{EBO}	10.0			Vdc
Collector Current	I_C	4.0			Adc
Total Power Dissipation @ $T_A = +25^\circ\text{C}$ (1) @ $T_A = +25^\circ\text{C}$ (2)	P_T	10			W
		175			W
Operating & Storage Temperature Range	T_{op}, T_{stg}	-65 to +200			$^\circ\text{C}$
Thermal Resistance, Junction-to-Case Junction_to-Ambient	$R_{\theta JC}$	10.0			$^\circ\text{C/W}$
	$R_{\theta JA}$	175.0			

1) Derate linearly @ 5.7 mW/ $^\circ\text{C}$ for $T_A > +25^\circ\text{C}$

2) Derate linearly @ 100 mW/ $^\circ\text{C}$ for $T_C > +25^\circ\text{C}$

Electrical Characteristics ($T_C = 25^\circ\text{C}$ unless otherwise noted)

OFF Characteristics	Symbol	Mimumum	Maximum	Units
Collector - Emitter Breakdown Voltage $I_C = 0.1 \text{ mAdc}$	$V_{(BR)CEO}$	2N4150 70	---	Vdc
2N5237 120				
2N5238 170				
Collector - Emitter Cutoff Current $V_{BE} = 0.5 \text{ Vdc}, V_{CE} = 60 \text{ Vdc}$	I_{CEX}	2N4150 ---	10	μAdc
$V_{BE} = 0.5 \text{ Vdc}, V_{CE} = 110 \text{ Vdc}$		2N5237 10		
$V_{BE} = 0.5 \text{ Vdc}, V_{CE} = 160 \text{ Vdc}$		2N5238 10		
Collector - Emitter Cutoff Current $V_{CE} = 60 \text{ Vdc}$	I_{CEO}	2N4150 ---	10	μAdc
$V_{CE} = 110 \text{ Vdc}$		2N5237 10		
$V_{CE} = 160 \text{ Vdc}$		2N5238 10		
Emitter - Base Cutoff Current $V_{EB} = 7.0 \text{ Vdc}$	I_{EBO}	---	10	μAdc
$V_{EB} = 5.0 \text{ Vdc}$			0.1	
Collector-Base Cutoff Current $V_{CB} = 100 \text{ Vdc}$	I_{CBO}	---	2N4150 10	μAdc
$V_{CB} = 150 \text{ Vdc}$			2N5237 10	
$V_{CB} = 200 \text{ Vdc}$			2N5238 10	
$V_{CB} = 80 \text{ Vdc}$			All Types 0.1	

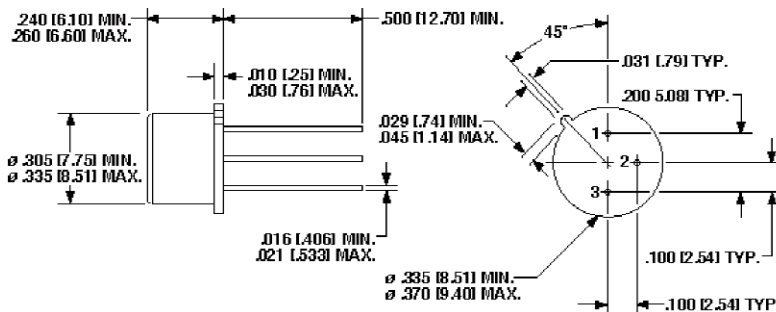


Electrical Characteristics -con't

ON Characteristics		Symbol	Mimimum	Maximum	Units
Collector-Base Cutoff Current $I_C = 1.0 \text{ Adc}, V_{CE} = 5.0 \text{ Vdc}$	2N4150	H_{FE}	50	20	μAdc
	2N5237		50	225	
	2N5238		50	225	
$I_C = 5.0 \text{ Adc}, V_{CE} = 5.0 \text{ Vdc}$	All Types		40	120	
$I_C = 10.0 \text{ Adc}, V_{CE} = 5.0 \text{ Vdc}$	All Types		10	---	
Collector-Emitter Saturation Voltage $I_C = 5.0 \text{ Adc}, I_B = 0.5 \text{ Adc}$ $I_C = 10.0 \text{ Adc}, I_B = 1.0 \text{ Adc}$		$V_{CE(sat)}$	---	0.6 2.5	Vdc
Base-Emitter Saturation Voltage $I_C = 5.0 \text{ Adc}, I_B = 0.5 \text{ Adc}$ $I_C = 10.0 \text{ Adc}, I_B = 1.0 \text{ Adc}$		$V_{BE(sat)}$	---	1.5 25	Vdc
DYNAMIC Characteristics					
Magnitude of Common Emitter Small-Signal Short-Circuit Forward Current Transfer Ratio $I_C = 0.2 \text{ Adc}, V_{CE} = 10.0 \text{ Vdc}, f = 10 \text{ MHz}$		$ h_{fe} $	1.5	7.5	
Output Capacitance $I_C = 50 \text{ mVdc}, V_{CB} = 5.0 \text{ V}, f = 1.0 \text{ kHz}$	2N4150 2N5237 2N5238	C_{obo}	---	160 160 250	pF
Output Capacitance $V_{BE} = 10 \text{ Vdc}, I_E = 0, 100 \text{ kHz} \leq f \leq 1.0 \text{ MHz}$		C_{ibo}	---	350	pF
SWITCHING Characteristics					
Delay Time	$V_{CC} = 20 \text{ Vdc}, V_{BB} = 5.0 \text{ Vdc},$	t_d	---	50	ηs
Rise Time	$I_C = 5.0 \text{ Adc}, I_{B1} = 0.5 \text{ Adc}$	t_r	---	500	ηs
Storage Time	$V_{CC} = 20 \text{ Vdc}, V_{BB} = 5.0 \text{ Adc},$	t_s	---	1.5	ηs
Fall Time	$I_C = 5.0 \text{ Adc}, I_{B1} = -I_{B2} = -0.5 \text{ Adc}$	t_f	---	500	ηs
SAFE OPERATING AREA					
DC Tests:	$T_C = +25 \text{ }^\circ\text{C}, 1 \text{ Cycle}, t = 1.0 \text{ s}$				
Test 1:	$V_{CE} = 40.0 \text{ Vdc}, I_C = 0.22 \text{ Adc}$				
Test 2:	$V_{CE} = 70 \text{ Vdc}, I_C = 90 \text{ mAdc}$				
TEST 3:	$V_{CE} = 120 \text{ Vdc}, I_C = 15 \text{ mAdc}$	2N5237			
	$V_{CE} = 170 \text{ Vdc}, I_C = 3.5 \text{ mAdc}$	2N5238			

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

Outline Drawing



Note: All dimensions are inches [mm].

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