

## PNP LOW POWER SILICON TRANSISTOR

Qualified per MIL-PRF-19500/485

### Devices

**2N5415**  
**2N5415S**

**2N5416**  
**2N5416S**

### Qualified Level

**JAN**  
**JANTX**  
**JANTXV**

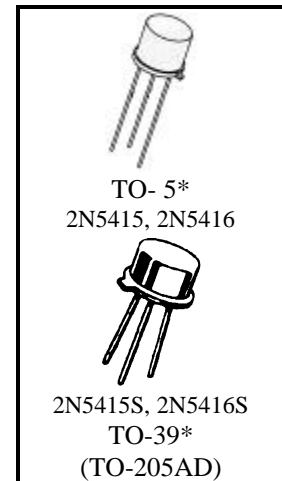
### MAXIMUM RATINGS

Ratings	Symbol	2N5415	2N5416	Units
Collector-Emitter Voltage	$V_{CEO}$	200	300	Vdc
Collector-Base Voltage	$V_{CBO}$	200	350	Vdc
Emitter-Base Voltage	$V_{EBO}$	6.0		Vdc
Collector Current	$I_C$	1.0		Adc
Total Power Dissipation	$P_T$	@ $T_A = +25^{\circ}C$		0.75
		@ $T_C = +25^{\circ}C$		10
Operating & Storage Temperature Range	$T_{op}, T_{stg}$	-65 to +200		$^{\circ}C$

### THERMAL CHARACTERISTICS

Characteristics	Symbol	Max.	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	17.5	$^{\circ}C/W$

- 1) Derate linearly 4.28 mW/ $^{\circ}C$  for  $T_A > +25^{\circ}C$
- 2) Derate linearly 57.1 mW/ $^{\circ}C$  for  $T_C > +25^{\circ}C$



\*See appendix A for package outline

### ELECTRICAL CHARACTERISTICS ( $T_A = 25^{\circ}C$ unless otherwise noted)

Characteristics	Symbol	Min.	Max.	Unit	
<b>OFF CHARACTERISTICS</b>					
Collector-Emitter Cutoff Current	$I_{CEO}$		50	$\mu A_{dc}$	
$V_{CE} = 150$ Vdc					2N5415
$V_{CE} = 200$ Vdc					2N5415
$V_{CE} = 250$ Vdc					2N5416
$V_{CE} = 300$ Vdc	2N5416	1.0	mAdc		
Emitter-Base Cutoff Current	$I_{EBO}$		20	$\mu A_{dc}$	
$V_{EB} = 6.0$ Vdc					
Collector-Emitter Cutoff Current	$I_{CEX}$		50	$\mu A_{dc}$	
$V_{CE} = 200$ Vdc, $V_{BE} = 1.5$ Vdc					2N5415
$V_{CE} = 300$ Vdc, $V_{BE} = 1.5$ Vdc	2N5416	50	$\mu A_{dc}$		
Collector-Base Cutoff Current	$I_{CBO1}$		50	$\mu A_{dc}$	
$V_{CB} = 175$ Vdc					2N5415
$V_{CB} = 280$ Vdc	2N5416	50	$\mu A_{dc}$		
Collector-Base Cutoff Current	$I_{CBO2}$		500	$\mu A_{dc}$	
$V_{CB} = 200$ Vdc					2N5415
$V_{CB} = 350$ Vdc	2N5416	500	$\mu A_{dc}$		

**2N5415, 2N5416 JAN, SERIES**

**ELECTRICAL CHARACTERISTICS (con't)**

Characteristics	Symbol	Min.	Max.	Unit
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**ON CHARACTERISTICS <sup>(3)</sup>**

Forward-Current Transfer Ratio $I_C = 50 \text{ mAdc}, V_{CE} = 10 \text{ Vdc}$ $I_C = 1.0 \text{ mAdc}, V_{CE} = 10 \text{ Vdc}$	$h_{FE}$	30 15	120	
Collector-Emitter Saturation Voltage $I_C = 50 \text{ mAdc}, I_B = 5.0 \text{ mAdc}$	$V_{CE(sat)}$		2.0	Vdc
Base-Emitter Voltage $I_C = 50 \text{ mAdc}, V_{CE} = 10 \text{ Vdc}$	$V_{BE}$		1.5	Vdc

**DYNAMIC CHARACTERISTICS**

Magnitude of Common Emitter Small-Signal Short Circuit Forward Current Transfer Ratio $I_C = 10 \text{ mAdc}, V_{CE} = 10 \text{ Vdc}, f = 5.0 \text{ MHz}$	$ h_{fe} $	3.0	15	
Forward Current Transfer Ratio $I_C = 5.0 \text{ mAdc}, V_{CE} = 10 \text{ Vdc}, f = 1.0 \text{ kHz}$	$h_{fe}$	25		
Output Capacitance $V_{CB} = 10 \text{ Vdc}, I_E = 0, 100 \text{ kHz} \leq f \leq 1.0 \text{ MHz}$	$C_{obo}$		15	pF
Input Capacitance $V_{EB} = 5.0 \text{ Vdc}, I_C = 0, 100 \text{ kHz} \leq f \leq 1.0 \text{ MHz}$	$C_{ibo}$		75	pF

**SWITCHING CHARACTERISTICS**

Turn-On Time $V_{CC} = 200 \text{ Vdc}, I_C = 50 \text{ mAdc}, I_{B1} = 5.0 \text{ mAdc}$	$t_{on}$		1.0	$\mu\text{s}$
Turn-Off Time $V_{CC} = 200 \text{ Vdc}, I_C = 50 \text{ mAdc}, I_{B1} = I_{B2} = 5.0 \text{ mAdc}$	$t_{off}$		10	$\mu\text{s}$

**SAFE OPERATING AREA**

<b>DC Tests</b>				
$T_C = +25^\circ\text{C}; 1 \text{ Cycle}; t = 0.4 \text{ s}$				
<b>Test 1</b>				
$V_{CE} = 10 \text{ Vdc}, I_C = 1.0 \text{ Adc}$				
<b>Test 2</b>				
$V_{CE} = 100 \text{ Vdc}, I_C = 100 \text{ mAdc}$				
<b>Test 3</b>				
$V_{CE} = 200 \text{ Vdc}, I_C = 24 \text{ mAdc}$	2N5415			
<b>Test 4</b>				
$V_{CE} = 300 \text{ Vdc}, I_C = 10 \text{ mAdc}$	2N5416			

(3) Pulse Test: Pulse Width = 300 $\mu\text{s}$ , Duty Cycle  $\leq$  2.0%.

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