

2N3416 / 2N3417



**Discrete POWER & Signal
Technologies**

**2N3416
2N3417**



NPN General Purpose Amplifier

This device is designed for use as general purpose amplifiers and switches requiring collector currents to 300 mA. Sourced from Process 10. See PN100A for characteristics.

Absolute Maximum Ratings*

TA = 25°C unless otherwise noted

Symbol	Parameter	Value	Units
V _{CEO}	Collector-Emitter Voltage	50	V
V _{CBO}	Collector-Base Voltage	50	V
V _{EBO}	Emitter-Base Voltage	5.0	V
I _C	Collector Current - Continuous	500	mA
T _J , T _{stg}	Operating and Storage Junction Temperature Range	-55 to +150	°C

*These ratings are limiting values above which the serviceability of any semiconductor device may be impaired.

NOTES:

- 1) These ratings are based on a maximum junction temperature of 150 degrees C.
- 2) These are steady state limits. The factory should be consulted on applications involving pulsed or low duty cycle operations.

Thermal Characteristics

TA = 25°C unless otherwise noted

Symbol	Characteristic	Max	Units
		2N3416 / 2N3417	
P _D	Total Device Dissipation Derate above 25°C	625	mW
		5.0	mW/°C
R _{θJC}	Thermal Resistance, Junction to Case	83.3	°C/W
R _{θJA}	Thermal Resistance, Junction to Ambient	200	°C/W

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NPN General Purpose Amplifier
(continued)

Electrical Characteristics

TA = 25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Max	Units
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OFF CHARACTERISTICS

$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage*	$I_C = 10 \text{ mA}, I_B = 0$	50		V
$V_{(BR)CBO}$	Collector-Base Breakdown Voltage	$I_C = 10 \text{ }\mu\text{A}, I_E = 0$	50		V
$V_{(BR)EBO}$	Emitter-Base Breakdown Voltage	$I_E = 10 \text{ }\mu\text{A}, I_C = 0$	5.0		V
I_{CBO}	Collector-Cutoff Current	$V_{CB} = 25 \text{ V}, I_E = 0$ $V_{CB} = 18 \text{ V}, I_E = 0, T_A = 100^\circ\text{C}$		100 15	nA μA
I_{EBO}	Emitter-Cutoff Current	$V_{EB} = 5.0 \text{ V}, I_C = 0$		100	nA

ON CHARACTERISTICS*

h_{FE}	DC Current Gain	$V_{CE} = 4.5 \text{ V}, I_C = 2.0 \text{ mA}$ 2N3416 2N3417	75 180	225 540	
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C = 50 \text{ mA}, I_B = 3.0 \text{ mA}$		0.3	V
$V_{BE(sat)}$	Base-Emitter Saturation Voltage	$I_C = 50 \text{ mA}, I_B = 3.0 \text{ mA}$	0.6	1.3	V

SMALL SIGNAL CHARACTERISTICS

h_{fe}	Small-Signal Current Gain	$I_C = 2.0 \text{ mA}, V_{CE} = 4.5 \text{ V},$ $f = 1.0 \text{ kHz}$ 2N3416 2N3417	75 180		
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*Pulse Test: Pulse Width $\leq 300 \mu\text{s}$, Duty Cycle $\leq 2.0\%$