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2N3415

Silicon NPN Transistor

General Purpose Amplifier

TO-92 Type Package

Absolute Maximum Ratings: ($T_A = +25^\circ\text{C}$ unless otherwise specified)

Collector-Emitter Voltage, V_{CEO}	25V
Collector-Base Voltage, V_{CBO}	25V
Emitter-Base Voltage, V_{EBO}	5V
Continuous Collector Current, I_C	500mA
Total Device Dissipation ($T_A = +25^\circ\text{C}$), P_D	625mW
Derate Above 25°C	5.0mW/ $^\circ\text{C}$
Operating Junction Temperature Range, T_J	-55° to $+150^\circ\text{C}$
Storage Temperature Range, T_{stg}	-55° to $+150^\circ\text{C}$
Thermal Resistance, Junction-to-Case, R_{thJC}	83.3 $^\circ\text{C/W}$
Thermal Resistance, Junction-to-Ambient, R_{thJA}	200 $^\circ\text{C/W}$

Note 1. These ratings are limiting values above which the serviceability of any semiconductor may be impaired.

Note 2. These ratings are based on a maximum junction temperature of 150°C .

Electrical Characteristics: ($T_A = +25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	$I_C = 10\text{mA}$, $I_B = 0$, Note 3	25	–	–	V
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	$I_C = 10\mu\text{A}$, $I_E = 0$	25	–	–	V
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	$I_E = 10\mu\text{A}$, $I_C = 0$	5.0	–	–	V
Collector Cutoff Current	I_{CBO}	$V_{CB} = 25\text{V}$, $I_E = 0$	–	–	0.1	μA
		$V_{CB} = 25\text{V}$, $I_E = 0$, $T_A = +100^\circ\text{C}$	–	–	15	μA
Emitter Cutoff Current	I_{EBO}	$V_{BE} = 5\text{V}$, $I_C = 0$	–	–	0.1	μA

Note 3. Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2\%$

Electrical Characteristics (Cont'd): ($T_A = +25^{\circ}\text{C}$ unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
DC Current Gain	h_{FE}	$V_{CE} = 4.5\text{V}$, $I_C = 2\text{mA}$, Note 3	180	–	540	
Collector–Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = 50\text{mA}$, $I_B = 3\text{mA}$, Note 3	–	–	0.3	V
Base–Emitter Saturation Voltage	$V_{BE(sat)}$	$I_C = 50\text{mA}$, $I_B = 3\text{mA}$, Note 3	0.6	–	1.3	V
Small–Signal Current Gain	h_{fe}	$I_C = 2\text{mA}$, $V_{CE} = 4.5\text{V}$, $f = 1\text{kHz}$, Note 3	180	–	–	

Note 3. Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2\%$

