
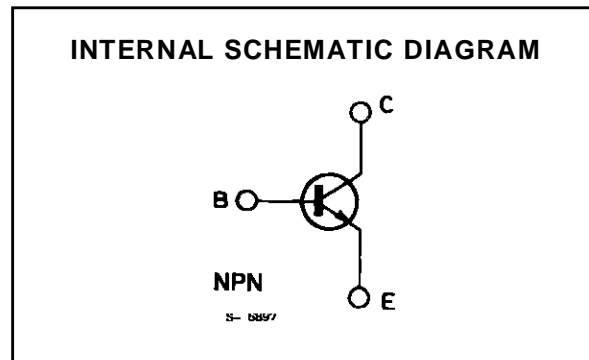
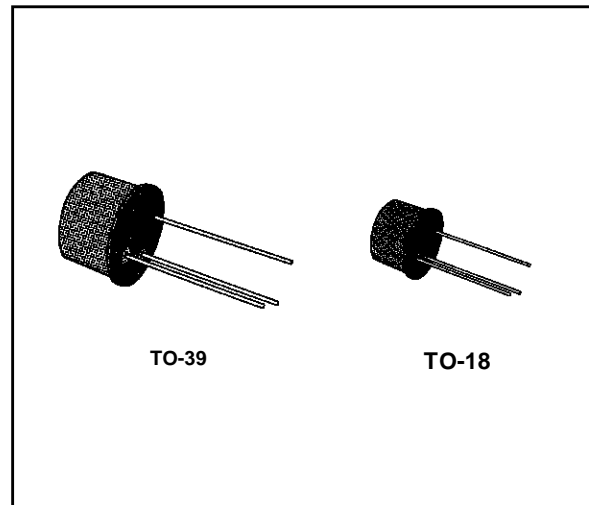


HIGH-SPEED SWITCHES

DESCRIPTION

The 2N2218, 2N2219, 2N2221 and 2N2222 are silicon planar epitaxial NPN transistors in Jedec TO-39 (for 2N2218 and 2N2219) and in Jedec TO-18 (for 2N2221 and 2N2222) metal cases. They are designed for high-speed switching applications at collector currents up to 500 mA, and feature useful current gain over a wide range of collector current, low leakage currents and low saturation voltages.

 2N2218/2N2219 approved to CECC 50002-100, 2N2221/2N2222 approved to CECC 50002-101 available on request.



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{CBO}	Collector-base Voltage ($I_E = 0$)	60	V
V_{CEO}	Collector-emitter Voltage ($I_B = 0$)	30	V
V_{EBO}	Emitter-base Voltage ($I_C = 0$)	5	V
I_C	Collector Current	0.8	A
P_{tot}	Total Power Dissipation at $T_{amb} \leq 25\text{ }^\circ\text{C}$ for 2N2218 and 2N2219 for 2N2221 and 2N2222 at $T_{case} \leq 25\text{ }^\circ\text{C}$ for 2N2218 and 2N2219 for 2N2221 and 2N2222	0.8	W
		0.5	W
		3	W
		1.8	W
T_{stg}	Storage Temperature	- 65 to 200	$^\circ\text{C}$
T_j	Junction Temperature	175	$^\circ\text{C}$

2N2218-2N2219-2N2221-2N2222

THERMAL DATA

			2N2218 2N2219	2N2221 2N2222
$R_{th\ j-case}$	Thermal Resistance Junction-case	Max	50 °C/W	83.3 °C/W
$R_{th\ j-amb}$	Thermal Resistance Junction-ambient	Max	187.5 °C/W	300 °C/W

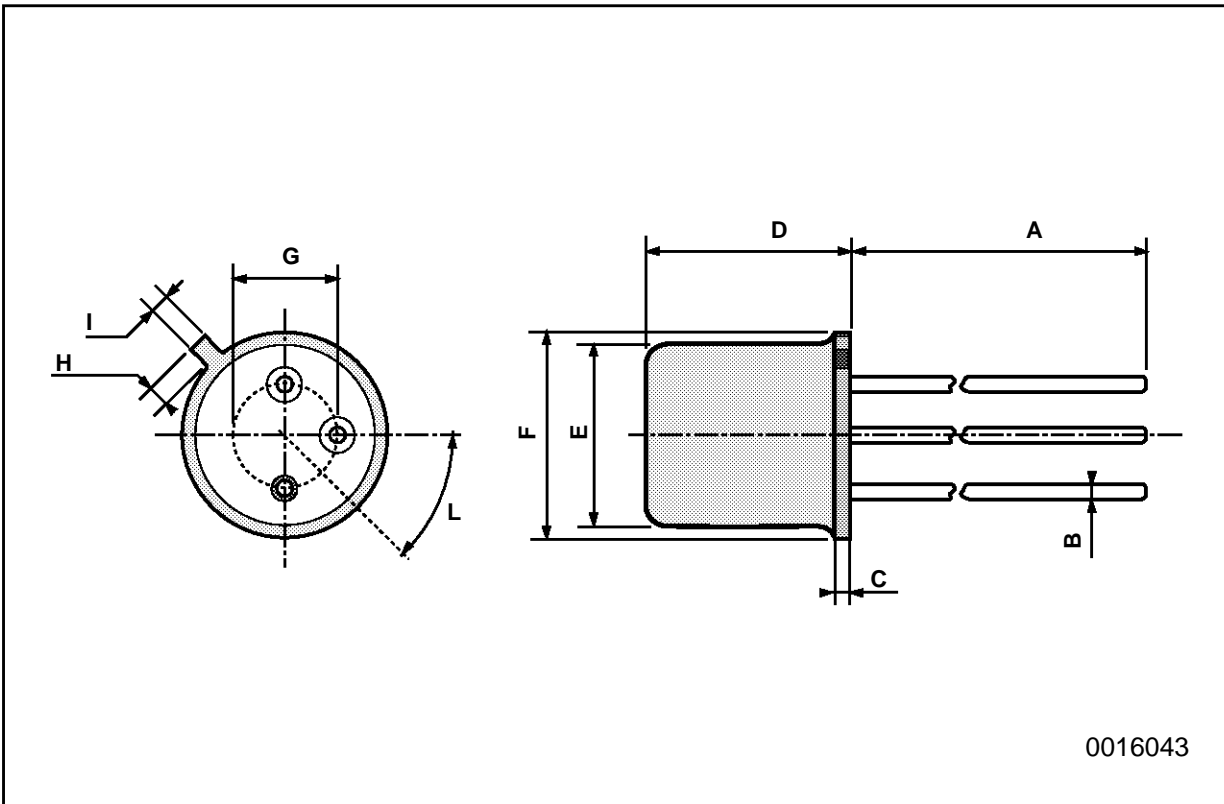
ELECTRICAL CHARACTERISTICS ($T_{amb} = 25\text{ °C}$ unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit	
I_{CBO}	Collector Cutoff Current ($I_E = 0$)	$V_{CB} = 50\text{ V}$			10	nA	
		$V_{CB} = 50\text{ V}$ $T_{amb} = 150\text{ °C}$			10	μA	
I_{EBO}	Emitter Cutoff Current ($I_C = 0$)	$V_{EB} = 3\text{ V}$			10	nA	
$V_{(BR)\ CBO}$	Collector-base Breakdown Voltage ($I_E = 0$)	$I_C = 10\ \mu\text{A}$	60			V	
$V_{(BR)\ CEO}^*$	Collector-emitter Breakdown Voltage ($I_B = 0$)	$I_C = 10\text{ mA}$	30			V	
$V_{(BR)\ EBO}$	Emitter-base Breakdown Voltage ($I_C = 0$)	$I_E = 10\ \mu\text{A}$	5			V	
$V_{CE(sat)}^*$	Collector-emitter Saturation Voltage	$I_C = 150\text{ mA}$ $I_B = 15\text{ mA}$			0.4	V	
		$I_C = 500\text{ mA}$ $I_B = 50\text{ mA}$			1.6	V	
$V_{BE(sat)}^*$	Base-emitter Saturation Voltage	$I_C = 150\text{ mA}$ $I_B = 15\text{ mA}$			1.3	V	
		$I_C = 500\text{ mA}$ $I_B = 50\text{ mA}$			2.6	V	
h_{FE}^*	DC Current Gain	for 2N2218 and 2N2221					
		$I_C = 0.1\text{ mA}$ $V_{CE} = 10\text{ V}$	20				
		$I_C = 1\text{ mA}$ $V_{CE} = 10\text{ V}$	25				
		$I_C = 10\text{ mA}$ $V_{CE} = 10\text{ V}$	35				
		$I_C = 150\text{ mA}$ $V_{CE} = 10\text{ V}$	40			120	
		$I_C = 500\text{ mA}$ $V_{CE} = 10\text{ V}$	20				
		$I_C = 150\text{ mA}$ $V_{CE} = 1\text{ V}$	20				
		for 2N2219 and 2N2222					
		$I_C = 0.1\text{ mA}$ $V_{CE} = 10\text{ V}$	35				
		$I_C = 1\text{ mA}$ $V_{CE} = 10\text{ V}$	50				
		$I_C = 10\text{ mA}$ $V_{CE} = 10\text{ V}$	75				
		$I_C = 150\text{ mA}$ $V_{CE} = 10\text{ V}$	100			300	
$I_C = 500\text{ mA}$ $V_{CE} = 10\text{ V}$	30						
$I_C = 150\text{ mA}$ $V_{CE} = 1\text{ V}$	50						
f_T	Transition Frequency	$I_C = 20\text{ mA}$ $V_{CE} = 20\text{ V}$ $f = 100\text{ MHz}$	250			MHz	
C_{CBO}	Collector-base Capacitance	$I_E = 0$ $V_{CB} = 10\text{ V}$ $f = 100\text{ kHz}$			8	pF	
$R_{e(hie)}$	Real Part of Input Impedance	$I_C = 20\text{ mA}$ $V_{CE} = 20\text{ V}$ $f = 300\text{ MHz}$			60	Ω	

* Pulsed : pulse duration = 300 μs , duty cycle = 1 %.

TO-18 MECHANICAL DATA

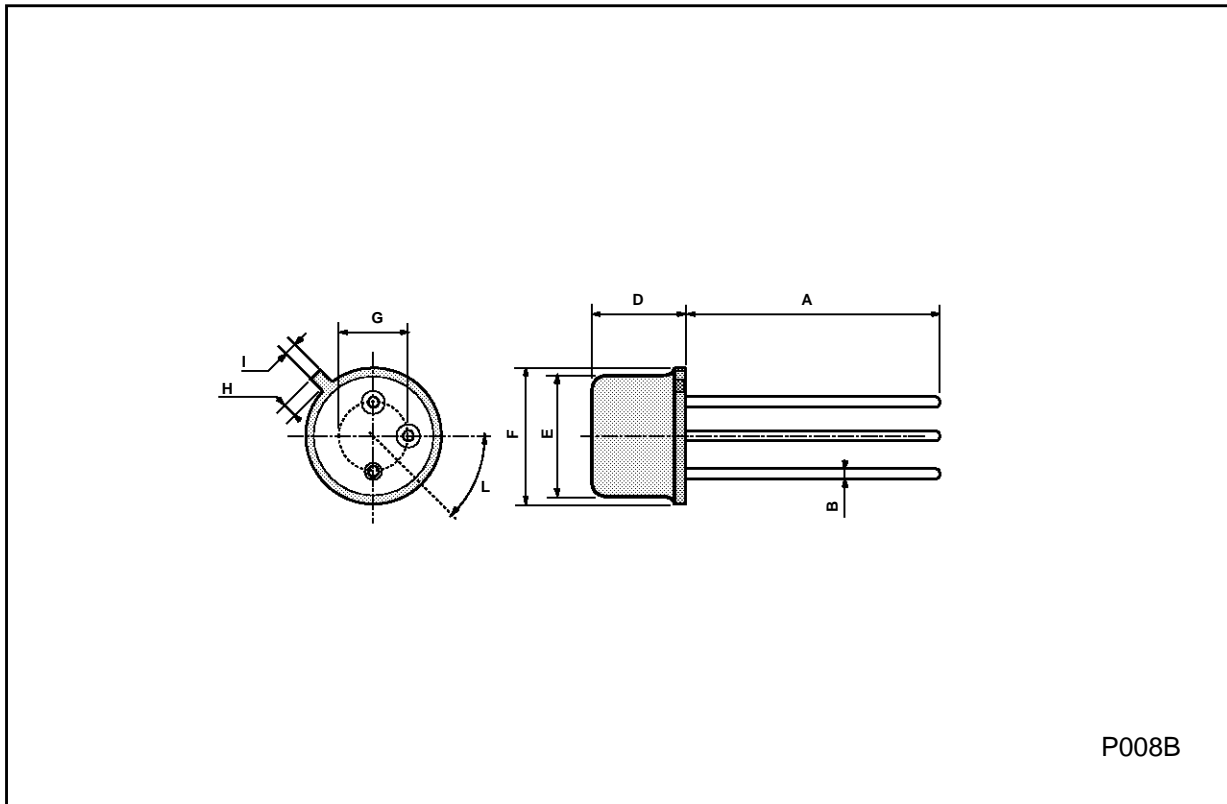
DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A		12.7			0.500	
B			0.49			0.019
D			5.3			0.208
E			4.9			0.193
F			5.8			0.228
G	2.54			0.100		
H			1.2			0.047
I			1.16			0.045
L	45°			45°		



0016043

TO39 MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	12.7			0.500		
B			0.49			0.019
D			6.6			0.260
E			8.5			0.334
F			9.4			0.370
G	5.08			0.200		
H			1.2			0.047
I			0.9			0.035
L	45° (typ.)					



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