

## **ELECTRICAL CHARACTERISTICS FOR 2N4030** (T<sub>case</sub> = 25°C unless otherwise stated)

	Parameter	Test Conditions	Min.	Тур.	Max.	Unit
I <sub>CBO</sub>	Collector Cut Off Current	V <sub>CB</sub> = -50V			-50	nA
		$V_{CB} = -50V$ $T_A = 150^{\circ}C$			-50	μA
I <sub>EBO</sub>	Emitter Cut Off Current	$V_{EB} = 5V$			-10	μA
V <sub>CE(sat)</sub>	Collector Emitter Saturation	$I_C = -150 \text{mA}$ $I_B = -15 \text{mA}$			-0.15	V
	Voltage <sup>1</sup>	$I_{C} = -500 \text{mA}$ $I_{B} = -50 \text{mA}$			0.50	V
V <sub>BE(sat)</sub>	Base Emitter Saturation Voltage <sup>1</sup>	$I_C = -150 \text{mA}$ $I_B = -15 \text{mA}$			-0.9	V
V <sub>BE(on)</sub>	Base Emitter on Voltage <sup>1</sup>	$I_C = -500 \text{mA}$ $V_{CE} = -0.5 \text{V}$			-1.1	V
V <sub>(BR)CEO</sub>	Collector Emitter Breakdown Voltage <sup>1</sup>	I <sub>C</sub> = -10mA	-60			V
V <sub>(BR)CBO</sub>	Collector Base Breakdown Voltage <sup>1</sup>	$I_C = -10\mu A$	-60			V
V(BR)EBO	Emitter Base Breakdown Voltage	$I_C = -10\mu A$	-5			V
h <sub>FE</sub>	DC Current Gain <sup>1</sup>	$I_C = -100 \text{mA}$ $V_{CE} = -5.0 \text{V}$	40		120	
		T <sub>A</sub> = -55℃	15			
		$I_C = -100 \mu A$ $V_{CE} = -5.0 V$	30			
		$I_C = -500 \text{mA}$ $V_{CE} = -5.0 \text{V}$				
		$I_C = -1.0A$ $V_{CE} = -5.0V$	15			

 $<sup>^{1}</sup>$  Pulse test  $t_{p} = 300 \mu s$  ,  $\delta < 2\%$ 

Semelab Plc reserves the right to change test conditions, parameter limits and package dimensions without notice. Information furnished by Semelab is believed to be both accurate and reliable at the time of going to press. However Semelab assumes no responsibility for any errors or omissions discovered in its use. Semelab encourages customers to verify that datasheets are current before placing orders.



# **ELECTRICAL CHARACTERISTICS FOR 2N4031** ( $T_{case} = 25^{\circ}C$ unless otherwise stated)

	Parameter	Test Conditions	Min.	Тур.	Max.	Unit
I <sub>CBO</sub>	Collector Cut Off Current	V <sub>CB</sub> = -60V			-50	nA
		$V_{CB} = -60V$ $T_A = 150^{\circ}C$			-50	μA
I <sub>EBO</sub>	Emitter Cut Off Current	V <sub>EB</sub> = 5V			-10	μA
V <sub>CE(sat)</sub>	Collector Emitter Saturation	$I_{C} = -150 \text{mA}$ $I_{B} = -15 \text{mA}$			-0.15	V
	Voltage <sup>1</sup>	$I_{C} = -500 \text{mA}$ $I_{B} = -50 \text{mA}$			0.50	V
V <sub>BE(sat)</sub>	Base Emitter Saturation Voltage <sup>1</sup>	$I_C = -150 \text{mA}$ $I_B = -15 \text{mA}$			-0.9	V
V <sub>BE(on)</sub>	Base Emitter on Voltage <sup>1</sup>	$I_C = -500 \text{mA}$ $V_{CE} = -0.5 \text{V}$			-1.1	V
V <sub>(BR)CEO</sub>	Collector Emitter Breakdown Voltage <sup>1</sup>	I <sub>C</sub> = -10mA	-80			V
V <sub>(BR)CBO</sub>	Collector Base Breakdown Voltage <sup>1</sup>	$I_C = -10\mu A$	-80			V
V(BR)EBO	Emitter Base Breakdown Voltage	$I_C = -10\mu A$	-5			V
h <sub>FE</sub>	DC Current Gain <sup>1</sup>	$I_C = -100 \text{mA}$ $V_{CE} = -5.0 \text{V}$	40		120	
		T <sub>A</sub> = -55℃	15			
		$I_C = -100 \mu A$ $V_{CE} = -5.0 V$	30			
		$I_C = -500 \text{mA}$ $V_{CE} = -5.0 \text{V}$	25			
		$I_C = -1.0A$ $V_{CE} = -5.0V$	10			

<sup>&</sup>lt;sup>1</sup> Pulse test  $t_p = 300 \mu s$  ,  $\delta < 2\%$ 

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# **ELECTRICAL CHARACTERISTICS FOR 2N4032** ( $T_{case} = 25^{\circ}C$ unless otherwise stated)

	Parameter	Test Conditions	Min.	Тур.	Max.	Unit
I <sub>CBO</sub>	Collector Cut Off Current	V <sub>CB</sub> = -50V			-50	nA
		$V_{CB} = -50V$ $T_A = 150^{\circ}C$			-50	μΑ
I <sub>EBO</sub>	Emitter Cut Off Current	$V_{EB} = 5V$			-10	μA
V <sub>CE(sat)</sub>	Collector Emitter Saturation	$I_{C} = -150 \text{mA}$ $I_{B} = -15 \text{mA}$			-0.15	V
	Voltage <sup>1</sup>	$I_{C} = -500 \text{mA}$ $I_{B} = -50 \text{mA}$			0.50	V
V <sub>BE(sat)</sub>	Base Emitter Saturation Voltage <sup>1</sup>	$I_C = -150 \text{mA}$ $I_B = -15 \text{mA}$			-0.9	V
V <sub>BE(on)</sub>	Base Emitter on Voltage <sup>1</sup>	$I_C = -500 \text{mA}$ $V_{CE} = -0.5 \text{V}$			-1.1	V
V <sub>(BR)CEO</sub>	Collector Emitter Breakdown Voltage <sup>1</sup>	I <sub>C</sub> = -10mA	-60			V
V <sub>(BR)CBO</sub>	Collector Base Breakdown Voltage <sup>1</sup>	$I_C = -10\mu A$	-60			V
V(BR)EBO	Emitter Base Breakdown Voltage	$I_C = -10\mu A$	-5			V
h <sub>FE</sub>	DC Current Gain <sup>1</sup>	V <sub>CE</sub> = -5.0V	100		300	
		$I_C = -100 \text{mA}$ $T_A = -55 ^{\circ}$	40			
		$I_C = -100 \mu A$ $V_{CE} = -5.0 V$	75			
		$I_C = -500 \text{mA}$ $V_{CE} = -5.0 \text{V}$	70			
		$I_C = -1.0A$ $V_{CE} = -5.0V$	40			

<sup>&</sup>lt;sup>1</sup> Pulse test  $t_p = 300 \mu s$ ,  $\delta < 2\%$ 

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# **ELECTRICAL CHARACTERISTICS FOR 2N4033** (T<sub>case</sub> = 25°C unless otherwise stated)

	Parameter	Test Conditions	Min.	Тур.	Max.	Unit
I <sub>CBO</sub>	Collector Cut Off Current	V <sub>CB</sub> = -60V			-50	nA
		$V_{CB} = -60V$ $T_A = 150^{\circ}C$			-50	μA
I <sub>EBO</sub>	Emitter Cut Off Current	$V_{EB} = 5V$			-10	μΑ
V <sub>CE(sat)</sub>	Collector Emitter Saturation	$I_{C} = -150 \text{mA}$ $I_{B} = -15 \text{mA}$			-0.15	V
	Voltage <sup>1</sup>	$I_{C} = -500 \text{mA}$ $I_{B} = -50 \text{mA}$			0.50	V
V <sub>BE(sat)</sub>	Base Emitter Saturation Voltage <sup>1</sup>	$I_C = -150 \text{mA}$ $I_B = -15 \text{mA}$			-0.9	V
V <sub>BE(on)</sub>	Base Emitter on Voltage <sup>1</sup>	$I_C = -500 \text{mA}$ $V_{CE} = -0.5 \text{V}$			-1.1	V
V <sub>(BR)CEO</sub>	Collector Emitter Breakdown Voltage <sup>1</sup>	I <sub>C</sub> = -10mA	-80			V
V <sub>(BR)CBO</sub>	Collector Base Breakdown Voltage <sup>1</sup>	$I_C = -10\mu A$	-80			V
V(BR)EBO	Emitter Base Breakdown Voltage	I <sub>C</sub> = -10μA	-5			V
h <sub>FE</sub>	DC Current Gain <sup>1</sup>	V <sub>CE</sub> = -5.0V	100		300	
		$I_C = -100 \text{mA}$ $T_A = -55 ^{\circ}$	40			
		$I_C = -100 \mu A$ $V_{CE} = -5.0 V$	75			
		$I_C = -500 \text{mA}$ $V_{CE} = -5.0 \text{V}$	70			
		$I_C = -1.0A$ $V_{CE} = -5.0V$	25			

 $<sup>^{1}</sup>$  Pulse test  $t_{p}$  = 300 $\mu$ s ,  $\delta$  < 2%

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## **SMALL SIGNAL CHARACTERISTICS** (T<sub>case</sub> = 25°C unless otherwise stated)

	Parameter	Test Conditions	Min.	Тур.	Max.	Unit
C <sub>CBO</sub>	Collector-base Capacitance	$V_{CE} = -10V$ $f = 1MHz$			20	pF
C <sub>EBO</sub>	Emitter-base Capacitance	$V_{EB} = -0.5V$ $f = 1MHz$			110	pF
h <sub>fe</sub>	Small Signal Gain	$V_{CE} = -10V$ $f = 100MHz$ $I_C = -50mA$	1		4	

### **SMALL SIGNAL CHARACTERISTICS** (T<sub>case</sub> = 25°C unless otherwise stated)

	Parameter	Test Conditions	Min.	Тур.	Max.	Unit
t <sub>on</sub>	Turn On Time	V 20V I 500mA			100	ns
t <sub>f</sub>	Fall Time	$V_{CC} = -30V$ $I_{C} = -500mA$ $I_{B_1} = I_{B_2} = -50mA$			50	ns
t <sub>s</sub>	Storage Time	$1B_1 = 1B_2 = -30111A$			350	ns
$f_{T}$	Transition Frequency for 2N4030	$V_{CE} = -10V$ f = 1 MHz	100		400	MHz
	Transition Frequency for 2N4031	$I_C = -50 \text{mA}$	100		400	MHz
	Transition Frequency for 2N4032		150		500	MHz
	Transition Frequency for 2N4033		150		500	MHz

#### THERMAL CHARACTERISTICS

$R_{ heta JC}$	Thermal Resistance Junction-case	44	<b>€</b> W
$R_{ heta JA}$	Thermal Resistance Junction-ambient	218	€\M

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