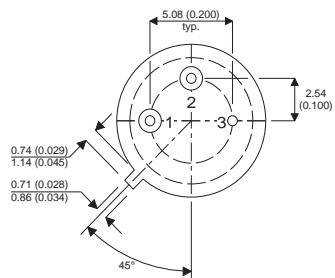
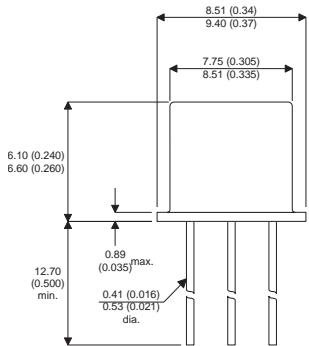


MECHANICAL DATA

Dimensions in mm (inches)



TO39 (TO205AD)

PINOUTS

1 – Emitter 2 – Base 3 – Collector

**Bipolar PNP Device in a
Hermetically Sealed TO39
Metal Package.**

DESCRIPTION

The 2N4030, 2N4031, 2N4032 and the 2N4033 are silicon epitaxial planar PNP transistors in the JEDEC TO-39 (TO205AD) metal case intended for use in switching applications.

All Semelab hermetically sealed products can be processed in accordance with the requirements of BS, CECC and JAN, JANTX, JANTXV and JANS specifications

ABSOLUTE MAXIMUM RATINGS

($T_{case} = 25^\circ\text{C}$ unless otherwise stated)

		2N4030	2N4031
		2N4032	2N4033
V_{CEO}	Collector – Emitter Voltage	-60V	-80V
V_{CBO}	Collector – Base Voltage	-60V	-80V
V_{EBO}	Emitter – Base Voltage	-5V	
I_C	Continuous Collector Current	-1A	
P_D	Total Device Dissipation at $T_A = 25^\circ\text{C}$	0.8W	
	Derate above 25°C	4.56 mW/ $^\circ\text{C}$	
P_D	Total Device Dissipation at $T_C = 25^\circ\text{C}$	4W	
	Derate above 25°C	22.8mW/ $^\circ\text{C}$	
T_{stg}	Operating and Storage Temperature Range	-65 to +200 $^\circ\text{C}$	

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ELECTRICAL CHARACTERISTICS FOR 2N4030 ($T_{case} = 25^\circ\text{C}$ unless otherwise stated)

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

¹ Pulse test $t_p = 300\mu\text{s}$, $\delta < 2\%$



**SEME
LAB**

**2N4030 – 2N4031
2N4032 – 2N4033**

ELECTRICAL CHARACTERISTICS FOR 2N4031 (T_{case} = 25°C unless otherwise stated)

Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I _{CBO} Collector Cut Off Current	V _{CB} = -60V			-50	nA
	V _{CB} = -60V T _A =150°C			-50	µA
I _{EBO} Emitter Cut Off Current	V _{EB} = 5V			-10	µA
V _{CE(sat)} Collector Emitter Saturation Voltage ¹	I _C = -150mA I _B = -15mA			-0.15	V
	I _C = -500mA I _B = -50mA			0.50	
V _{BE(sat)} Base Emitter Saturation Voltage ¹	I _C = -150mA I _B = -15mA			-0.9	V
V _{BE(on)} Base Emitter on Voltage ¹	I _C = -500mA V _{CE} = -0.5V			-1.1	V
V _{(BR)CEO} Collector Emitter Breakdown Voltage ¹	I _C = -10mA	-80			V
V _{(BR)CBO} Collector Base Breakdown Voltage ¹	I _C = -10µA	-80			V
V _{(BR)EBO} Emitter Base Breakdown Voltage	I _C = -10µA	-5			V
h _{FE} DC Current Gain ¹	I _C = -100mA V _{CE} = -5.0V	40		120	
	T _A = -55°C	15			
	I _C = -100µA V _{CE} = -5.0V	30			
	I _C = -500mA V _{CE} = -5.0V	25			
	I _C = -1.0A V _{CE} = -5.0V	10			

¹ Pulse test t_p = 300µs , δ < 2%

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**SEME
LAB**

**2N4030 – 2N4031
2N4032 – 2N4033**

ELECTRICAL CHARACTERISTICS FOR 2N4032 (T_{case} = 25°C unless otherwise stated)

Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I _{CBO} Collector Cut Off Current	V _{CB} = -50V			-50	nA
	V _{CB} = -50V T _A =150°C			-50	μA
I _{EBO} Emitter Cut Off Current	V _{EB} = 5V			-10	μA
V _{CE(sat)} Collector Emitter Saturation Voltage ¹	I _C = -150mA I _B = -15mA			-0.15	V
	I _C = -500mA I _B = -50mA			0.50	
V _{BE(sat)} Base Emitter Saturation Voltage ¹	I _C = -150mA I _B = -15mA			-0.9	V
V _{BE(on)} Base Emitter on Voltage ¹	I _C = -500mA V _{CE} = -0.5V			-1.1	V
V _{(BR)CEO} Collector Emitter Breakdown Voltage ¹	I _C = -10mA	-60			V
V _{(BR)CBO} Collector Base Breakdown Voltage ¹	I _C = -10μA	-60			V
V _{(BR)EBO} Emitter Base Breakdown Voltage	I _C = -10μA	-5			V
h _{FE} DC Current Gain ¹	V _{CE} = -5.0V	100		300	
	I _C = -100mA T _A = -55°C	40			
	I _C = -100μA V _{CE} = -5.0V	75			
	I _C = -500mA V _{CE} = -5.0V	70			
	I _C = -1.0A V _{CE} = -5.0V	40			

¹ Pulse test t_p = 300μs , δ < 2%

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**SEME
LAB**

**2N4030 – 2N4031
2N4032 – 2N4033**

ELECTRICAL CHARACTERISTICS FOR 2N4033 (T_{case} = 25°C unless otherwise stated)

Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I _{CBO} Collector Cut Off Current	V _{CB} = -60V			-50	nA
	V _{CB} = -60V T _A =150°C			-50	µA
I _{EBO} Emitter Cut Off Current	V _{EB} = 5V			-10	µA
V _{CE(sat)} Collector Emitter Saturation Voltage ¹	I _C = -150mA I _B = -15mA			-0.15	V
	I _C = -500mA I _B = -50mA			0.50	
V _{BE(sat)} Base Emitter Saturation Voltage ¹	I _C = -150mA I _B = -15mA			-0.9	V
V _{BE(on)} Base Emitter on Voltage ¹	I _C = -500mA V _{CE} = -0.5V			-1.1	V
V _{(BR)CEO} Collector Emitter Breakdown Voltage ¹	I _C = -10mA	-80			V
V _{(BR)CBO} Collector Base Breakdown Voltage ¹	I _C = -10µA	-80			V
V _{(BR)EBO} Emitter Base Breakdown Voltage	I _C = -10µA	-5			V
h _{FE} DC Current Gain ¹	V _{CE} = -5.0V	100		300	
	I _C = -100mA T _A = -55°C	40			
	I _C = -100µA V _{CE} = -5.0V	75			
	I _C = -500mA V _{CE} = -5.0V	70			
	I _C = -1.0A V _{CE} = -5.0V	25			

¹ Pulse test t_p = 300µs , δ < 2%

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SMALL SIGNAL CHARACTERISTICS ($T_{case} = 25^\circ C$ unless otherwise stated)

Parameter	Test Conditions	Min.	Typ.	Max.	Unit
C_{CBO} Collector-base Capacitance	$V_{CE} = -10V$ $f = 1MHz$			20	pF
C_{EBO} Emitter-base Capacitance	$V_{EB} = -0.5V$ $f = 1MHz$			110	pF
h_{fe} Small Signal Gain	$V_{CE} = -10V$ $f = 100MHz$ $I_C = -50mA$	1		4	

SMALL SIGNAL CHARACTERISTICS ($T_{case} = 25^\circ C$ unless otherwise stated)

Parameter	Test Conditions	Min.	Typ.	Max.	Unit
t_{on} Turn On Time				100	ns
t_f Fall Time	$V_{CC} = -30V$ $I_C = -500mA$ $I_{B1} = I_{B2} = -50mA$			50	ns
t_s Storage Time				350	ns
f_T	$V_{CE} = -10V$ $f = 1 MHz$ $I_C = -50mA$	100		400	MHz
Transition Frequency for 2N4031		100		400	MHz
Transition Frequency for 2N4032		150		500	MHz
Transition Frequency for 2N4033		150		500	MHz

THERMAL CHARACTERISTICS

$R_{\theta JC}$	Thermal Resistance Junction-case		44	°C/W
$R_{\theta JA}$	Thermal Resistance Junction-ambient		218	°C/W

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