

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

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

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

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

Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{CBO} Collector Cut Off Current	$V_{CB} = -60V$			-50	nA
	$V_{CB} = -60V$ $T_A = 150^{\circ}C$			-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	$I_C = -10\mu A$	-80			V
$V_{(BR)EBO}$ Emitter Base Breakdown Voltage	$I_C = -10\mu A$	-5			V
h_{FE} DC Current Gain ¹	$I_C = -100mA$ $V_{CE} = -5.0V$ $T_A = -55^{\circ}C$	40		120	
		15			
	$I_C = -100\mu A$ $V_{CE} = -5.0V$	30			
	$I_C = -500mA$ $V_{CE} = -5.0V$	25			
	$I_C = -1.0A$ $V_{CE} = -5.0V$	10			

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

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

Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{CBO} Collector Cut Off Current	$V_{CB} = -50V$			-50	nA
	$V_{CB} = -50V$ $T_A = 150^{\circ}C$			-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	$I_C = -10\mu A$	-60			V
$V_{(BR)EBO}$ Emitter Base Breakdown Voltage	$I_C = -10\mu A$	-5			V
h_{FE} DC Current Gain ¹	$V_{CE} = -5.0V$	100		300	
	$I_C = -100mA$ $T_A = -55^{\circ}C$	40			
	$I_C = -100\mu A$ $V_{CE} = -5.0V$	75			
	$I_C = -500mA$ $V_{CE} = -5.0V$	70			
	$I_C = -1.0A$ $V_{CE} = -5.0V$	40			

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

ELECTRICAL CHARACTERISTICS FOR 2N4033 ($T_{case} = 25^{\circ}C$ unless otherwise stated)

Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{CBO} Collector Cut Off Current	$V_{CB} = -60V$			-50	nA
	$V_{CB} = -60V$ $T_A = 150^{\circ}C$			-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	$I_C = -10\mu A$	-80			V
$V_{(BR)EBO}$ Emitter Base Breakdown Voltage	$I_C = -10\mu A$	-5			V
h_{FE} DC Current Gain ¹	$V_{CE} = -5.0V$	100		300	
	$I_C = -100mA$ $T_A = -55^{\circ}C$	40			
	$I_C = -100\mu A$ $V_{CE} = -5.0V$	75			
	$I_C = -500mA$ $V_{CE} = -5.0V$	70			
	$I_C = -1.0A$ $V_{CE} = -5.0V$	25			

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

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

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

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

Parameter	Test Conditions	Min.	Typ.	Max.	Unit
t_{on} Turn On Time	$V_{\text{CC}} = -30\text{V}$ $I_{\text{C}} = -500\text{mA}$ $I_{\text{B}1} = I_{\text{B}2} = -50\text{mA}$			100	ns
t_{f} Fall Time				50	ns
t_{s} Storage Time				350	ns
f_{T} Transition Frequency for 2N4030	$V_{\text{CE}} = -10\text{V}$ $f = 1\text{ MHz}$ $I_{\text{C}} = -50\text{mA}$	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

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