Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

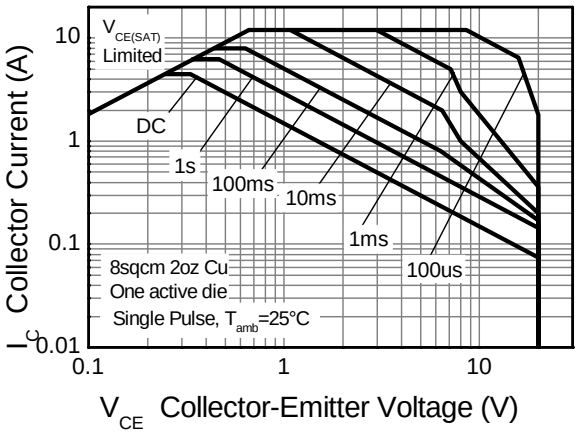
Characteristic		Symbol	NPN	PNP	Unit
Collector-Base Voltage		V_{CBO}	40	-25	V
Collector-Emitter Voltage		V_{CEO}	20	-20	V
Emitter-Base Voltage		V_{EBO}	7	-7	V
Peak Pulse Current		I_{CM}	12	-6	A
Continuous Collector Current	(Notes 6 & 9)	I_C	4.5	-3.5	A
Continuous Collector Current	(Notes 7 & 9)		5	-3.8	
Base Current		I_B	1		A

Thermal Characteristics (@T_A = +25°C, unless otherwise specified.)

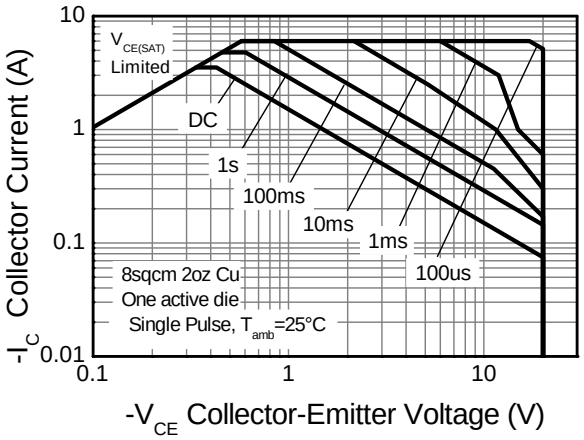
Characteristic		Symbol	NPN	PNP	Unit
Power Dissipation Linear Derating Factor	(Notes 6 & 9)	P_D	1.5 12		W mW/°C
	(Notes 7 & 9)		2.45 19.6		
	(Notes 8 & 9)		1.13 8		
	(Notes 8 & 10)		1.7 13.6		
Thermal Resistance, Junction to Ambient	(Notes 6 & 9)	$R_{\theta JA}$	83.3		°C/W
	(Notes 7 & 9)		51.0		
	(Notes 8 & 9)		111		
	(Notes 8 & 10)		73.5		
Thermal Resistance, Junction to Lead	(Notes 9 & 11)	$R_{\theta JL}$	17.1		
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150		°C

Notes:
6. For a dual device surface mounted on 28mm x 28mm (8cm^2) FR4 PCB with high coverage of single sided 2 oz copper, in still air conditions; the device is measured when operating in a steady-state condition. The heatsink is split in half with the exposed collector pads connected to each half.
7. Same as note (6), except the device is measured at t <5 sec.
8. Same as note (6), except the device is surface mounted on 31mm x 31mm (10cm^2) FR4 PCB with high coverage of single sided 1oz copper.
9. For a dual device with one active die.
10. For dual device with 2 active die running at equal power.
11. Thermal resistance from junction to solder-point (on the exposed collector pads).

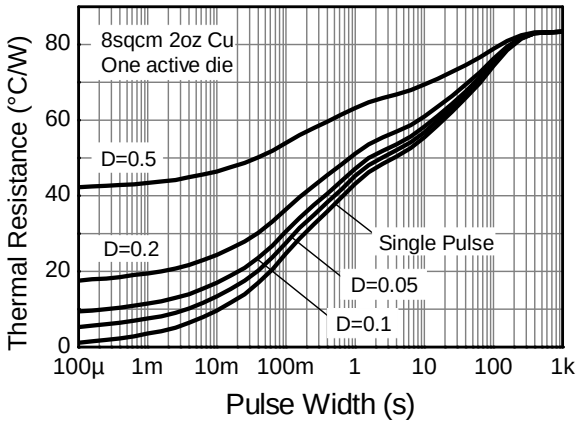
Thermal Characteristics and Derating Information



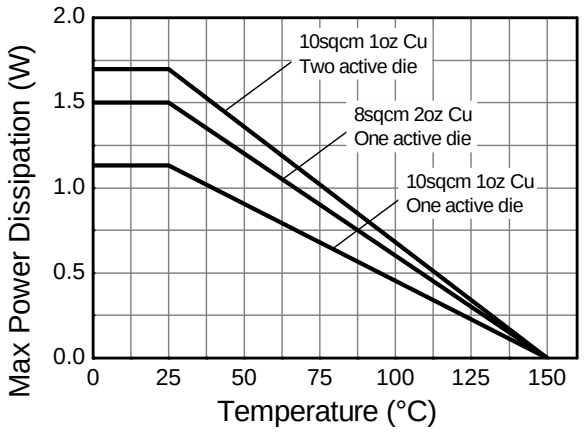
NPN Safe Operating Area



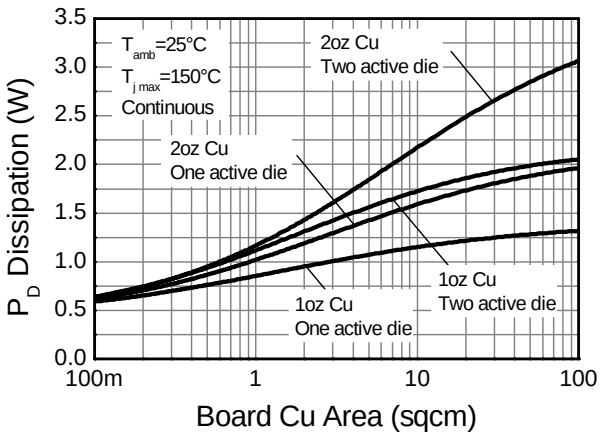
PNP Safe Operating Area



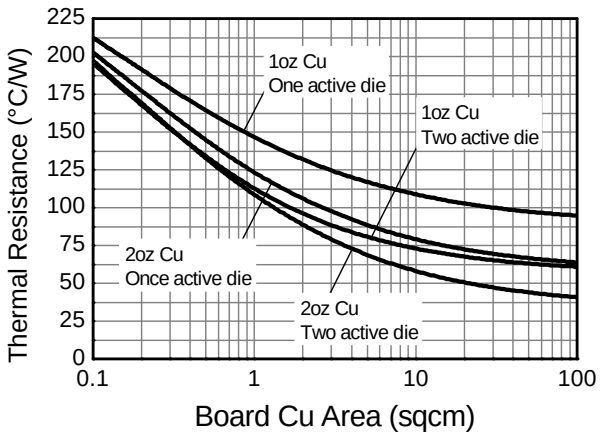
Transient Thermal Impedance



Derating Curve



Power Dissipation v Board Area



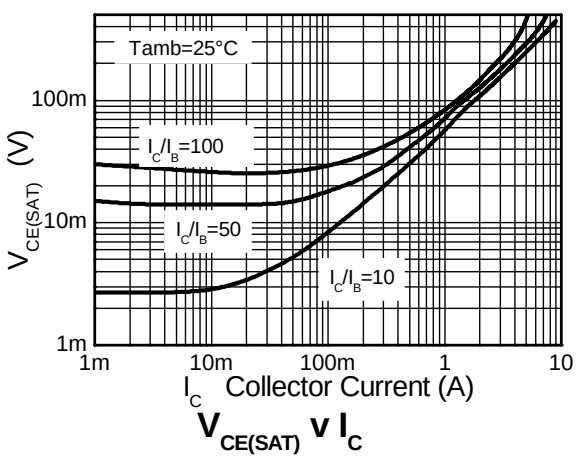
Thermal Resistance v Board Area

NPN - Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

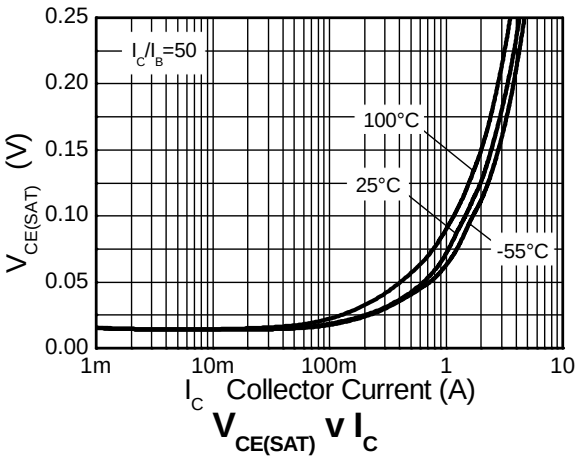
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	40	100	-	V	I_C = 100µA
Collector-Emitter Breakdown Voltage (Note 12)	BV_{CEO}	20	27	-	V	I_C = 10mA
Emitter-Base Breakdown Voltage	BV_{EBO}	7	8.2	-	V	I_E = 100µA
Collector Cutoff Current	I_{CBO}	-	-	100	nA	V_{CB} = 30V
Emitter Cutoff Current	I_{EBO}	-	-	100	nA	V_{EB} = 6V
Collector Emitter Cutoff Current	I_{CES}	-	-	100	nA	V_{CE} = 16V
Static Forward Current Transfer Ratio (Note 12)	h_{FE}	200 300 200 100	400 450 360 180	- - - -	- - - -	I_C = 10mA, V_{CE} = 2V I_C = 200mA, V_{CE} = 2V I_C = 2A, V_{CE} = 2V I_C = 6A, V_{CE} = 2V
Collector-Emitter Saturation Voltage (Note 12)	$V_{CE(sat)}$	-	8 90 115 190 210	15 150 135 250 300	mV	I_C = 0.1A, I_B = 10mA I_C = 1A, I_B = 10mA I_C = 2A, I_B = 50mA I_C = 3A, I_B = 100mA I_C = 4.5A, I_B = 125mA
Base-Emitter Turn-On Voltage (Note 12)	$V_{BE(on)}$	-	0.88	0.97	V	I_C = 4.5A, V_{CE} = 2V
Base-Emitter Saturation Voltage (Note 12)	$V_{BE(sat)}$	-	0.98	1.07	V	I_C = 4.5A, I_B = 125mA
Output Capacitance	C_{obo}	-	23	30	pF	V_{CB} = 10V, f = 1MHz
Transition Frequency	f_T	100	140	-	MHz	V_{CE} = 10V, I_C = 50mA, f = 100MHz
Turn-on Time	t_{on}	-	170	-	ns	V_{CC} = 10V, I_C = 3A
Turn-off Time	t_{off}	-	400	-	ns	I_{B1} = I_{B2} = 10mA

Notes: 12. Measured under pulsed conditions. Pulse width ≤ 300µs. Duty cycle ≤ 2%.

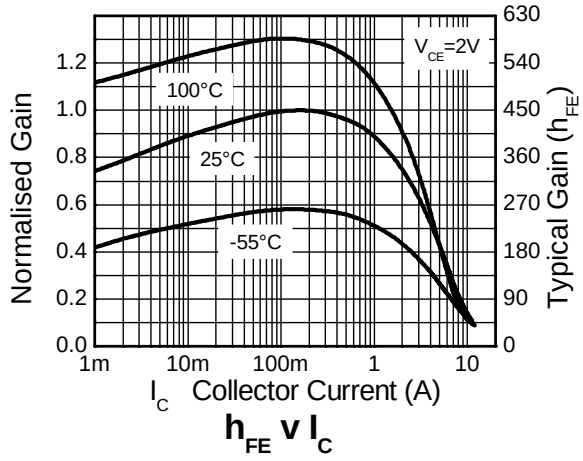
NPN - Typical Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)



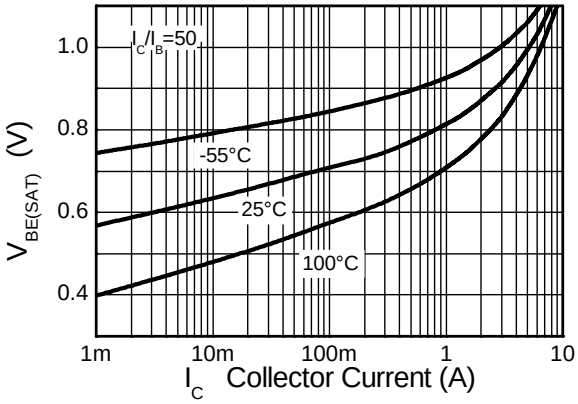
$V_{CE(SAT)}$ v I_C



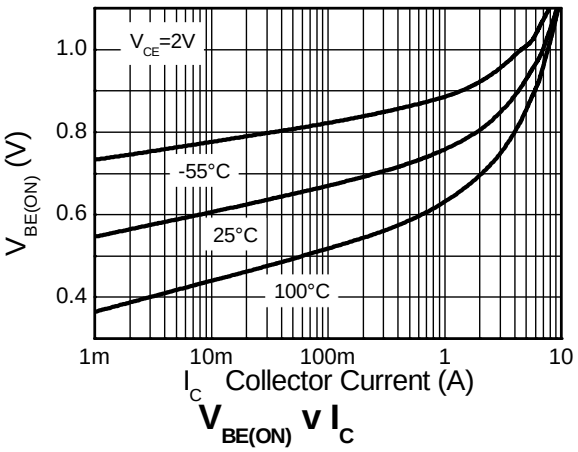
$V_{CE(SAT)}$ v I_C



h_{FE} v I_C



$V_{BE(SAT)}$ v I_C



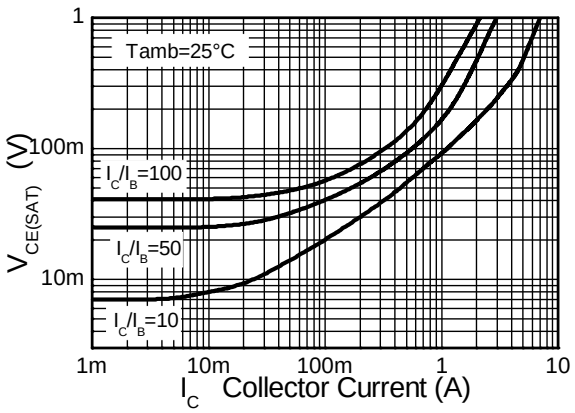
$V_{BE(ON)}$ v I_C

PNP - Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

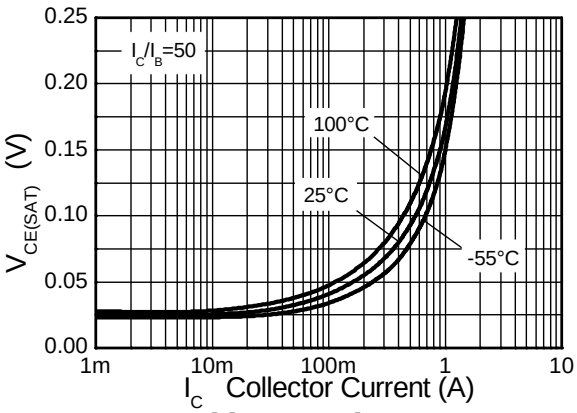
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	-25	-35	-	V	I_C = -100µA
Collector-Emitter Breakdown Voltage (Note 12)	BV_{CEO}	-20	-25	-	V	I_C = -10mA
Emitter-Base Breakdown Voltage	BV_{EBO}	-7	-8.5	-	V	I_E = -100µA
Collector Cutoff Current	I_{CBO}	-	-	-100	nA	V_{CB} = -20V
Emitter Cutoff Current	I_{EBO}	-	-	-100	nA	V_{EB} = -6V
Collector Emitter Cutoff Current	I_{CES}	-	-	-100	nA	V_{CES} = -16V
Static Forward Current Transfer Ratio (Note 12)	h_{FE}	300 300 150 15	475 450 230 30	- - - -	-	I_C = -10mA, V_{CE} = -2V I_C = -100mA, V_{CE} = -2V I_C = -2A, V_{CE} = -2V I_C = -6A, V_{CE} = -2V
Collector-Emitter Saturation Voltage (Note 12)	$V_{CE(sat)}$	- - - - -	-19 -170 -190 -240 -225	-30 -220 -250 -350 -300	mV	I_C = -0.1A, I_B = -10mA I_C = -1A, I_B = -20mA I_C = -1.5A, I_B = -50mA I_C = -2.5A, I_B = -150mA I_C = -3.5A, I_B = -350mA
Base-Emitter Turn-On Voltage (Note 12)	$V_{BE(on)}$	-	-0.87	-0.95	V	I_C = -3.5A, V_{CE} = -2V
Base-Emitter Saturation Voltage (Note 12)	$V_{BE(sat)}$	-	-1.01	-1.12	V	I_C = -3.5A, I_B = -350mA
Output Capacitance	C_{obo}	-	21	30	pF	V_{CB} = -10V. f = 1MHz
Transition Frequency	f_T	150	180	-	MHz	V_{CE} = -10V, I_C = -50mA, f = 100MHz
Turn-on Time	t_{on}	-	40	-	ns	V_{CC} = -10V, I_C = -1A
Turn-off Time	t_{off}	-	670	-	ns	I_{B1} = I_{B2} = -10mA

Notes: 12. Measured under pulsed conditions. Pulse width ≤ 300µs. Duty cycle ≤ 2%.

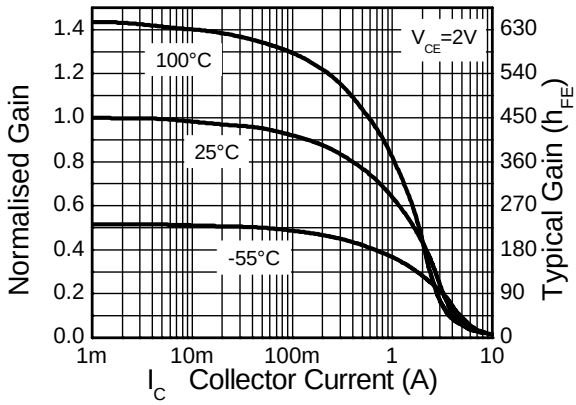
PNP - Typical Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)



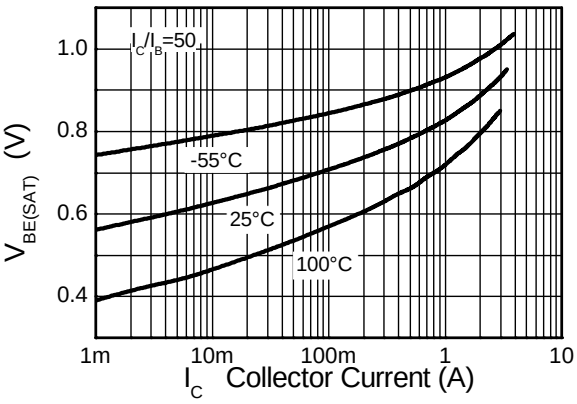
$V_{CE(SAT)}$ v I_C



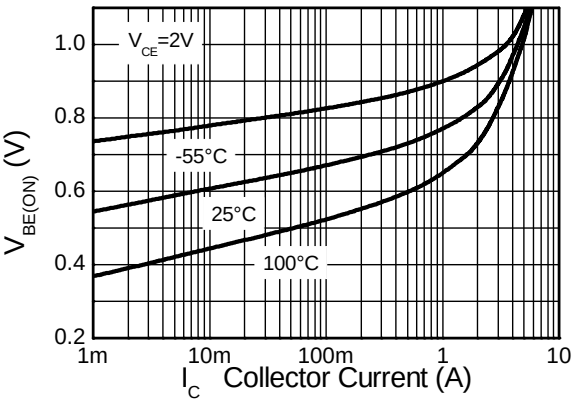
$V_{CE(SAT)}$ v I_C



h_{FE} v I_C



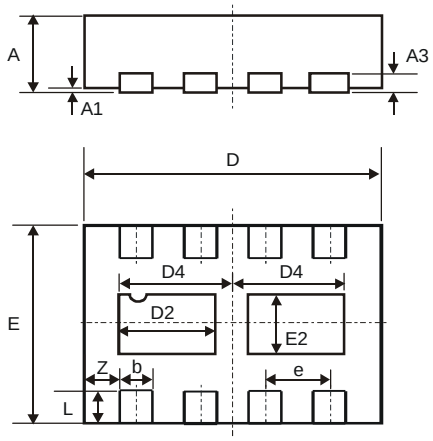
$V_{BE(SAT)}$ v I_C



$V_{BE(ON)}$ v I_C

Package Outline Dimensions

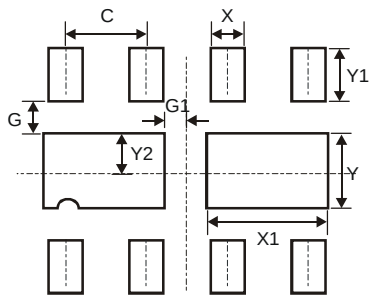
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for latest version.



W-DFN3020-8 Type B			
Dim	**Min**	**Max**	**Typ**
A	0.77	0.83	0.80
A1	0	0.05	0.02
A3	-	-	0.15
b	0.25	0.35	0.30
D	2.95	3.075	3.00
D2	0.82	1.02	0.92
D4	1.01	1.21	1.11
e	-	-	0.65
E	1.95	2.075	2.00
E2	0.43	0.63	0.53
L	0.25	0.35	0.30
Z	-	-	0.375
All Dimensions in mm			

Suggested Pad Layout

Please see AP02001 at http://www.diodes.com/datasheets/ap02001.pdf for the latest version.



Dimensions	Value (in mm)
C	0.650
G	0.285
G1	0.090
X	0.400
X1	1.120
Y	0.730
Y1	0.500
Y2	0.365

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