Micro Commercial Components

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BDX33 THRU BDX33D

NPN Silicon Power Darlingtons

Features

- Halogen free available upon request by adding suffix "-HF"
- Lead Free Finish/RoHS Compliant(Note 1) ("P" Suffix designates RoHS Compliant. See ordering information)
- Designed For Complementary Use with BDX34, BDX34A, BDX34B, BDX34C and BDX34D
- 70W at 25℃ Cass Temperature
- 10A Continuous Collector Current
- Minimum h_{FE} of 750 at 3.0V, 3.0A
- Epoxy meets UL 94 V-0 flammability rating
- Moisure Sensitivity Level 1
- Mounting Torgue: 5 in-lbs Maximum

Absolute Maximum Ratings @ 25°C Unless Otherwise Noted

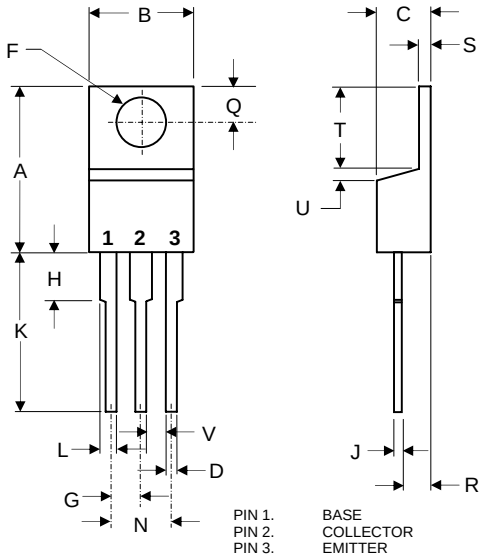
Symbol	Rating	Value	Unit
V_{CBO}	Collector-Base Voltage (I_E=0) BDX33 BDX33A BDX33B BDX33C BDX33D	 45 60 80 100 100	 V
V_{CEO}	Collector-Emitter Voltage (I_B=0) BDX33 BDX33A BDX33B BDX33C BDX33D	 45 60 80 100 100	 V
V_{EBO}	Emitter-Base Voltage	5.0	V
I_C	Continuous Collector Current	10	A
I_B	Continuous Base Current	0.3	A
P_{TOT}	Continuous Device Dissipation at (or below) 25℃ Case Temperature (see Note2)	70	W
P_{TOT}	Continuous Device Dissipation at (or below) 25℃ Free Air Temperature (see Note 3)	2.0	W
T_J	Operating Free Air Temperature Range	-55~+150	℃
T_{STG}	Storage Temperature Range	-55~+150	℃
T_A	Operating Free-Air Temperature Range	-55~+150	℃

Notes: 1. High Temperature Solder Exemption Applied, see EU Directive Annex 7.
2. Derate Linearly to 150℃ Case Temperature at the Rate of 0.56 W/℃
3. Derate Linearly to 150℃ Free Air Temperature at the Rate of 16m W/℃

Electrical Characteristics @ 25°C Unless Otherwise Specified

Symbol	Parameter	Min	Typ	Max	Unit
$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage (I_C=100mA, I_B=0,see note 3) BDX33 BDX33A BDX33B BDX33C BDX33D	 45 60 80 100 100			 V

TO-220



DIMENSIONS

DIM	INCHES MIN	INCHES MAX	MM MIN	MM MAX	NOTE
A	.560	.625	14.22	15.88	
B	.380	.420	9.65	10.67	
C	.140	.190	3.56	4.82	
D	.020	.045	0.51	1.14	
F	.139	.161	3.53	4.09	∅
G	.190	.110	2.29	2.79	
H	---	.250	---	6.35	
J	.012	.025	0.30	0.64	
K	.500	.580	12.70	14.73	
L	.045	.060	1.14	1.52	
N	.190	.210	4.83	5.33	
Q	.100	.135	2.54	3.43	
R	.080	.115	2.04	2.92	
S	.045	.055	1.14	1.39	
T	.230	.270	5.84	6.86	
U	-----	.050	-----	1.27	
V	.045	-----	1.15	-----	

Symbol	Parameter		Min	Typ	Max	Unit
I_{CEO}	Collector-Emitter Cut-Off Current					
	(V_{CE}=30V, I_B=0)	BDX33			0.5	mA
	(V_{CE}=30V, I_B=0)	BDX33A			0.5	
	(V_{CE}=40V, I_B=0)	BDX33B			0.5	
	(V_{CE}=50V, I_B=0)	BDX33C			0.5	
	(V_{CE}=60V, I_B=0)	BDX33D			0.5	
	(V_{CE}=30V, I_B=0, T_C=100℃)	BDX33			10	
	(V_{CE}=30V, I_B=0, T_C=100℃)	BDX33A			10	
	(V_{CE}=40V, I_B=0, T_C=100℃)	BDX33B			10	
	(V_{CE}=50V, I_B=0, T_C=100℃)	BDX33C			10	
	(V_{CE}=60V, I_B=0, T_C=100℃)	BDX33D			10	
I_{CBO}	Collector Cut-Off Current					
	(V_{CB}=45V, I_E=0)	BDX33			1.0	mA
	(V_{CB}=60V, I_E=0)	BDX33A			1.0	
	(V_{CB}=80V, I_E=0)	BDX33B			1.0	
	(V_{CB}=100V, I_E=0)	BDX33C			1.0	
	(V_{CB}=100V, I_E=0)	BDX33D			1.0	
	(V_{CB}=45V, I_E=0, T_C=100℃)	BDX33			5.0	
	(V_{CB}=60V, I_E=0, T_C=100℃)	BDX33A			5.0	
	(V_{CB}=80V, I_E=0, T_C=100℃)	BDX33B			5.0	
	(V_{CB}=100V, I_E=0, T_C=100℃)	BDX33C			5.0	
	(V_{CB}=120V, I_E=0, T_C=100℃)	BDX33D			5.0	
I_{EBO}	Emitter Cut-Off Current					
	(V_{EB}=5.0V, I_C=0)				10	mA
h_{FE}	Forward Current Transfer Ratio					
	(V_{CE}=3.0V, I_C=4.0A)	BDX33	750			
	(V_{CE}=3.0V, I_C=4.0A)	BDX33A	750			
	(V_{CE}=3.0V, I_C=3.0A) (see notes 4 and 5)	BDX33B	750			
	(V_{CE}=3.0V, I_C=3.0A)	BDX33C	750			
	(V_{CE}=3.0V, I_C=3.0A)	BDX33D	750			
$V_{BE(ON)}$	Base-Emitter Voltage					
	(V_{CE}=3.0V, I_C=4.0A)	BDX33			2.5	V
	(V_{CE}=3.0V, I_C=4.0A)	BDX33A			2.5	
	(V_{CE}=3.0V, I_C=3.0A) (see notes 4 and 5)	BDX33B			2.5	
	(V_{CE}=3.0V, I_C=3.0A)	BDX33C			2.5	
	(V_{CE}=3.0V, I_C=3.0A)	BDX33D			2.5	
$V_{CE(SAT)}$	Collector-Emitter Saturation Voltage					
	(I_B=8.0mA, I_C=4.0A)	BDX33			2.5	V
	(I_B=8.0mA, I_C=4.0A)	BDX33A			2.5	
	(I_B=6.0mA, I_C=3.0A) (see notes 4 and 5)	BDX33B			2.5	
	(I_B=6.0mA, I_C=3.0A)	BDX33C			2.5	
	(I_B=6.0mA, I_C=3.0A)	BDX33D			2.5	
V_{EC}	Parallel Diode Forward Voltage					
	(I_E=8.0A, I_B=0)				4.0	V

NOTES: 4. These parameters must be measured using pulse techniques, tp=300μs, duty cycle≦2%.

5. These parameters must be measured using voltage-sensing contacts, separate from the current carrying contacts.

Thermal Characteristics

Symbol	Parameter	Min	Typ	Max	Unit
$R_{\theta JC}$	Junction to Case Thermal Resistance			1.78	℃/W
$R_{\theta JA}$	Junction to Free Air Thermal Resistance			62.5	℃/W

Resistive-Load-Switching Characteristics at 25℃ Case Temperature

Symbol	Parameter	Test Conditions+	Min	Typ	Max	Unit
t_{on}	Turn-On Time	I_C=3.0A, $I_{B(on)}$=12mA, $I_{B(off)}$=-12mA		1.0		μs
t_{off}	Turn-Off Time	$V_{BE(off)}$=-3.5V, R_L=10Ω, t_p=20μs, dc≦2%		5.0		μs

+ Voltage and current values shown are nominal; exact values vary slightly with transistor parameters.

TYPICAL DC CURRENT GAIN vs COLLECTOR CURRENT

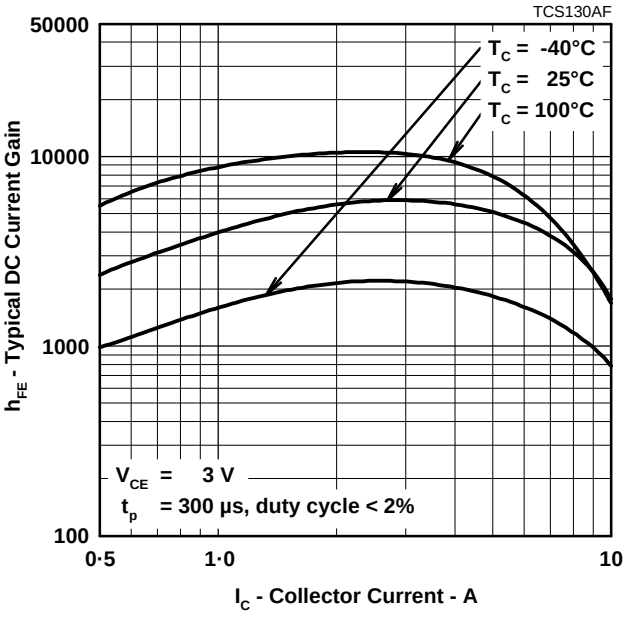


Figure 1.

COLLECTOR-EMITTER SATURATION VOLTAGE vs COLLECTOR CURRENT

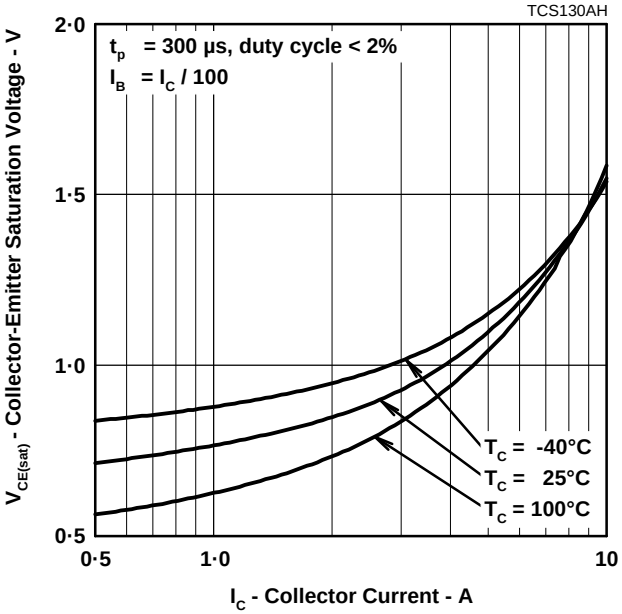


Figure 2.

BASE-EMITTER SATURATION VOLTAGE vs COLLECTOR CURRENT

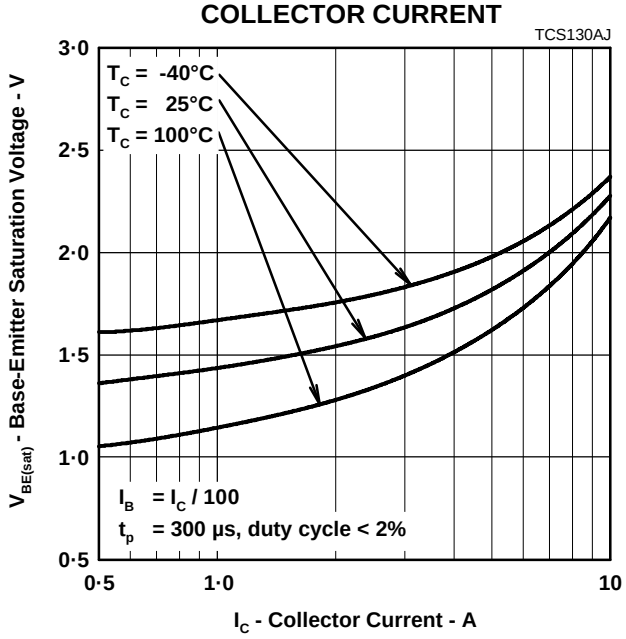


Figure 3.

THERMAL INFORMATION

MAXIMUM POWER DISSIPATION vs CASE TEMPERATURE

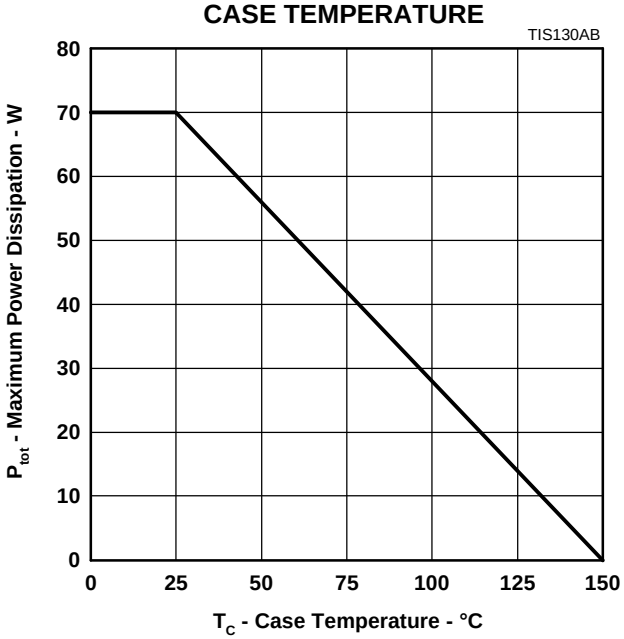


Figure 4.

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Ordering Information :

Device	Packing
Part Number-BP	Bulk;1Kpcs/Box

Note : Adding "-HF" suffix for halogen free, eg. Part Number-BP-HF

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