



## NPN BDX33 – BDX33A – BDX33B – BDX33C

### COMPLEMENTARY SILICON POWER DARLINGTON TRANSISTORS

The BDX33, BDX33A, BDX33B and BDX33C are silicon epitaxial-base NPN power transistors in monolithic Darlington configuration and are mounted in Jedec TO-220 plastic package.

They are intended for use in power linear and switching applications.

The complementary PNP types are the BDX34, BDX34A, BDX34B and BDX34C respectively. Compliance to RoHS.

#### ABSOLUTE MAXIMUM RATINGS

Symbol	Ratings		Value	Unit	
$V_{CEO}$	Collector-Emitter Voltage	$I_B=0$	BDX33	45	V
			BDX33A	60	
			BDX33B	80	
			BDX33C	100	
$V_{CBO}$	Collector-Base Voltage	$I_E=0$	BDX33	45	V
			BDX33A	60	
			BDX33B	80	
			BDX33C	100	
$I_C$	Collector Current	$I_{C(RMS)}$	10	A	
		$I_{CM}$	15		
$I_B$	Base Current		0.25	A	
$P_T$	Power Dissipation	@ $T_C = 25^\circ$	70	W	
$T_J$	Junction Temperature		-65 to +150	°C	
$T_S$	Storage Temperature				

#### THERMAL CHARACTERISTICS

Symbol	Ratings	Value	Unit
$R_{thJ-C}$	Thermal Resistance, Junction to Case		1.78 °C/W



## NPN BDX33 – BDX33A – BDX33B – BDX33C

### ELECTRICAL CHARACTERISTICS

TC=25°C unless otherwise noted

Symbol	Ratings	Test Condition(s)	Min	Typ	Max	Unit	
$V_{CE0(SUS)}$	Collector-Emitter Breakdown Voltage (*)	$I_C=100\text{ mA}$	BDX33	45	-	-	V
			BDX33A	60	-	-	
			BDX33B	80	-	-	
			BDX33C	100	-	-	
$V_{CER(SUS)}$	Collector-Emitter Sustaining Voltage (*)	$I_B=100\text{ mA}$ , $R_{BE}=100\Omega$	BDX33	45	-	-	V
			BDX33A	60	-	-	
			BDX33B	80	-	-	
			BDX33C	100	-	-	
$V_{CEV(SUS)}$	Collector-Emitter Sustaining Voltage (*)	$I_C=100\text{ mA}$ $V_{BE}=-1.5\text{ V}$	BDX33	45	-	-	V
			BDX33A	60	-	-	
			BDX33B	80	-	-	
			BDX33C	100	-	-	
$I_{CEO}$	Collector Cutoff Current	$V_{CB}=22\text{ V}$	BDX33	-	-	0.5	mA
		$V_{CB}=30\text{ V}$	BDX33A	-	-		
		$V_{CB}=40\text{ V}$	BDX33B	-	-		
		$V_{CB}=50\text{ V}$	BDX33C	-	-		
		$V_{CB}=22\text{ V}, T_C=100^\circ\text{C}$	BDX33	-	-	10	
		$V_{CB}=30\text{ V}, T_C=100^\circ\text{C}$	BDX33A	-	-		
		$V_{CB}=40\text{ V}, T_C=100^\circ\text{C}$	BDX33B	-	-		
$V_{CB}=50\text{ V}, T_C=100^\circ\text{C}$	BDX33C	-	-				
$I_{EBO}$	Emitter Cutoff Current	$V_{BE}=5\text{ V}$	BDX33	-	-	5.0	mA
			BDX33A				
			BDX33B				
			BDX33C				
$I_{CBO}$	Collector-Base Cutoff Current	$V_{CBO}=45\text{ V}$	BDX33	-	-	0.2	mA
		$V_{CBO}=60\text{ V}$	BDX33A	-	-		
		$V_{CBO}=80\text{ V}$	BDX33B	-	-		
		$V_{CBO}=100\text{ V}$	BDX33C	-	-		
$I_{CBO}$	Collector-Base Cutoff Current	$V_{CBO}=45\text{ V}$ $T_C=100^\circ\text{C}$	BDX33	-	-	5	mA
		$V_{CBO}=60\text{ V}$ $T_C=100^\circ\text{C}$	BDX33A	-	-		
		$V_{CBO}=80\text{ V}$ $T_C=100^\circ\text{C}$	BDX33B	-	-		
		$V_{CBO}=100\text{ V}$ $T_C=100^\circ\text{C}$	BDX33C	-	-		



## NPN BDX33 – BDX33A – BDX33B – BDX33C

### ELECTRICAL CHARACTERISTICS

TC=25°C unless otherwise noted

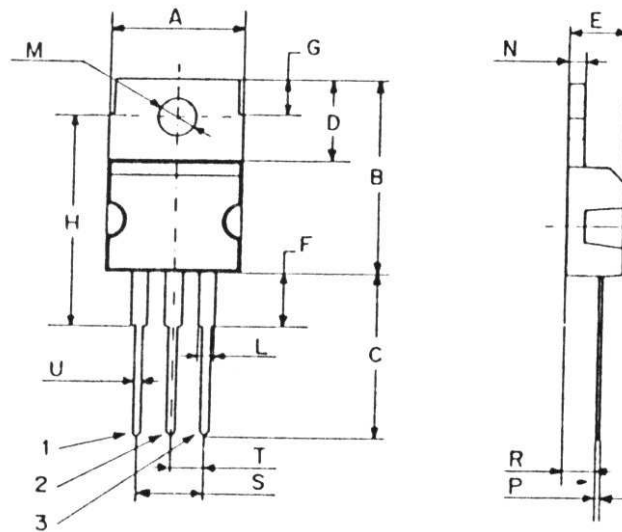
Symbol	Ratings	Test Condition(s)	Min	Typ	Max	Unit	
$V_{CE(SAT)}$	Collector-Emitter saturation Voltage (*)	$I_C=4.0\text{ A}, I_B=8.0\text{ mA}$	BDX33	-	-	2.5	V
			BDX33A				
			BDX33B				
			BDX33C				
		$I_C=3.0\text{ A}, I_B=6.0\text{ mA}$	BDX33	-	-	2.5	
			BDX33A				
			BDX33B				
			BDX33C				
$V_F$	Forward Voltage (pulse method)	$I_F=8\text{ A}$	BDX33	-	-	4.0	V
			BDX33A				
			BDX33B				
			BDX33C				
$V_{BE}$	Base-Emitter Voltage (*)	$I_C=4.0\text{ A}, V_{CE}=3.0\text{ V}$	BDX33	-	-	2.5	V
			BDX33A				
		$I_C=3.0\text{ A}, V_{CE}=3.0\text{ V}$	BDX33B	-	-	2.5	
			BDX33C				
$h_{FE}$	DC Current Gain (*)	$V_{CE}=3.0\text{ V}, I_C=4.0\text{ A}$	BDX33	750	-	-	-
			BDX33A				
		$V_{CE}=3.0\text{ V}, I_C=3.0\text{ A}$	BDX33B	750	-	-	
			BDX33C				

(\*) Pulse Width  $\approx 300\ \mu\text{s}$ , Duty Cycle  $\angle 2.0\%$

## NPN BDX33 – BDX33A – BDX33B – BDX33C

### MECHANICAL DATA CASE TO-220

DIMENSIONS (mm)		
	Min.	Max.
A	9,90	10,30
B	15,65	15,90
C	13,20	13,40
D	6,45	6,65
E	4,30	4,50
F	2,70	3,15
G	2,60	3,00
H	15,75	17,15
L	1,15	1,40
M	3,50	3,70
N	-	1,37
P	0,46	0,55
R	2,50	2,70
S	4,98	5,08
T	2,49	2,54
U	0,70	0,90



Pin 1 :	Base
Pin 2 :	Collector
Pin 3 :	Emitter
Case :	Collector

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