



BDX53E BDX54E
BDX53F BDX54F

EPITAXIAL-BASE NPN/PNP

POWER DARLINGTONS

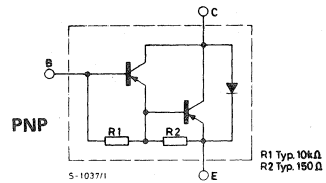
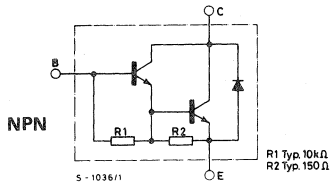
The BDX 53E, BDX 53F are silicon epitaxial base NPN transistors in monolithic Darlington configuration and are mounted in Jedec TO-220 plastic package. They are intended for use in power linear and switching applications. The complementary PNP types are the BDX 54E and BDX 54F respectively.

ABSOLUTE MAXIMUM RATINGS

	NPN PNP*	BDX53E BDX54E	BDX53F BDX54F
V_{CBO}	Collector-base voltage ($I_E = 0$)	140V	160V
V_{CEO}	Collector-emitter voltage ($I_B = 0$)	140V	160V
V_{EBO}	Emitter-base voltage ($I_C = 0$)		5V
I_C	Collector current	8A	
I_{CM}	Collector peak current	12A	
I_B	Base current	0.2A	
P_{tot}	Total power dissipation at $T_{case} \leq 25^\circ C$	60W	
T_{stg}	Storage temperature	-65 to $150^\circ C$	
T_j	Junction temperature	$150^\circ C$	

* For PNP types voltage and current values are negative

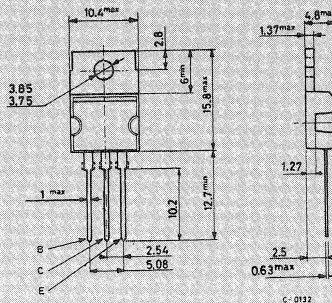
INTERNAL SCHEMATIC DIAGRAMS



MECHANICAL DATA

Dimensions in mm

Collector connected to tab.



TO-220



BDX53E BDX54E
BDX53F BDX54F

THERMAL DATA

$R_{th\ j-case}$	Thermal resistance junction-case	max	2.08	°C/W
$R_{th\ j-amb}$	Thermal resistance junction-ambient	max	70	°C/W

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

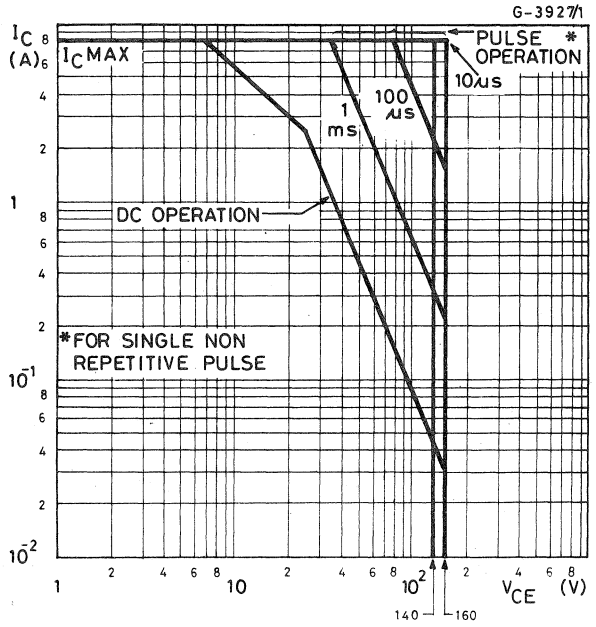
Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_{CEO}	Collector cutoff current ($I_B = 0$)	for BDX53E/4E for BDX53F/4F	$V_{CE} = 70\text{V}$ $V_{CE} = 80\text{V}$	0.5 0.5	mA mA
I_{CBO}	Collector cutoff current ($I_E = 0$)	for BDX53E/4E for BDX53F/4F	$V_{CB} = 140\text{V}$ $V_{CB} = 160\text{V}$	0.2 0.2	mA mA
I_{EBO}	Emitter cutoff current ($I_E = 0$)	$V_{EB} = 5\text{V}$		5	mA
$V_{CEO(sus)}$	*Collector-emitter sustaining voltage ($I_B = 0$)	$I_C = 50\text{mA}$ for BDX53E/BDX54E for BDX53F/BDX54F		140 160	V V
$V_{CE(sat)}$	*Collector-emitter saturation voltage	$I_C = 2\text{A}$	$I_B = 10\text{mA}$	2	V
$V_{BE(sat)}$	*Base-emitter saturation voltage	$I_C = 2\text{A}$	$I_B = 10\text{mA}$	2.5	V
h_{FE}	DC current gain	$I_C = 2\text{A}$ $I_C = 3\text{A}$	$V_{CE} = 5\text{V}$ $V_{CE} = 5\text{V}$	500 150	— —
V_F	*Parallel diode forward voltage	$I_F = 2\text{A}$		2.5	V
h_{fe}	Small signal current gain	$I_C = 0.5\text{A}$ $f = 1\text{MHz}$	$V_{CE} = 2\text{V}$	20	—

* Pulsed: pulse duration = 300 μs , duty cycle = 1%

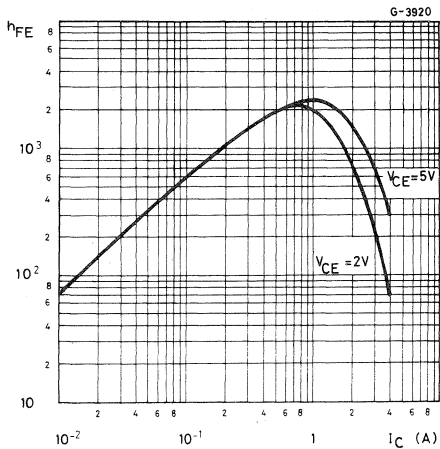
For PNP types voltage and current values are negative



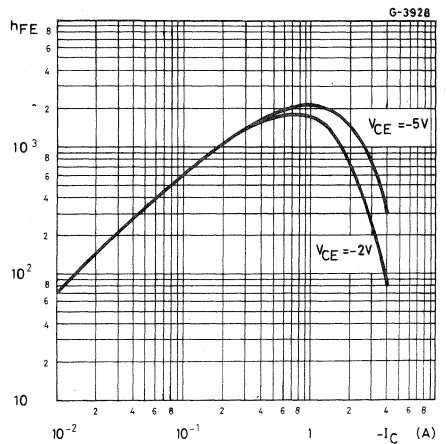
Safe operating areas



DC current gain (NPN types)



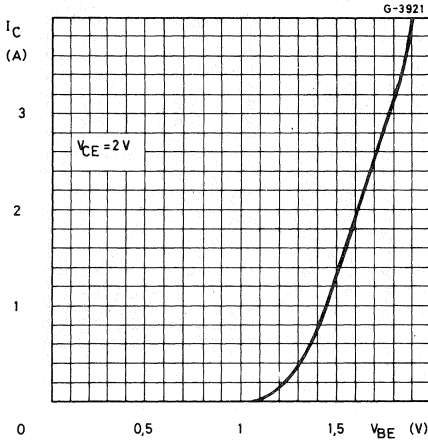
DC current gain (PNP types)



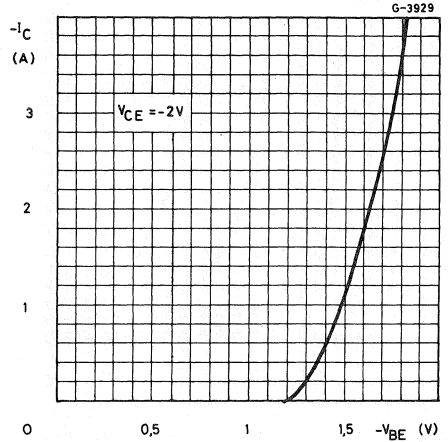


BDX53E BDX54E
BDX53F BDX54F

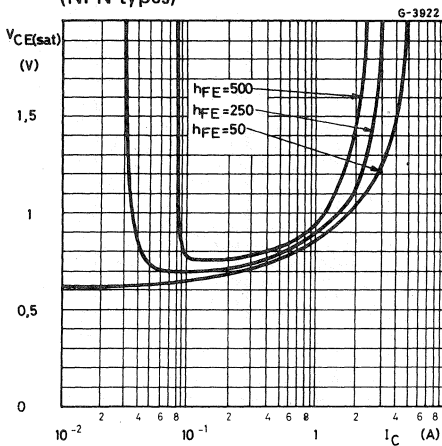
DC transconductance (NPN types)



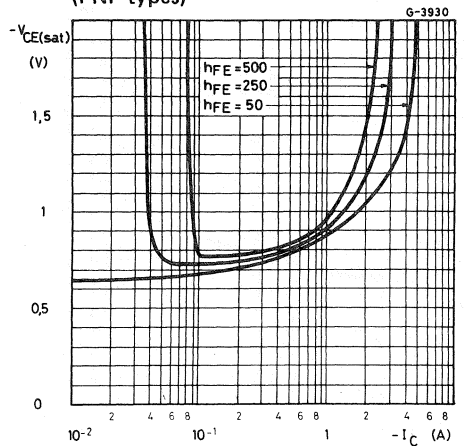
DC transconductance (PNP types)



Collector-emitter saturation voltage (NPN types)



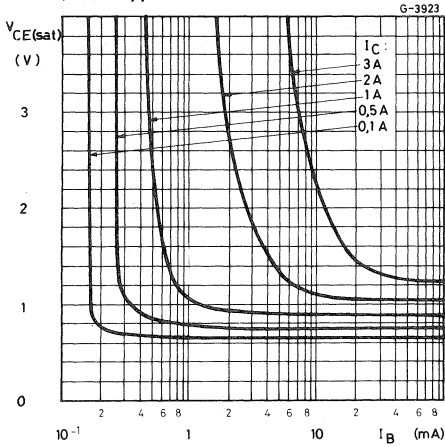
Collector-emitter saturation voltage (PNP types)



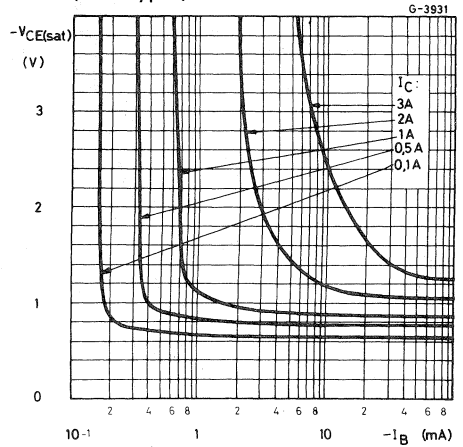


BDX53E BDX54E
BDX53F BDX54F

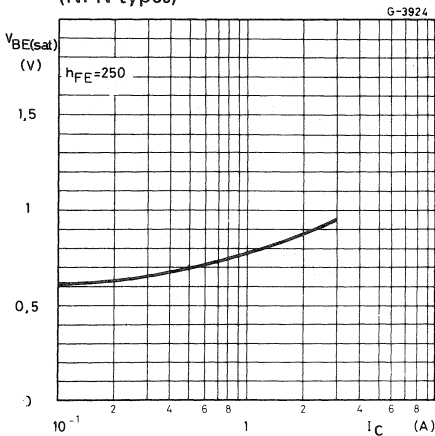
Collector-emitter saturation voltage
(NPN types)



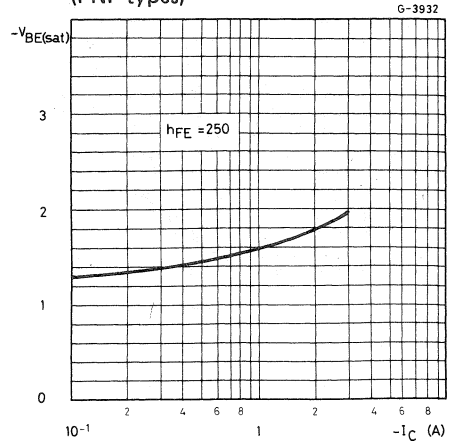
Collector-emitter saturation voltage
(PNP types)



Base-emitter saturation voltage
(NPN types)



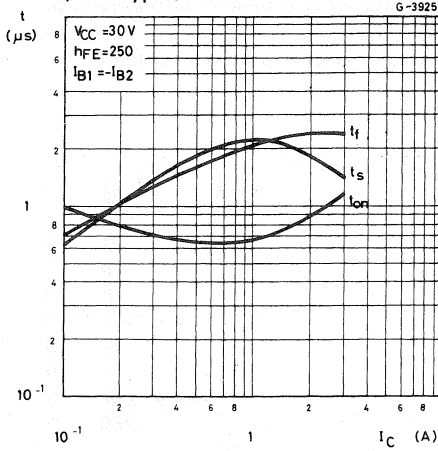
Base-emitter saturation voltage
(PNP types)





BDX53E BDX54E
BDX53F BDX54F

Saturated switching characteristics
(NPN types)



Saturated switching characteristics
(PNP types)

