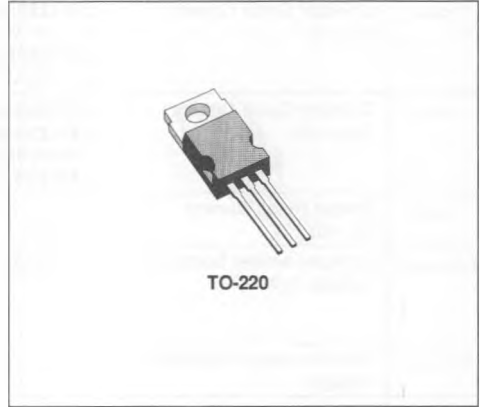


## MEDIUM POWER LINEAR AND SWITCHING APPLICATIONS

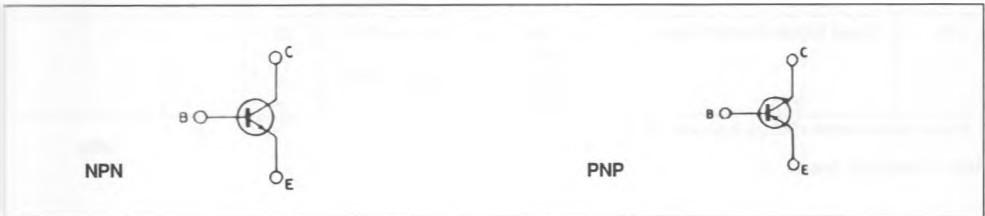
### DESCRIPTION

The BD239, BD239A, BD239B and BD239C are silicon epitaxial-base NPN power transistors in Jedec TO-220 plastic package, intended for use in medium power linear and switching applications.

The complementary PNP types are the BD240, BD240A, BD240B and BD240C respectively.



### INTERNAL SCHEMATIC DIAGRAMS



### ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	NPN PNP*	Value				Unit
			BD239 BD240	BD239A BD240A	BD239B BD240B	BD239C BD240C	
$V_{CEr}$	Collector-emitter Voltage ( $R_{BE} = 100 \Omega$ )		55	70	90	115	V
$V_{CE0}$	Collector-emitter Voltage ( $I_B = 0$ )		45	60	80	100	V
$V_{EBO}$	Emitter-base Voltage ( $I_C = 0$ )		5				V
$I_C$	Collector Current		2				A
$I_{CM}$	Collector Peak Current		4				A
$I_B$	Base Current		0.6				A
$P_{Tot}$	Total Power Dissipation at $T_{case} \leq 25^\circ C$ $T_{amb} \leq 25^\circ C$		30				W
			2				W
$T_{sig}$	Storage Temperature		- 65 to 150				$^\circ C$
$T_j$	Junction Temperature		150				$^\circ C$

\* For PNP types voltage and current values are negative.

**THERMAL DATA**

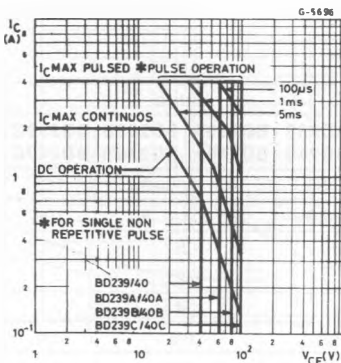
$R_{th\ j-case}$	Thermal Resistance Junction-case	Max	4.17	°C/W
$R_{th\ j-amb}$	Thermal Resistance Junction-ambient	Max	62.5	°C/W

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

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$I_{CEO}$	Collector Cutoff Current ( $I_B = 0$ )	for <b>BD239/40/39A/40A</b> $V_{CE} = 30\ V$ for <b>BD239B/40B/39C/40C</b> $V_{CE} = 60\ V$			0.3	mA
$I_{CES}$	Collector Cutoff Current ( $V_{BE} = 0$ )	for <b>BD239/40</b> $V_{CE} = 45\ V$ for <b>BD239A/40A</b> $V_{CE} = 60\ V$ for <b>BD239B/40B</b> $V_{CE} = 80\ V$ for <b>BD239C/40C</b> $V_{CE} = 100\ V$			0.2	mA
$I_{EBO}$	Emitter Cutoff Current ( $I_C = 0$ )	$V_{EB} = 5\ V$			1	mA
$V_{CE(0sus)^*}$	Collector-emitter Sustaining Voltage ( $I_B = 0$ )	$I_C = 30\ mA$ for <b>BD239/40</b> for <b>BD239A/40A</b> for <b>BD239B/40B</b> for <b>BD239C/40C</b>	45 60 80 100			V
$V_{CE(sat)^*}$	Collector-emitter Saturation Voltage	$I_C = 1\ A$ $I_B = 0.2\ mA$			0.7	V
$V_{BE(on)^*}$	Base-emitter Voltage	$I_C = 1\ A$ $V_{CE} = 4\ V$			1.3	V
$h_{FE}^*$	DC Current Gain	$I_C = 0.2\ A$ $V_{CE} = 4\ V$ $I_C = 1\ A$ $V_{CE} = 4\ V$	40 15			
$h_{fe}$	Small Signal Current Gain	$I_C = 0.2\ A$ $V_{CE} = 10\ V$ $f = 1\ KHz$ $I_C = 0.2\ A$ $V_{CE} = 10\ V$ $f = 1\ MHz$	20 3			

\* Pulsed : pulse duration = 300  $\mu s$ , duty cycle  $\leq 2\ %$ .

**Safe Operating Areas.**



For the others characteristics curves see TIP31/TIP32 series.