

# EPITAXIAL-BASE NPN/PNP



BD439 BD440  
BD441 BD442

## MEDIUM POWER LINEAR AND SWITCHING APPLICATIONS

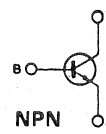
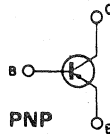
The BD 439 and BD 441 are silicon epitaxial-base NPN power transistors in Jedec TO-126 plastic package, intended for use in power linear and switching applications. The complementary PNP types are the BD 440 and BD 442 respectively.

### ABSOLUTE MAXIMUM RATINGS

		NPN PNP*	BD439 BD440	BD441 BD442
$V_{CBO}$	Collector-base voltage ( $I_E = 0$ )		60V	80V
$V_{CES}$	Collector-emitter voltage ( $V_{BE} = 0$ )		60V	80V
$V_{CEO}$	Collector-emitter voltage ( $I_B = 0$ )		60V	80V
$V_{EBO}$	Emitter-base voltage ( $I_C = 0$ )			5V
$I_C$	Collector current		4A	
$I_{CM}$	Collector peak current ( $t \leq 10\text{ms}$ )		7A	
$I_B$	Base current		1A	
$P_{tot}$	Total power dissipation at $T_{case} \leq 25^\circ\text{C}$		36W	
$T_{stg}$	Storage temperature		-65 to $150^\circ\text{C}$	
$T_j$	Junction temperature		150 $^\circ\text{C}$	

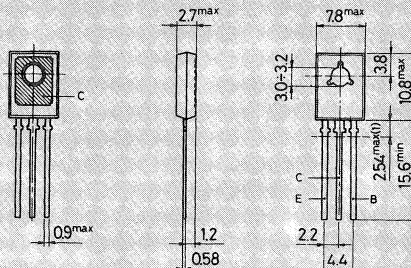
\* For PNP types voltage and current values are negative

### INTERNAL SCHEMATIC DIAGRAMS



### MECHANICAL DATA

Dimensions in mm



(1) Within this region the cross-section of the leads is uncontrolled

P032

TO-126 (SOT-32)



BD439 BD440  
BD441 BD442

## THERMAL DATA

$R_{th\ j-case}$	Thermal resistance junction-case	max	3.5	°C/W
$R_{th\ j-amb}$	Thermal resistance junction-ambient	max	100	°C/W

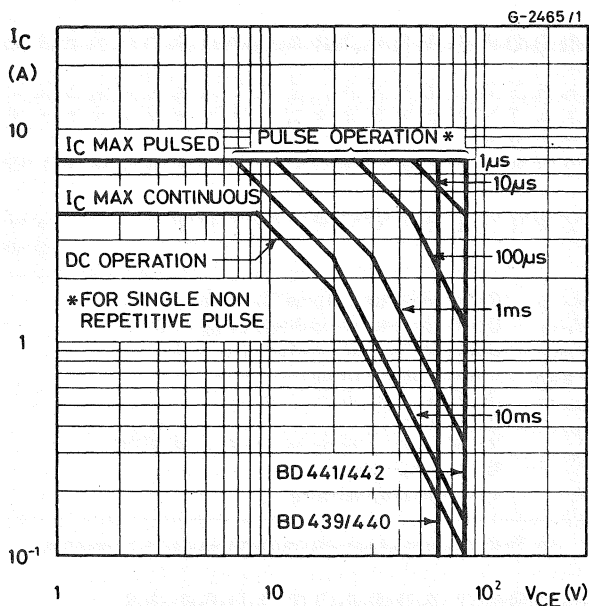
## ELECTRICAL CHARACTERISTICS ( $T_{case} = 25^{\circ}C$ unless otherwise specified)

Parameter	Test conditions	Min.	Typ.	Max.	Unit
$I_{CBO}$	Collector cutoff current ( $I_E = 0$ ) for <b>BD439/40</b> $V_{CB} = 60V$ for <b>BD441/42</b> $V_{CB} = 80V$			100 100	$\mu A$ $\mu A$
$I_{CES}$	Collector cutoff current ( $V_{BE} = 0$ ) for <b>BD439/40</b> $V_{CE} = 60V$ for <b>BD441/42</b> $V_{CE} = 80V$			100 100	$\mu A$ $\mu A$
$I_{EBO}$	Emitter cutoff current ( $I_C = 0$ ) $V_{EB} = 5V$			1	mA
$V_{CEO(sus)}$ *	Collector-emitter sustaining voltage ( $I_B = 0$ ) $I_C = 100mA$ for <b>BD439/40</b> for <b>BD441/42</b>	60 80			V V
$V_{CE(sat)}$ *	Collector-emitter saturation voltage $I_C = 2A$ $I_B = 0.2A$			0.8	V
$V_{BE}$ *	Base-emitter voltage $I_C = 10mA$ $V_{CE} = 5V$ $I_C = 2A$ $V_{CE} = 1V$		0.58	1.5	V V
$h_{FE}$ *	DC current gain $I_C = 10mA$ $V_{CE} = 5V$ for <b>BD439/40</b> for <b>BD441/42</b> $I_C = 500mA$ $V_{CE} = 1V$ for <b>BD439/40</b> for <b>BD441/42</b> $I_C = 2A$ $V_{CE} = 1V$ for <b>BD439/40</b> for <b>BD441/42</b>	20 15 40 40 25 15	130 130 140 140		— — — — — —
$h_{FE1}/h_{FE2}$ *	Matched pair $I_C = 500mA$ $V_{CE} = 1V$			1.4	—
$f_T$	Transition frequency $I_C = 250mA$ $V_{CE} = 1V$			3	MHz

\* Pulsed: pulse duration = 300  $\mu s$ , duty cycle = 1.5%

For PNP types voltage and current values are negative

Safe operating areas



For the others characteristic curve see the BD433/BD434 series