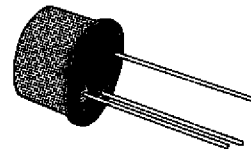


## MEDIUM-POWER AMPLIFIERS

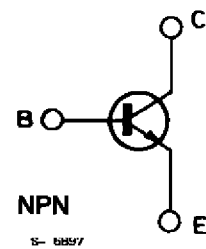
### DESCRIPTION

The BFY50, BFY51 and BFY52 are silicon planar epitaxial NPN transistors in Jedec TO-39 metal case. They are intended for general purpose linear and switching applications.



TO-39

### INTERNAL SCHEMATIC DIAGRAM



### ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	BFY50	BFY51	BFY52
$V_{CBO}$	Collector-base Voltage ( $I_E = 0$ )	80 V	60 V	40 V
$V_{CEO}$	Collector-emitter Voltage ( $I_B = 0$ )	35 V	30 V	20 V
$V_{EBO}$	Emitter-base Voltage ( $I_C = 0$ )	6 V		
$I_C$	Collector Current	1 A		
$I_{CM}$	Collector Peak Current	1.5 A		
$P_{tot}$	Total Power Dissipation at $T_{amb} \leq 25^\circ\text{C}$ at $T_{case} \leq 25^\circ\text{C}$	0.8 W 5 W		
$T_{stg}, T_j$	Storage and Junction Temperature	- 65 to 200 $^\circ\text{C}$		

## BFY50-BFY51-BFY52

### THERMAL DATA

$R_{th\ j-case}$	Thermal Resistance Junction-case	Max	35	°C/W
$R_{th\ j-amb}$	Thermal Resistance Junction-ambient	Max	218	°C/W

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

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$I_{CBO}$	Collector Cutoff Current ( $I_E = 0$ )	for <b>BFY50</b> $V_{CB} = 60\text{ V}$ $V_{CB} = 60\text{ V}$ $T_{case} = 100\ ^\circ\text{C}$ for <b>BFY51</b> $V_{CB} = 40\text{ V}$ $V_{CB} = 40\text{ V}$ $T_{case} = 100\ ^\circ\text{C}$ for <b>BFY52</b> $V_{CB} = 30\text{ V}$ $V_{CB} = 30\text{ V}$ $T_{case} = 100\ ^\circ\text{C}$			50 2.5 50 2.5 50 2.5	nA $\mu\text{A}$ nA $\mu\text{A}$ nA $\mu\text{A}$
$I_{EBO}$	Emitter Cutoff Current ( $I_C = 0$ )	$V_{EB} = 5\text{ V}$ $V_{EB} = 5\text{ V}$ $T_{case} = 100\ ^\circ\text{C}$			50 2.5	nA $\mu\text{A}$
$V_{(BR)CBO}^*$	Collector-base Breakdown Voltage ( $I_E = 0$ )	$I_C = 100\ \mu\text{A}$ for <b>BFY50</b> for <b>BFY51</b> for <b>BFY52</b>	80 60 40			V V V
$V_{(BR)CEO}^*$	Collector-emitter Breakdown Voltage ( $I_B = 0$ )	$I_C = 30\text{ mA}$ for <b>BFY50</b> for <b>BFY51</b> for <b>BFY52</b>	35 30 20			V V V
$V_{(BR)EBO}$	Emitter-base Breakdown Voltage ( $I_C = 0$ )	$I_E = 100\ \mu\text{A}$	6			V
$V_{CE(sat)}^*$	Collector-emitter Saturation Voltage	$I_C = 150\text{ mA}$ $I_B = 15\text{ mA}$ for <b>BFY50</b> for <b>BFY51</b> and <b>BFY52</b> $I_C = 1\text{ A}$ $I_B = 0.1\text{ A}$ for <b>BFY50</b> for <b>BFY51</b> and <b>BFY52</b>		0.14 0.14 0.7 0.7	0.2 0.35 1 1.6	V V V V
$V_{BE(sat)}^*$	Base-emitter Saturation Voltage	$I_C = 150\text{ mA}$ $I_B = 15\text{ mA}$ $I_C = 1\text{ A}$ $I_B = 0.1\text{ A}$		0.95 1.5	1.3 2	V V
$h_{FE}^*$	DC Current Gain	for <b>BFY50</b> $I_C = 10\text{ mA}$ $V_{CE} = 10\text{ V}$ $I_C = 150\text{ mA}$ $V_{CE} = 10\text{ V}$ $I_C = 1\text{ A}$ $V_{CE} = 10\text{ V}$ for <b>BFY51</b> $I_C = 10\text{ mA}$ $V_{CE} = 10\text{ V}$ $I_C = 150\text{ mA}$ $V_{CE} = 10\text{ V}$ $I_C = 1\text{ A}$ $V_{CE} = 10\text{ V}$ for <b>BFY52</b> $I_C = 10\text{ mA}$ $V_{CE} = 10\text{ V}$ $I_C = 150\text{ mA}$ $V_{CE} = 10\text{ V}$ $I_C = 1\text{ A}$ $V_{CE} = 10\text{ V}$	20 30 15 30 40 15 30 60 15	40 55 30 55 70 40 80 130 60		
$h_{fe}$	Small Signal Current Gain	$V_{CE} = 6\text{ V}$ $f = 1\text{ kHz}$ $I_C = 1\text{ mA}$  for <b>BFY50</b> for <b>BFY51</b> for <b>BFY52</b>  $I_C = 10\text{ mA}$  for <b>BFY50</b> for <b>BFY51</b> for <b>BFY52</b>		25 30 40 45 60 120		

\* Pulsed : pulse duration = 300  $\mu\text{s}$ , duty cycle = 1 %.

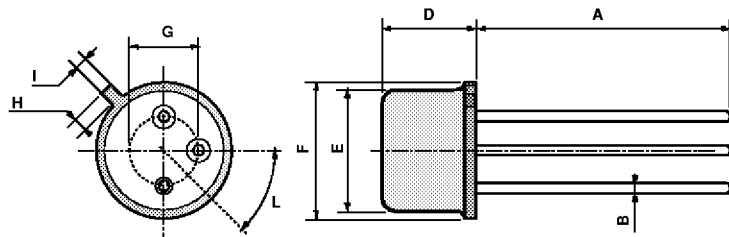
**ELECTRICAL CHARACTERISTICS** (continued)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$f_T$	Transition Frequency	$I_C = 50 \text{ mA}$ $V_{CE} = 10 \text{ V}$ for <b>BFY50</b> for <b>BFY51</b> for <b>BFY52</b>	60 50 50	100 110 120		MHz MHz MHz
$C_{CBO}$	Collector-base Capacitance	$I_E = 0$ $V_{CB} = 10 \text{ V}$ $f = 1 \text{ MHz}$		10		pF
$h_{ie}$	Input Impedance	$I_C = 10 \text{ mA}$ $V_{CE} = 5 \text{ V}$ $f = 1 \text{ kHz}$ for <b>BFY50</b> for <b>BFY51</b> for <b>BFY52</b>		180 220 400		$\Omega$ $\Omega$ $\Omega$
$h_{re}$	Reverse Voltage Ratio	$I_C = 10 \text{ mA}$ $V_{CE} = 5 \text{ V}$ $f = 1 \text{ kHz}$ for <b>BFY50</b> for <b>BFY51</b> for <b>BFY52</b>		$55 \times 10^{-6}$ $70 \times 10^{-6}$ $130 \times 10^{-6}$		
$h_{oe}$	Output Admittance	$I_C = 10 \text{ mA}$ $V_{CE} = 5 \text{ V}$ $f = 1 \text{ kHz}$ for <b>BFY50</b> for <b>BFY51</b> for <b>BFY52</b>		30 35 70		$\mu S$ $\mu S$ $\mu S$
$t_d$	Delay Time	$I_C = 150 \text{ mA}$ $V_{CC} = 10 \text{ V}$ $I_{B1} = 15 \text{ mA}$ $V_{BE} = -2 \text{ V}$		15		ns
$t_r$	Rise Time	$I_C = 150 \text{ mA}$ $V_{CC} = 10 \text{ V}$ $I_{B1} = 15 \text{ mA}$ $V_{BE} = -2 \text{ V}$		40		ns
$t_s$	Storage Time	$I_C = 150 \text{ mA}$ $V_{CC} = 10 \text{ V}$ $I_{B1} = -I_{B2} = 15 \text{ mA}$		300		ns
$t_f$	Fall Time	$I_C = 150 \text{ mA}$ $V_{CC} = 10 \text{ V}$ $I_{B1} = -I_{B2} = 15 \text{ mA}$		60		ns

\* Pulsed : pulse duration = 300  $\mu s$ , duty cycle = 1 %.

TO39 MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	12.7			0.500		
B			0.49			0.019
D			6.6			0.260
E			8.5			0.334
F			9.4			0.370
G	5.08			0.200		
H			1.2			0.047
I			0.9			0.035
L	45° (typ.)					



P008B

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