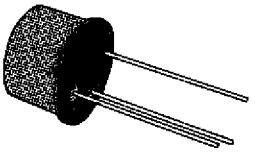
SGS-THOMSON MICROELECTRONICS

BFY50-BFY51 BFY52

MEDIUM-POWER AMPLIFIERS

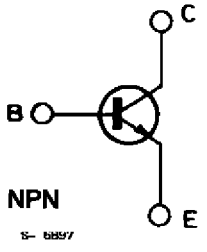
DESCRIPTION

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 $T_{amb} \leq 25$ °C at $T_{case} \leq 25$ °C	0.8 W 5 W		
T_{stg}, T_j	Storage and Junction Temperature	– 65 to 200 °C		

THERMAL DATA

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

ELECTRICAL CHARACTERISTICS (T_{case} = 25 °C unless otherwise specified)

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

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

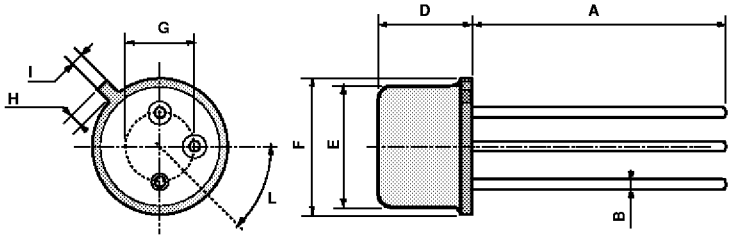
ELECTRICAL CHARACTERISTICS (continued)

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
f_T	Transition Frequency	I_C = 50 mA	V_{CE} = 10 V				
			for **BFY50**	60	100		MHz
			for **BFY51**	50	110		MHz
			for **BFY52**	50	120		MHz
C_{CBO}	Collector-base Capacitance	I_E = 0 f = 1 MHz	V_{CB} = 10 V		10		pF
h_{ie}	Input Impedance	I_C = 10 mA f = 1 kHz	V_{CE} = 5 V				
			for **BFY50**		180		Ω
			for **BFY51**		220		Ω
			for **BFY52**		400		Ω
h_{re}	Reserve Voltage Ratio	I_C = 10 mA f = 1 kHz	V_{CE} = 5 V				
			for **BFY50**		$55x10^{-6}$		
			for **BFY51**		$70x10^{-6}$		
			for **BFY52**		$130x10^{-6}$		
h_{oe}	Output Admittance	I_C = 10 mA f = 1 kHz	V_{CE} = 5 V				
			for **BFY50**		30		μS
			for **BFY51**		35		μS
			for **BFY52**		70		μS
t_d	Delay Time	I_C = 150 mA I_{B1} = 15 mA	V_{CC} = 10 V V_{BE} = – 2 V		15		ns
t_r	Rise Time	I_C = 150 mA I_{B1} = 15 mA	V_{CC} = 10 V V_{BE} = – 2 V		40		ns
t_s	Storage Time	I_C = 150 mA I_{B1} = – I_{B2} = 15 mA	V_{CC} = 10 V		300		ns
t_f	Fall Time	I_C = 150 mA I_{B1} = – I_{B2} = 15 mA	V_{CC} = 10 V		60		ns

* Pulsed : pulse duration = 300 μs, duty cyde = 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^{o} (typ.)					



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