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November 2014

FMBM5551

NPN General-Purpose Amplifier

Features

- This device has matched dies
- Sourced from process 16
- See MMBT5551 for characteristics

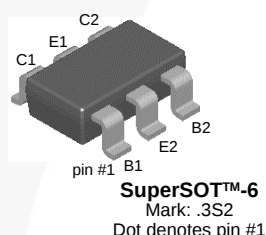


Figure 1. Device Package

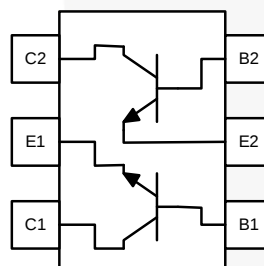


Figure 2. Internal Connection

Ordering Information

Part Number	Top Mark	Package	Packing Method
FMBM5551	3S2	SSOT 6L	Tape and Reel

Absolute Maximum Ratings

Stresses exceeding the absolute maximum ratings may damage the device. The device may not function or be operable above the recommended operating conditions and stressing the parts to these levels is not recommended. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only. Values are at $T_A = 25^\circ\text{C}$ unless otherwise noted.

Symbol	Parameter	Value	Unit
V_{CEO}	Collector-Emitter Voltage	160	V
V_{CBO}	Collector-Base Voltage	180	V
V_{EBO}	Emitter-Base Voltage	6	V
I_C	Collector Current (DC)	600	mA
T_J	Junction Temperature	150	$^\circ\text{C}$
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ\text{C}$

Thermal Characteristics^{(1), (2)}

Values are at $T_A = 25^\circ\text{C}$ unless otherwise noted.

Symbol	Parameter	Value	Unit
P_D	Power Dissipation ($T_C = 25^\circ\text{C}$)	0.7	W
	Derate Above 25°C	5.6	mW/ $^\circ\text{C}$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	180	$^\circ\text{C/W}$

Notes:

- P_D total, for both transistors. For each transistor, $P_D = 350$ mW.
- PCB size: FR-4, 76 mm x 114 mm x 1.57 mm (3.0 inch x 4.5 inch x 0.062 inch) with minimum land pattern size.

Electrical Characteristics

Values are at $T_A = 25^\circ\text{C}$ unless otherwise noted.

Symbol	Parameter	Conditions	Min.	Max.	Unit
BV_{CEO}	Collector-Emitter Breakdown Voltage	$I_C = 1$ mA, $I_B = 0$	160		V
BV_{CBO}	Collector-Base Breakdown Voltage	$I_C = 100$ μA , $I_E = 0$	180		V
BV_{EBO}	Emitter-Base Breakdown Voltage	$I_E = 10$ μA , $I_C = 0$	6		V
I_{CBO}	Collector Cut-Off Current	$V_{CB} = 120$ V, $I_E = 0$		50	nA
		$V_{CB} = 120$ V, $I_E = 0$, $T_A = 100^\circ\text{C}$		50	μA
I_{EBO}	Emitter Cut-Off Current	$V_{EB} = 4$ V, $I_C = 0$		50	nA
h_{FE1}	DC Current Gain	$V_{CE} = 5$ V, $I_C = 1$ mA	80		
DIVID1	Variation Ratio of h_{FE1} Between Die 1 and Die 2	$h_{FE1}(\text{Die1}) / h_{FE1}(\text{Die2})$	0.9	1.1	
h_{FE2}	DC Current Gain	$V_{CE} = 5$ V, $I_C = 10$ mA	80	250	
DIVID2	Variation Ratio of h_{FE2} Between Die 1 and Die 2	$h_{FE2}(\text{Die1}) / h_{FE2}(\text{Die2})$	0.95	1.05	
h_{FE3}	DC Current Gain	$V_{CE} = 5$ V, $I_C = 50$ mA	30		
DIVID3	Variation Ratio of h_{FE3} Between Die 1 and Die 2	$h_{FE3}(\text{Die1}) / h_{FE3}(\text{Die2})$	0.9	1.1	
$V_{CE}(\text{sat})$	Collector-Emitter Saturation Voltage	$I_C = 10$ mA, $I_B = 1$ mA		0.15	V
		$I_C = 50$ mA, $I_B = 5$ mA		0.20	
$V_{BE}(\text{sat})$	Base-Emitter Saturation Voltage	$I_C = 10$ mA, $I_B = 1$ mA		1	V
		$I_C = 50$ mA, $I_B = 5$ mA		1	
$V_{BE}(\text{on})$	Base-Emitter On Voltage	$V_{CE} = 5$ V, $I_C = 10$ mA		1	V
DEL	Difference of $V_{BE}(\text{on})$ Between Die1 and Die 2	$V_{BE}(\text{on})(\text{Die1}) - V_{BE}(\text{on})(\text{Die2})$	-8	8	mV
C_{ob}	Output Capacitance	$V_{CB} = 10$ V, $I_E = 0$, $f = 1$ MHz		6	pF
C_{ib}	Input Capacitance	$V_{EB} = 0.5$ V, $I_C = 0$, $f = 1$ MHz		20	pF
f_T	Current Gain Bandwidth Product	$V_{CE} = 10$ V, $I_C = 10$ mA, $f = 100$ MHz	100	300	MHz
NF	Noise Figure	$V_{CE} = 5$ V, $I_C = 200$ μA , $f = 1$ MHz, $R_S = 20$ k Ω , $B = 200$ Hz		8	dB
h_{fe}	Small Signal Current Gain	$V_{CE} = 10$ V, $I_C = 1.0$ mA, $f = 10$ kHz	50	250	

Typical Performance Characteristics

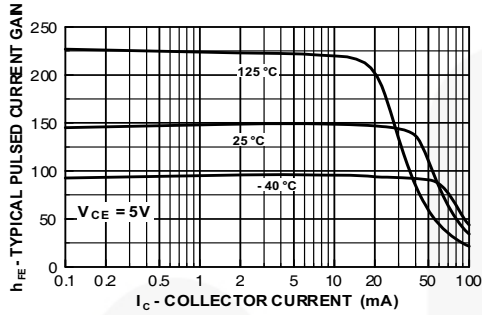


Figure 3. Typical Pulsed Current Gain vs. Collector Current

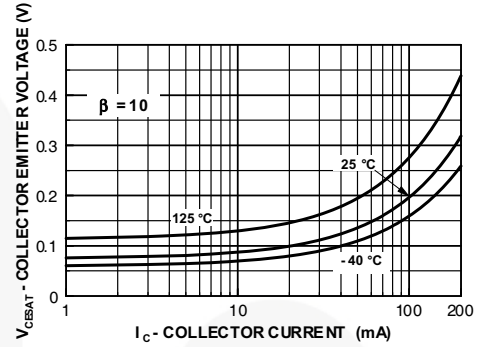


Figure 4. Collector-Emitter Saturation Voltage vs. Collector Current

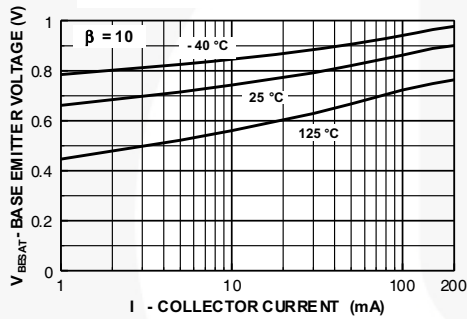


Figure 5. Base-Emitter Saturation Voltage vs. Collector Current

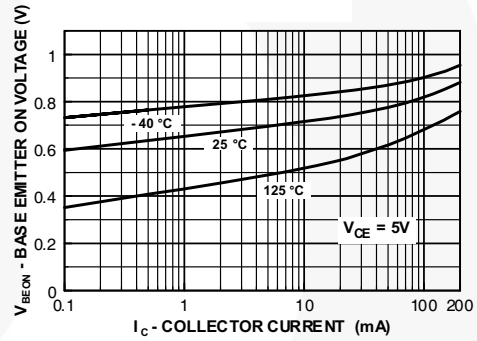


Figure 6. Base-Emitter On Voltage vs. Collector Current

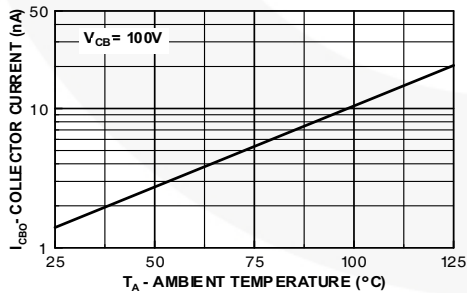


Figure 7. Collector Cut-Off Current vs. Ambient Temperature

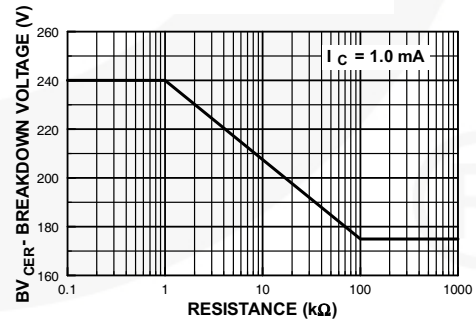


Figure 8. Collector-Emitter Breakdown Voltage with Resistance Between Emitter-Base

Typical Performance Characteristics (Continued)

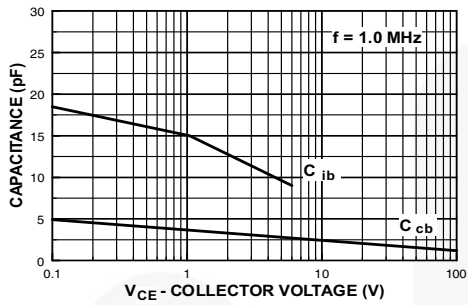


Figure 9. Input and Output Capacitance vs. Reverse Voltage

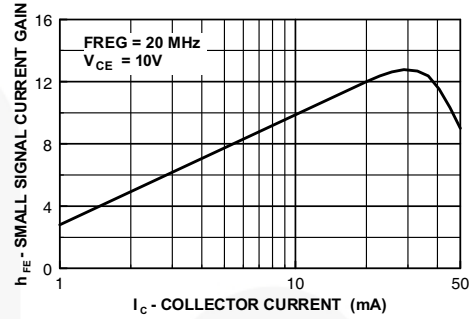


Figure 10. Small Signal Current Gain vs. Collector Current

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