MMBT3904LP

NPN low $V_{CE(sat)}$ BISS transistor

General Description

The MMBT3904LP combination of 60V/0.2A NPN low $V_{CE(sat)}$ Breakthrough In Small Signal (BISS) transistor. it is ideal for use in small power amplifiers and switch applications.

Specification Features

Supper high density cell design

High collector current capability:I_C=0.2A

igh energy efficiency due to less heat generation

High Power and current handing capability

Low $V_{CE(sat)}$:0.3V@I_C=50mA,I_B=5mA

Application

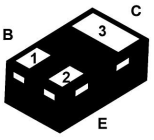
Charging circuits

Load Switching for portable device

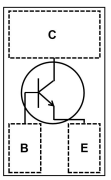
Power management

PWM applications

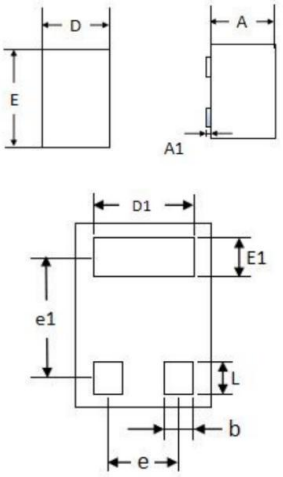
Power switches (e.g. motors, fans)



DFN1006-3L(Pb-Free)



Schematic Diagram



DFN1006-3L

	Millimeters			Inches		
	Min. (mm)	Typ. (mm)	Max. (mm)	Min. (mm)	Typ. (mm)	Max. (mm)
A	0.45	0.50	0.55	0.018	0.020	0.022
A1	0.00	-	0.05	0.000	-	0.002
D	0.55	0.60	0.65	0.022	0.024	0.026
E	0.95	1.00	1.05	0.037	0.039	0.041
D1	0.45	0.50	0.55	0.018	0.020	0.022
E1	0.20	0.25	0.30	0.008	0.010	0.012
L	0.20	0.25	0.30	0.008	0.010	0.012
b	0.10	0.15	0.20	0.003	0.005	0.007
e	0.35BSC			0.013BSC		
e1	0.65BSC			0.026BSC		

Absolute Maximum Ratings(T_J =25℃)

Rating	Symbol	Min.	Max.	Unit
Collector-base voltage	V_{CBO}		60	V
Collector-emitter voltage	V_{CEO}		40	V
Emitter-base voltage	V_{EBO}		6	V
Collector current (DC)	I_C		200	mA
Collector Power Dissipation	P_C		400	mW
Storage Temperature Range	T_J		+150	℃
Junction Temperature Range	T_{STG}	-55	+150	℃
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$		310	℃/W

Note :Repetitive Rating: Pulse width limited by maximum junction temperature

MMBT3904LP

Electrical Characteristics(T_J =25℃)

Parameter	Symbol	Conditions	Min.	Max.	Units
Collector-base Breakdown Voltage	$V_{BR(CBO)}$	I_C=10μA,I_E=0	60		V
Collector-emitter Breakdown Voltage	$V_{(BR)CEO}$	I_C=10mA,I_B=0	40		V
Emitter-base Breakdown Voltage	$V_{(BR)EBO}$	I_E=10μA,I_C=0	6		V
Collector Cut-off Current	I_{CEX}	V_{CE}=30V, $V_{EB(off)}$=3V		50	nA
Base Cut-off Current	I_{BL}	V_{CE}=30V, $V_{EB(off)}$=3V		50	nA
DC current gain	$H_{FE(1)}$	V_{CE}=1V,I_C=0.1mA	40		
	$H_{FE(2)}$	V_{CE}=1V,I_C=1mA	70		
	$H_{FE(3)}$	V_{CE}=1V,I_C=10mA	100	300	
	$H_{FE(4)}$	V_{CE}=1V,I_C=50mA	60		
	$H_{FE(5)}$	V_{CE}=1V,I_C=100mA	30		
Collector-emitter Saturation Voltage	$V_{CE(sat)1}$	I_C=10mA, I_B=1mA		0.2	V
	$V_{CE(sat)2}$	I_C=50mA, I_B=5mA		0.3	V
Base-emitter Saturation Voltage	$V_{BE(sat)1}$	I_C=10mA,I_B=1mA	0.65	0.85	V
	$V_{BE(sat)2}$	I_C=50mA, I_B=5mA		0.95	V
Transition frequency	F_T	I_C=10mA,V_{CE}=20V; f=100MHz	300		MHz
Collector Output Capacitance	Cob	I_E=0,V_{CB}=5V,f= 1MHz		4	pF
Base Iutput Capacitance	Cib	I_C=0,V_{EB}=0.5V, f= 1MHz		8.5	pF
Delay Time	t_d	V_{CC}= 3V, $V_{BE(off)}$=0.5V, I_C=10mA, I_{B1}=1mA		35	ns
Rise Time	t_r			35	ns
Storage time	t_S	V_{CC}=3V, I_C=10mA, I_{B1}=I_{B2}=1mA		200	ns
Fall Time	t_f			50	ns

Note :Repetitive Rating: Pulse width limited by maximum junction temperature

RATING AND CHARACTERISTIC CURVES (MMBT3904LP)

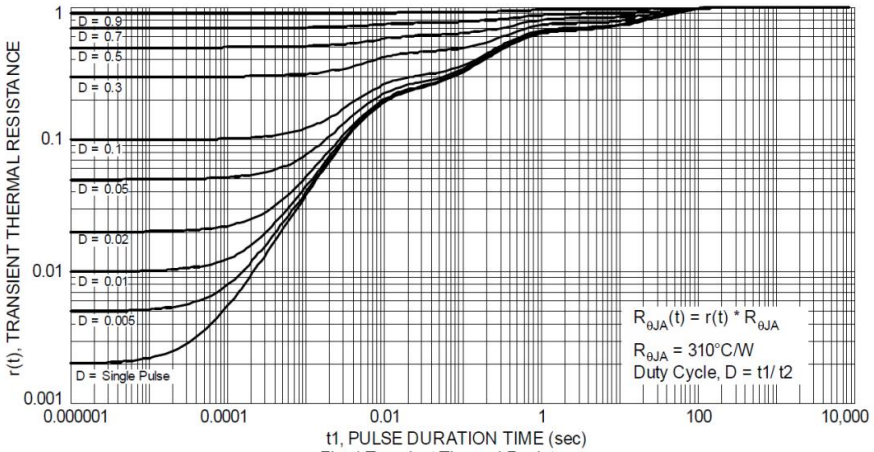


Fig. 1 Transient Thermal Resistance

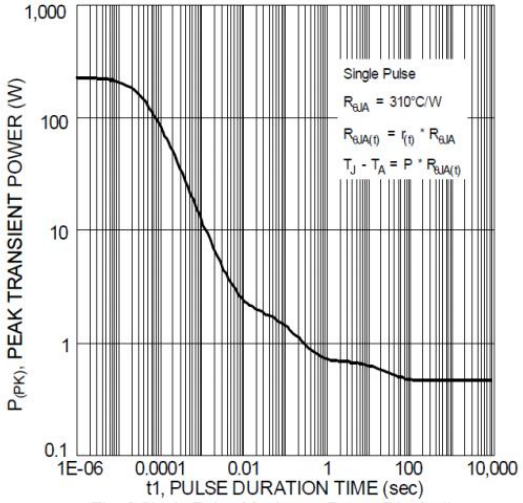


Fig. 2 Single Pulse Maximum Power Dissipation

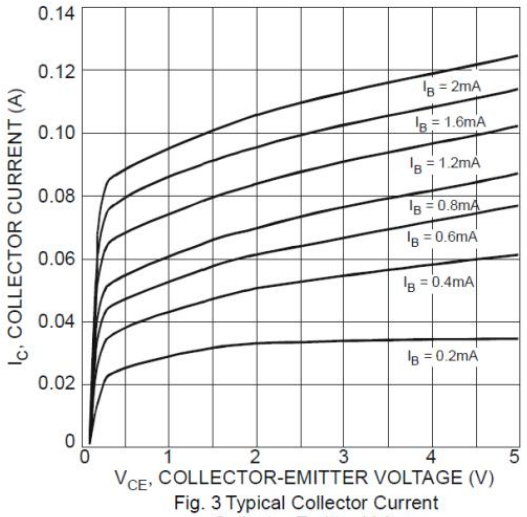


Fig. 3 Typical Collector Current
vs. Collector-Emitter Voltage

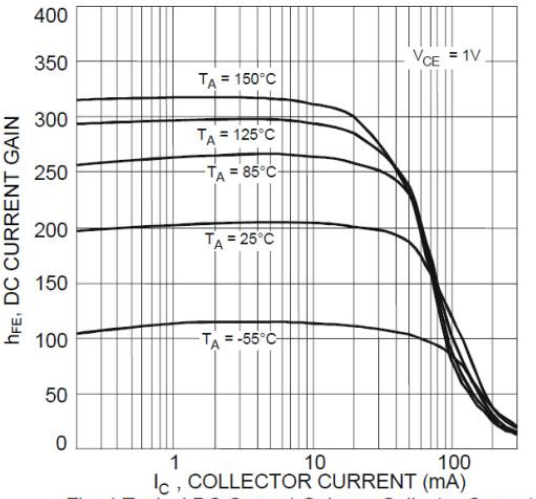


Fig. 4 Typical DC Current Gain vs. Collector Current

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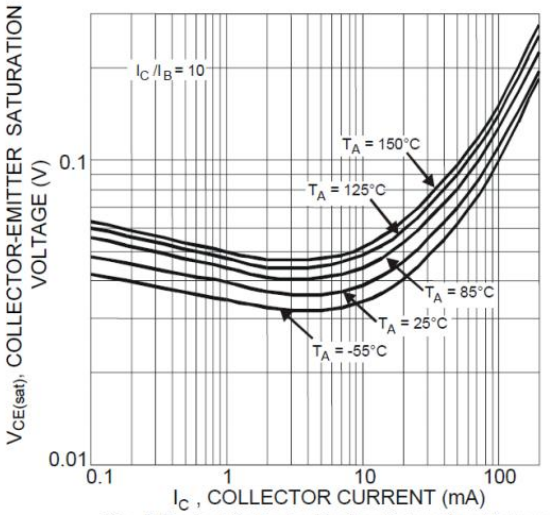

Fig. 5 Typical Collector-Emitter Saturation Voltage vs. Collector Current

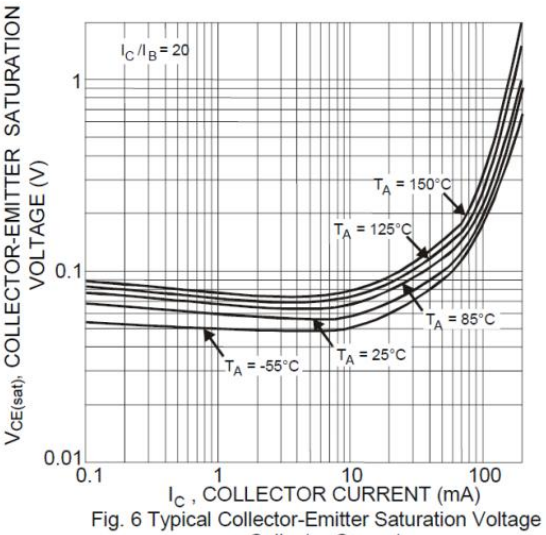

Fig. 6 Typical Collector-Emitter Saturation Voltage vs. Collector Current

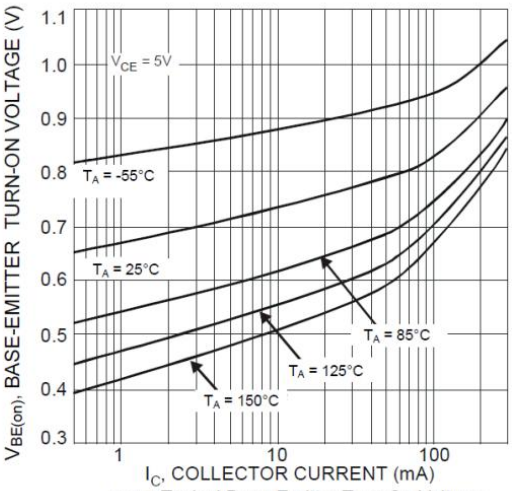

Fig. 7 Typical Base-Emitter Turn-On Voltage vs. Collector Current

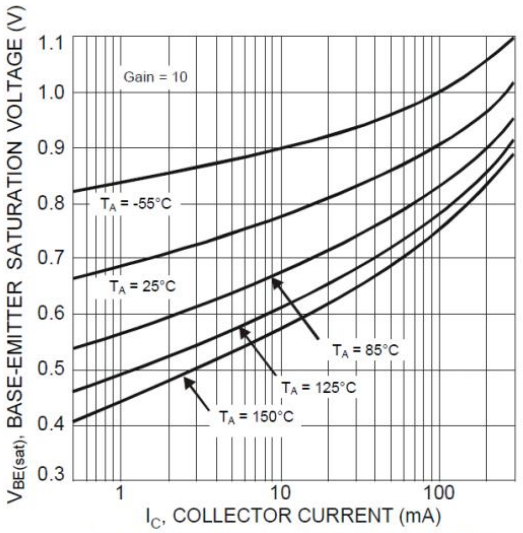

Fig. 8 Typical Base-Emitter Saturation Voltage vs. Collector Current