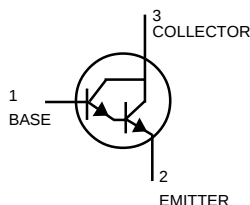


Darlington Transistors

NPN Silicon



MMBT6427LT1



CASE 318-08, STYLE 6
SOT-23 (TO-236AB)

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V_{CEO}	40	Vdc
Collector-Base Voltage	V_{CBO}	40	Vdc
Emitter-Base Voltage	V_{EBO}	12	Vdc
Collector Current — Continuous	I_C	500	mAdc

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Total Device Dissipation FR-5 Board, (1) $T_A = 25^\circ\text{C}$	P_D	225	mW
Derate above 25°C		1.8	mW/ $^\circ\text{C}$
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	556	$^\circ\text{C/W}$
Total Device Dissipation Alumina Substrate, (2) $T_A = 25^\circ\text{C}$	P_D	300	mW
Derate above 25°C		2.4	mW/ $^\circ\text{C}$
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	417	$^\circ\text{C/W}$
Junction and Storage Temperature	T_J, T_{stg}	-55 to +150	$^\circ\text{C}$

DEVICE MARKING

MMBT6427LT1 = 1V

ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise noted.)

Characteristic	Symbol	Min	Max	Unit
----------------	--------	-----	-----	------

OFF CHARACTERISTICS

Collector-Emitter Breakdown Voltage(3) ($I_C = 10 \text{ mAdc}, V_{BE} = 0$)	$V_{(BR)CEO}$	40	—	Vdc
Collector-Base Breakdown Voltage ($I_C = 100 \mu\text{Adc}, I_E = 0$)	$V_{(BR)CBO}$	40	—	Vdc
Emitter-Base Breakdown Voltage ($I_E = 10 \mu\text{Adc}, I_C = 0$)	$V_{(BR)EBO}$	12	—	Vdc
Collector Cutoff Current ($V_{CE} = 25\text{Vdc}, I_B = 0$)	I_{CES}	—	1.0	μAdc
Collector Cutoff Current ($V_{CB} = 30\text{Vdc}, I_E = 0$)	I_{CBO}	—	50	nAdc
Emitter Cutoff Current ($V_{EB} = 10\text{Vdc}, I_C = 0$)	I_{EBO}	—	50	nAdc

1. FR-5 = 1.0 x 0.75 x 0.062 in.

2. Alumina = 0.4 x 0.3 x 0.024 in. 99.5% alumina.

MMBT6427LT1

ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise noted) (Continued)

Characteristic	Symbol	Min	Max	Unit
----------------	--------	-----	-----	------

ON CHARACTERISTICS

DC Current Gain ($I_C = 10\text{ mAdc}$, $V_{CE} = 5.0\text{ Vdc}$)	h_{FE}	10,000	100,000	—
($I_C = 100\text{ mAdc}$, $V_{CE} = 5.0\text{ Vdc}$)		20,000	200,000	
($I_C = 500\text{ mAdc}$, $V_{CE} = 5.0\text{ Vdc}$)		14,000	140,000	
Collector-Emitter Saturation Voltage ($I_C = 50\text{ mAdc}$, $I_B = 0.5\text{ mAdc}$)	$V_{CE(sat)}(3)$	—	1.2	Vdc
($I_C = 500\text{ mAdc}$, $I_B = 0.5\text{ mAdc}$)		—	1.5	
Base-Emitter Saturation Voltage ($I_C = 500\text{ mAdc}$, $I_B = 0.5\text{ mAdc}$)	$V_{BE(sat)}$	—	2.0	Vdc
Base-Emitter On Voltage ($I_C = 50\text{ mAdc}$, $V_{CE} = 5.0\text{ Vdc}$)	$V_{BE(on)}$	—	1.75	Vdc

SMALL-SIGNAL CHARACTERISTICS

Output Capacitance ($V_{CB} = 10\text{ Vdc}$, $I_E = 0$, $f = 1.0\text{ MHz}$)	C_{obo}	—	7.0	pF
Input Capacitance ($V_{EB} = 0.5\text{ Vdc}$, $I_C = 0$, $f = 1.0\text{ MHz}$)	C_{ibo}	—	15	pF
Current Gain-High Frequency ($V_{CE} = 5.0\text{ Vdc}$, $I_C = 10\text{ mAdc}$, $f = 100\text{ MHz}$)	$ h_{fe} $	1.3	—	Vdc
Noise Finure ($V_{CE} = 5.0\text{ Vdc}$, $I_C = 1.0\text{ mAdc}$, $R_S = 100\text{ k}\Omega$, $f = 1.0\text{ kHz}$)	NF	—	10	dB

3. **Pulse Tent:** Pulse Width = 300 μs , Duty Cycle = 2.0%

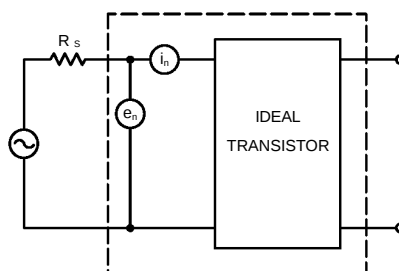


Figure 1. Transistor Noise Model

MMBT6427LT1

NOISE CHARACTERISTICS

($V_{CE} = 5.0 \text{ Vdc}$, $T_A = 25^\circ\text{C}$)

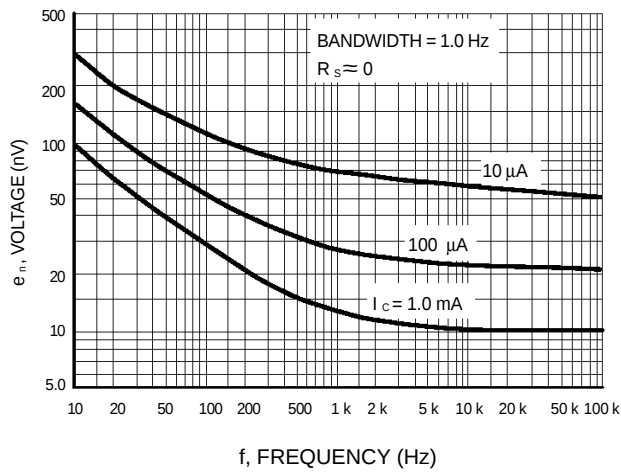


Figure 2. Noise Voltage

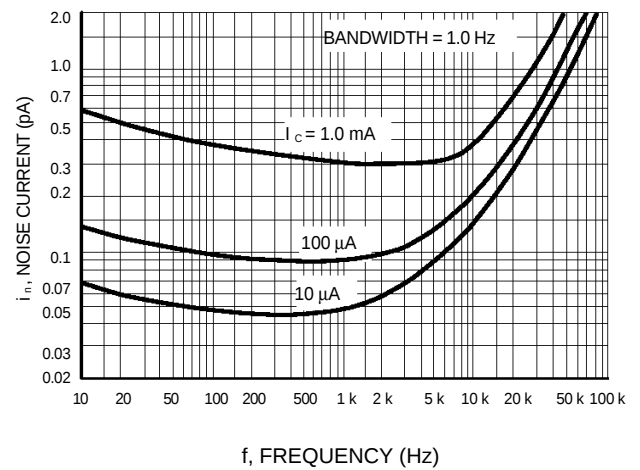


Figure 3. Noise Current

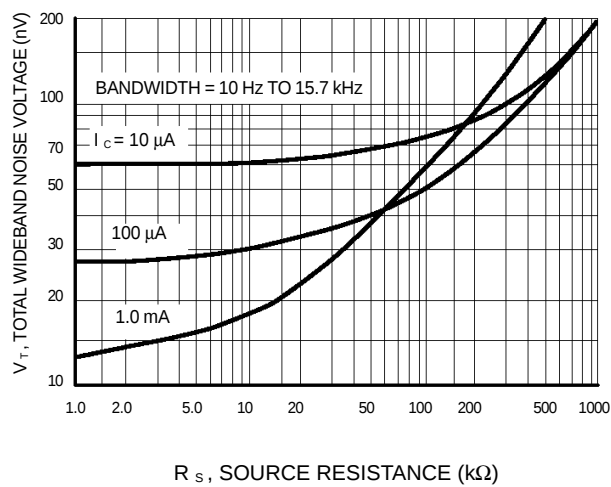


Figure 4. Total Wideband Noise Voltage

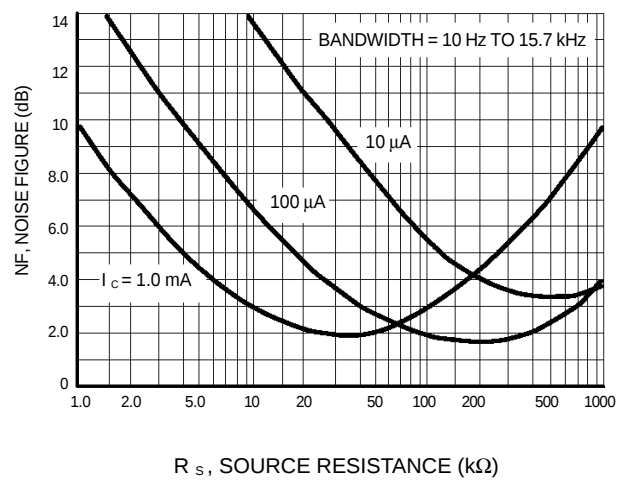


Figure 5. Wideband Noise Figure

MMBT6427LT1

SMALL-SIGNAL CHARACTERISTICS

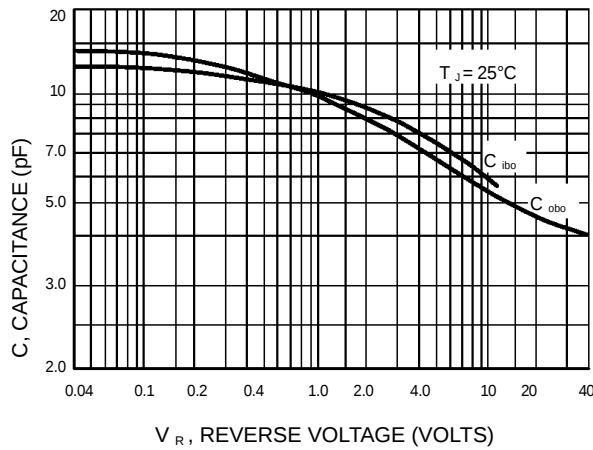


Figure 6. Capacitance

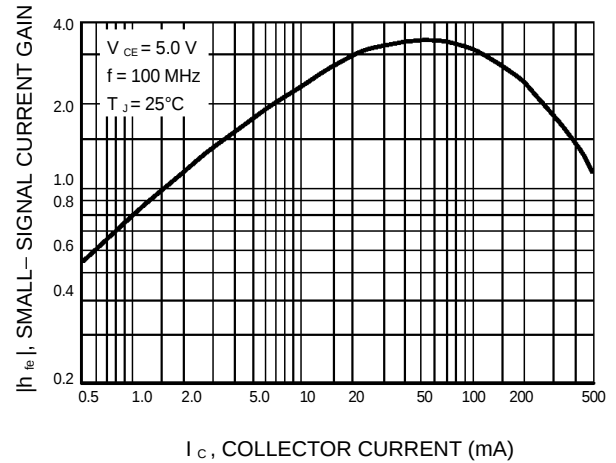


Figure 7. High Frequency Current Gain

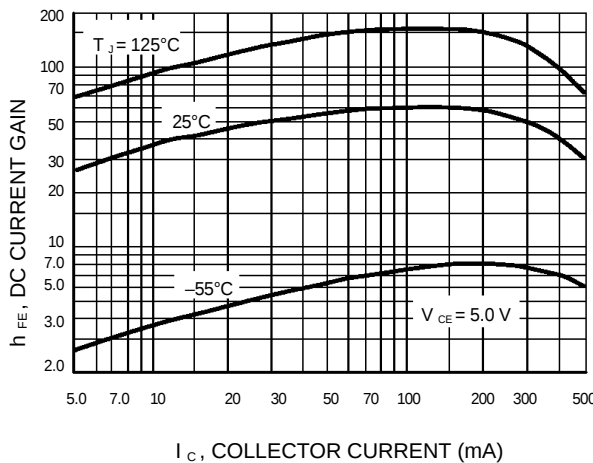


Figure 8. DC Current Gain

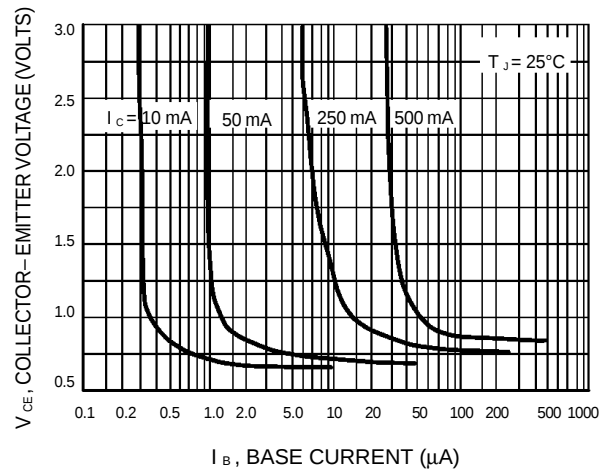


Figure 9. Collector Saturation Region

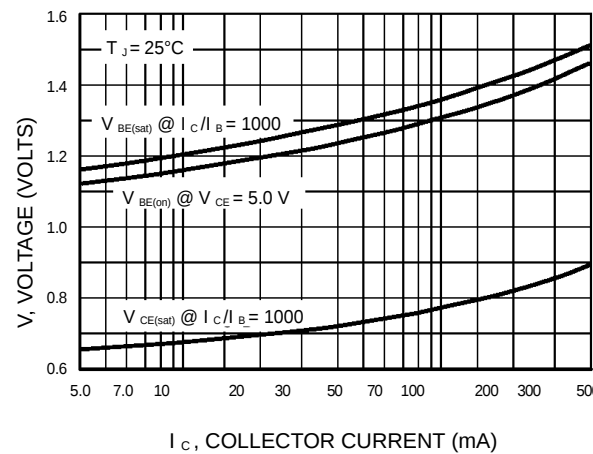


Figure 10. "On" Voltages

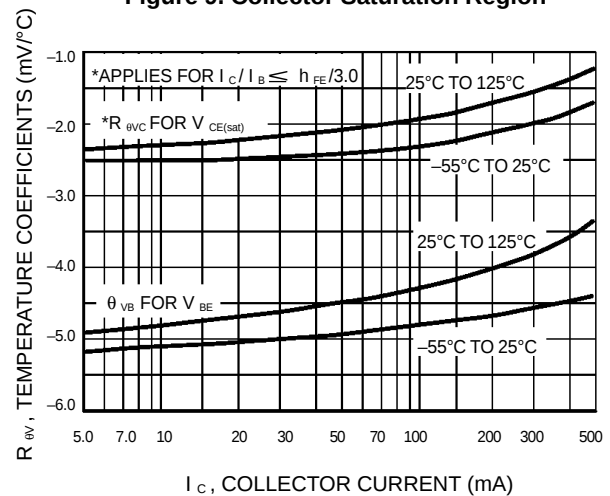


Figure 11. Temperature Coefficients

MMBT6427LT1

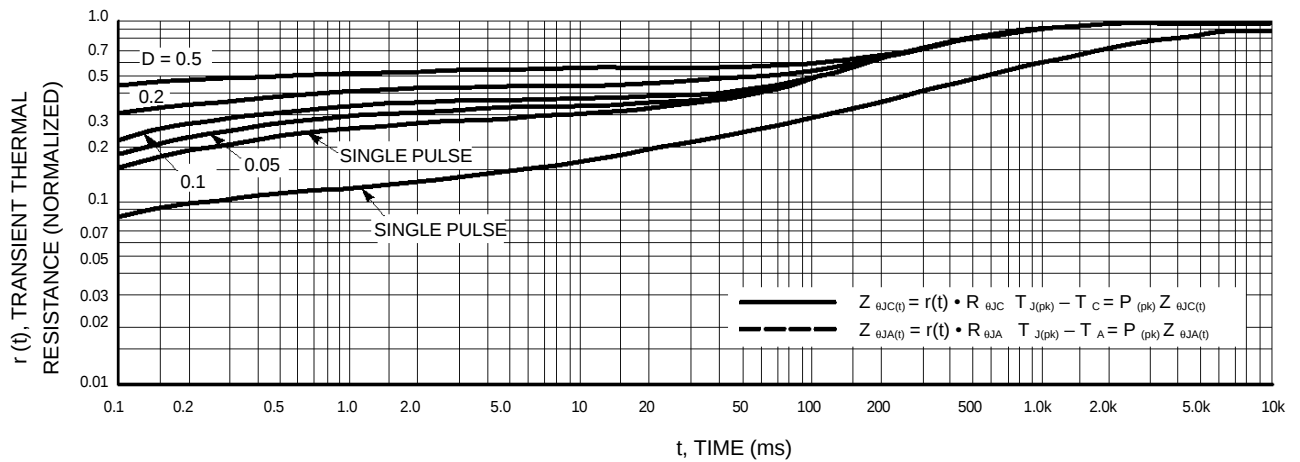
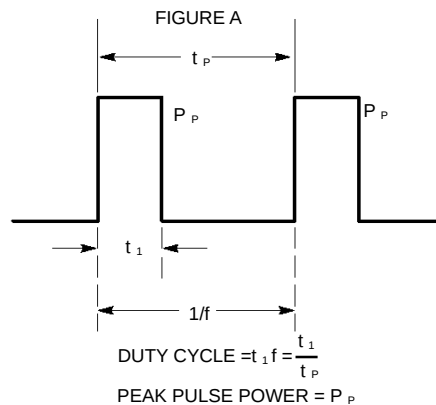


Figure 12. Thermal Response



Design Note: Use of Transient Thermal Resistance Data