

Darlington Transistors

NPN Silicon

- We declare that the material of product compliance with RoHS requirements.
- S- Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable.

Ordering Information

Device	Marking	Shipping
MBT6427 S-MBT6427	1V	3000/Tape&Reel

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, $T_A = 25^\circ\text{C}$	P_D	225	mW
Derate above 25°C		1.8	mW/ $^\circ\text{C}$
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	556	$^\circ\text{C}/\text{W}$
Total Device Dissipation Alumina Substrate, $T_A = 25^\circ\text{C}$	P_D	300	mW
Derate above 25°C		2.4	mW/ $^\circ\text{C}$
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	417	$^\circ\text{C}/\text{W}$
Junction and Storage Temperature	T_J, T_{stg}	–55 to +150	$^\circ\text{C}$

DEVICE MARKING

(S-)MBT6427= 1V

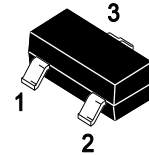
ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$)

Characteristic	Symbol	Min	Max	Unit
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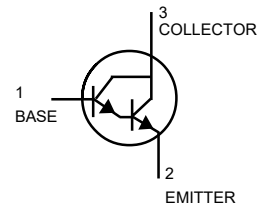
OFF CHARACTERISTICS

Collector–Emitter Breakdown Voltage ($I_C = 10\text{ mAdc}, V_{BE} = 0$)	$V_{(BR)CEO}$	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

MBT6427
S-MBT6427



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

Characteristic	Symbol	Min	Max	Unit
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ON CHARACTERISTICS

DC Current Gain ($I_C = 10\text{ mA}$, $V_{CE} = 5.0\text{ Vdc}$) ($I_C = 100\text{ mA}$, $V_{CE} = 5.0\text{ Vdc}$) ($I_C = 500\text{ mA}$, $V_{CE} = 5.0\text{ Vdc}$)	h_{FE}	10,000 20,000 14,000	100,000 200,000 140,000	—
Collector–Emitter Saturation Voltage ($I_C = 50\text{ mA}$, $I_B = 0.5\text{ mA}$) ($I_C = 500\text{ mA}$, $I_B = 0.5\text{ mA}$)	$V_{CE(sat)}(3)$	— —	1.2 1.5	Vdc
Base–Emitter Saturation Voltage ($I_C = 500\text{ mA}$, $I_B = 0.5\text{ mA}$)	$V_{BE(sat)}$	—	2.0	Vdc
Base–Emitter On Voltage ($I_C = 50\text{ mA}$, $V_{CE} = 5.0\text{ Vdc}$)	$V_{BE(on)}$	—	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 ($V_{CE} = 5.0\text{ Vdc}$, $I_C = 10\text{ mA}$, $f = 100\text{ MHz}$)	$ h_{fe} $	1.3	—	Vdc
Noise Figure ($V_{CE} = 5.0\text{ Vdc}$, $I_C = 1.0\text{ mA}$, $R_s = 100\text{ k}\Omega$, $f = 1.0\text{ kHz}$)	NF	—	10	dB

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

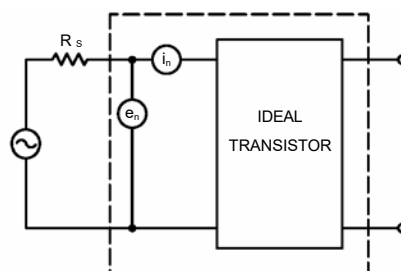


Figure 1. Transistor Noise Model



NOISE CHARACTERISTICS

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

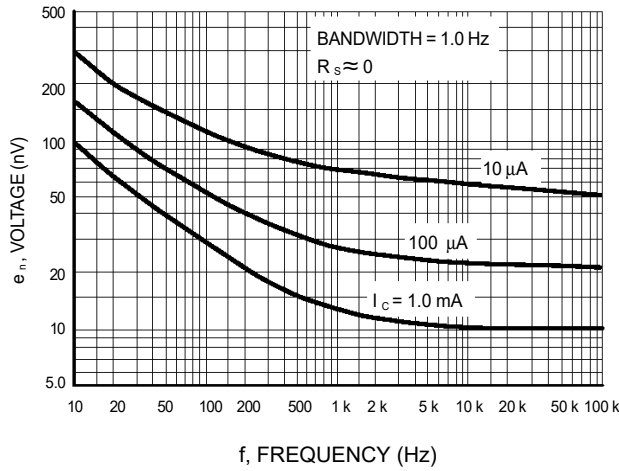


Figure 2. Noise Voltage

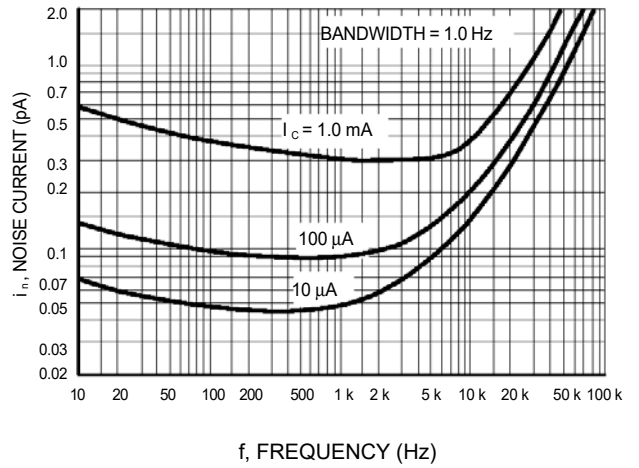


Figure 3. Noise Current

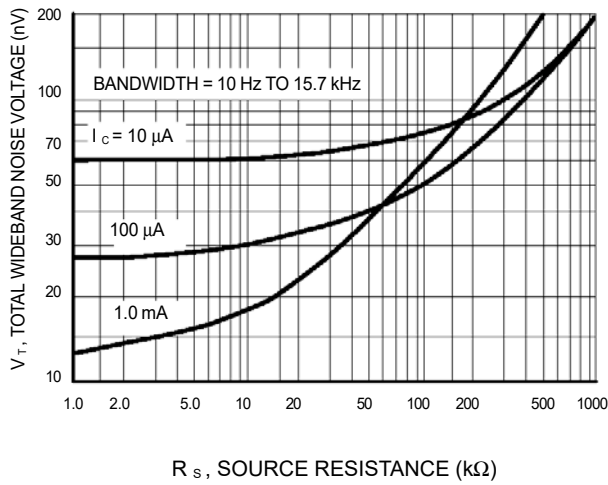


Figure 4. Total Wideband Noise Voltage

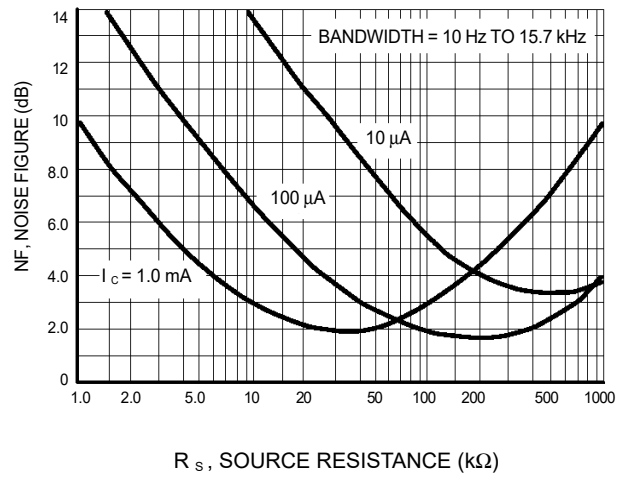


Figure 5. Wideband Noise Figure



SMALL-SIGNAL CHARACTERISTICS

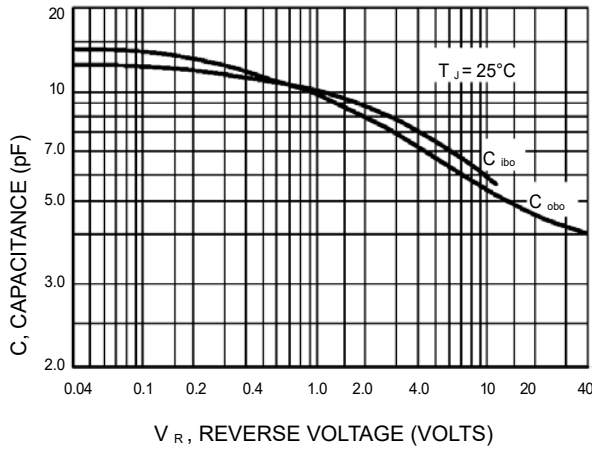


Figure 6. Capacitance

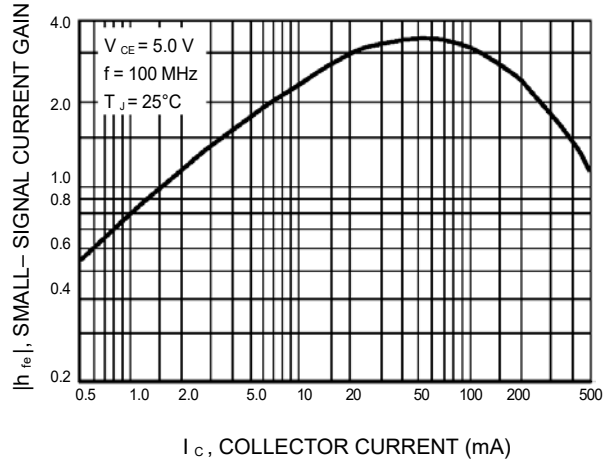


Figure 7. High Frequency Current Gain

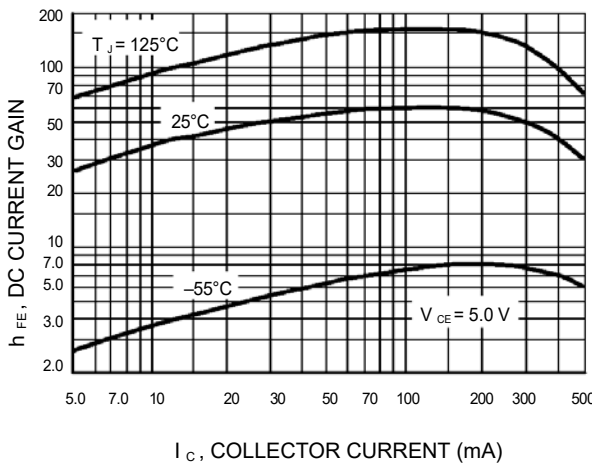


Figure 8. DC Current Gain

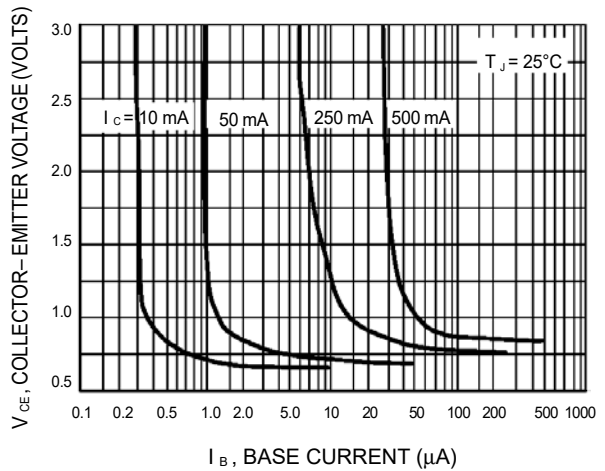


Figure 9. Collector Saturation Region

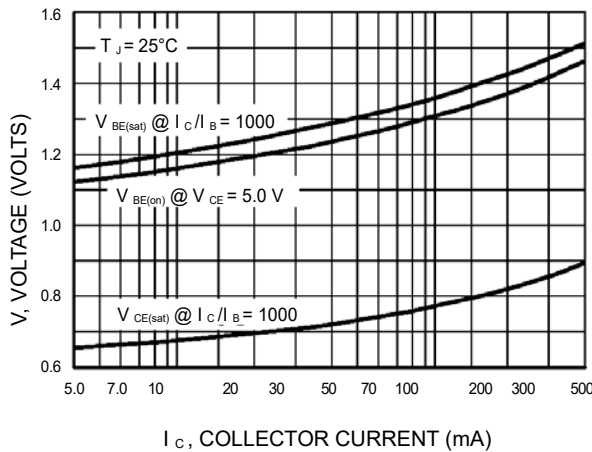


Figure 10. "On" Voltages

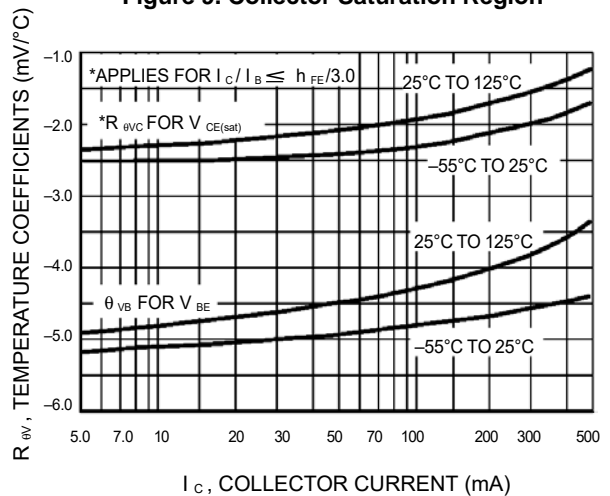


Figure 11. Temperature Coefficients



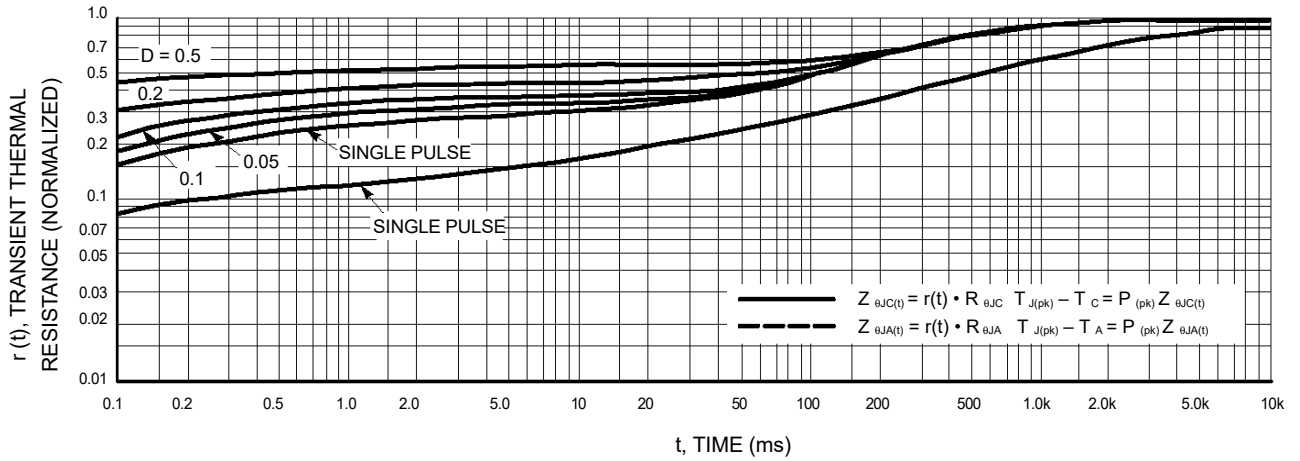
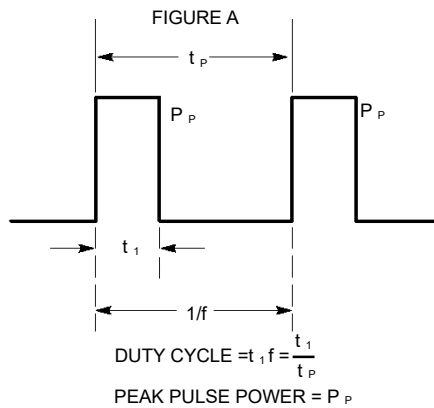


Figure 12. Thermal Response



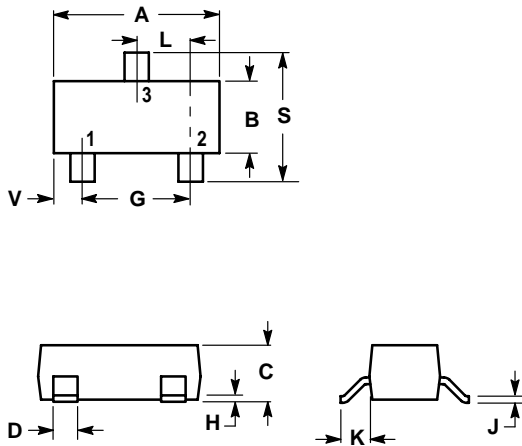
Design Note: Use of Transient Thermal Resistance Data



SOT-23

NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M,1982
2. CONTROLLING DIMENSION: INCH.



DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.1102	0.1197	2.80	3.04
B	0.0472	0.0551	1.20	1.40
C	0.0350	0.0440	0.89	1.11
D	0.0150	0.0200	0.37	0.50
G	0.0701	0.0807	1.78	2.04
H	0.0005	0.0040	0.013	0.100
J	0.0034	0.0070	0.085	0.177
K	0.0140	0.0285	0.35	0.69
L	0.0350	0.0401	0.89	1.02
S	0.0830	0.1039	2.10	2.64
V	0.0177	0.0236	0.45	0.60

