

## 350mW, PNP Small Signal Transistor

### FEATURES

- Low power loss, high efficiency
- Ideal for automated placement
- High surge current capability
- Moisture sensitivity level: level 1, per J-STD-020
- RoHS Compliant
- Halogen-free according to IEC 61249-2-21

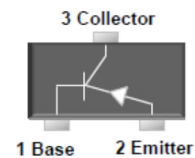
### APPLICATIONS

- Switching mode power supply (SMPS)
- Adapters
- Lighting application
- On-board DC/DC converter

### MECHANICAL DATA

- Case: SOT-23
- Molding compound meets UL 94 V-0 flammability rating
- Terminal: Matte tin plated leads, solderable per J-STD-002
- Meet JESD 201 class 1A whisker test
- Weight: 0.008g (approximately)

| KEY PARAMETERS |            |      |
|----------------|------------|------|
| PARAMETER      | VALUE      | UNIT |
| $V_{CBO}$      | -60        | V    |
| $V_{CEO}$      | -60        | V    |
| $V_{EBO}$      | -5         | V    |
| $I_C$          | -600       | mA   |
| $h_{FE}$       | 300        |      |
| Package        | SOT-23     |      |
| Configuration  | Single die |      |



| ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ unless otherwise noted) |           |             |                  |
|---|-----------|-------------|------------------|
| PARAMETER   | SYMBOL    | MMBT2907A   | UNIT             |
| Marking code on the device  |           | 2F          |                  |
| Collector-base voltage  | $V_{CBO}$ | -60         | V                |
| Collector-emitter voltage   | $V_{CEO}$ | -60         | V                |
| Emitter-base voltage  | $V_{EBO}$ | -5          | V                |
| Collector current   | $I_C$     | -600        | mA               |
| Power dissipation   | $P_D$     | 350         | mW               |
| Junction temperature  | $T_J$     | -55 to +150 | $^\circ\text{C}$ |
| Storage temperature   | $T_{STG}$ | -55 to +150 | $^\circ\text{C}$ |

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

| PARAMETER                            | CONDITIONS   | SYMBOL        | MIN | TYP | MAX  | UNIT |
|--------------------------------------|--|---------------|-----|-----|------|------|
| Collector-base breakdown voltage     | $I_C = -10 \mu\text{A}, I_E = 0$   | $V_{(BR)CBO}$ | -60 | -   | -    | V    |
| Collector-emitter breakdown voltage  | $I_C = -10 \text{mA}, I_B = 0$   | $V_{(BR)CEO}$ | -60 | -   | -    | V    |
| Emitter-base breakdown voltage       | $I_E = -10 \mu\text{A}, I_C = 0$   | $V_{(BR)EBO}$ | -5  | -   | -    | V    |
| Collector cutoff current             | $V_{CB} = -50 \text{V}, I_E = 0$   | $I_{CBO}$     | -   | -   | -20  | nA   |
| Emitter cutoff current               | $V_{CE} = -30 \text{V},$<br>$V_{BE(OFF)} = -0.5\text{V}$                         | $I_{CEX}$     | -   | -   | -50  | nA   |
| Base cut-off current                 | $V_{CE} = -30 \text{V},$<br>$V_{BE(OFF)} = -0.5\text{V}$                         | $I_B$         | -   | -   | -50  | nA   |
| DC current gain                      | $V_{CE} = -10 \text{V}, I_C = -0.1 \text{mA}$                                    | $h_{FE}$      | 75  | -   | -    |      |
|                                      | $V_{CE} = -10 \text{V}, I_C = -1 \text{mA}$                                      |               | 100 | -   | -    |      |
|                                      | $V_{CE} = -10 \text{V}, I_C = -10 \text{mA}$                                     |               | 100 | -   | -    |      |
|                                      | $V_{CE} = -10 \text{V}, I_C = -150 \text{mA}$                                    |               | 100 | -   | 300  |      |
|                                      | $V_{CE} = -10 \text{V}, I_C = -500 \text{mA}$                                    |               | 50  | -   | -    |      |
| Collector-emitter saturation voltage | $I_C = -150 \text{mA}, I_B = -15 \text{mA}$                                      | $V_{CE(sat)}$ | -   | -   | -0.4 | V    |
|                                      | $I_C = -500 \text{mA}, I_B = -50 \text{mA}$                                      |               | -   | -   | -1.6 |      |
| Base-emitter saturation voltage      | $I_C = -150 \text{mA}, I_B = -15 \text{mA}$                                      | $V_{BE(sat)}$ | -   | -   | -1.3 | V    |
|                                      | $I_C = -500 \text{mA}, I_B = -50 \text{mA}$                                      |               | -   | -   | -2.6 |      |
| Transition frequency                 | $V_{CE} = -20 \text{V}, I_C = -50 \text{mA},$<br>$f = 100\text{MHz}$             | $f_T$         | 200 | -   | -    | MHz  |
| Output capacitance                   | $f = 100\text{KHz}, V_{CB} = -10 \text{V},$<br>$I_E = 0$                         | $C_{obo}$     | -   | -   | 8    | pF   |
| Input capacitance                    | $f = 100\text{KHz}, V_{EB} = -2 \text{V},$<br>$I_C = 0$                          | $C_{ibo}$     | -   | -   | 30   | pF   |
| Delay time                           | $V_{CE} = -30\text{V}, I_{B1} = -15\text{mA},$<br>$I_C = -150\text{mA}$          | $t_d$         | -   | -   | 10   | ns   |
| Rise time                            | $V_{CE} = -30\text{V}, I_{B1} = -15\text{mA},$<br>$I_C = -150\text{mA}$          | $t_r$         | -   | -   | 40   | ns   |
| Storage time                         | $V_{CE} = -6\text{V}, I_{B1} = -I_{B2} = -15\text{mA},$<br>$I_C = -150\text{mA}$ | $t_s$         | -   | -   | 225  | ns   |
| Fall time                            | $V_{CE} = -6\text{V}, I_{B1} = -I_{B2} = -15\text{mA},$<br>$I_C = -150\text{mA}$ | $t_f$         | -   | -   | 60   | ns   |

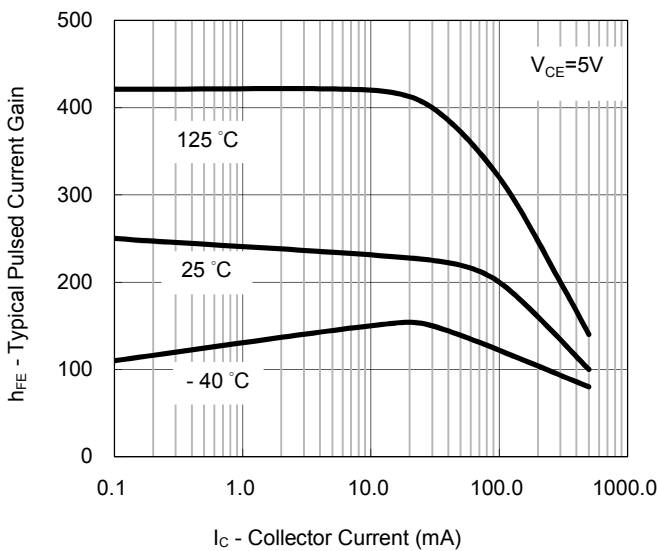
**ORDERING INFORMATION**

| ORDERING CODE | PACKAGE | PACKING      |
|---------------|---------|--------------|
| MMBT2907A RF  | SOT-23  | 3K / 7" Reel |
| MMBT2907A RFG | SOT-23  | 3K / 7" Reel |

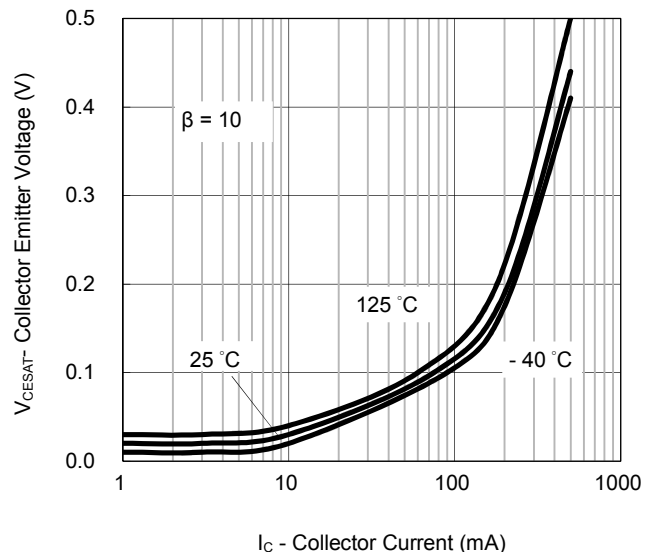
**CHARACTERISTICS CURVES**

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

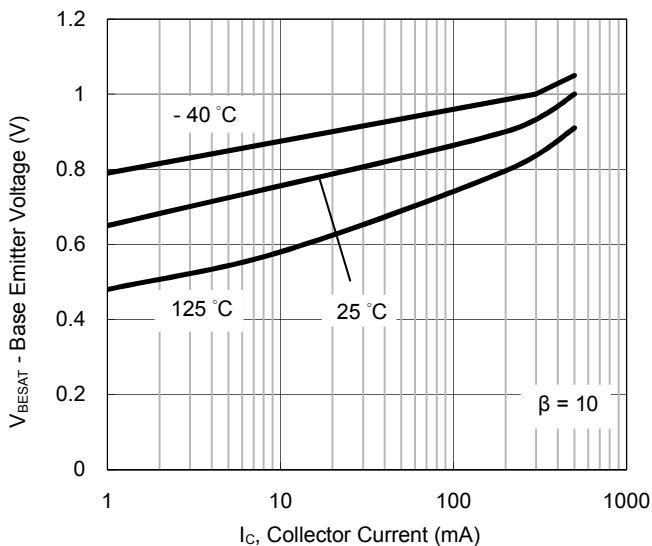
**Fig. 1 Typical Pulsed Current Gain VS. Collector Current**



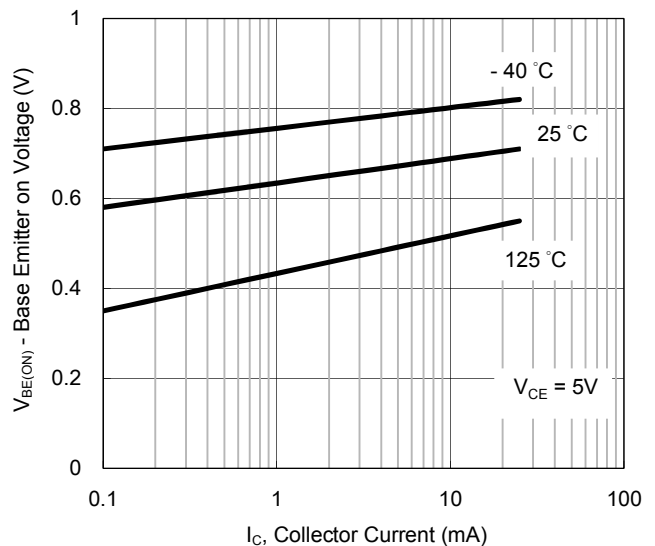
**Fig.2 Collector-Emitter Saturation Voltage VS. Collector Current**



**Fig.3 Base-Emitter Saturation Voltage VS. Collector Current**



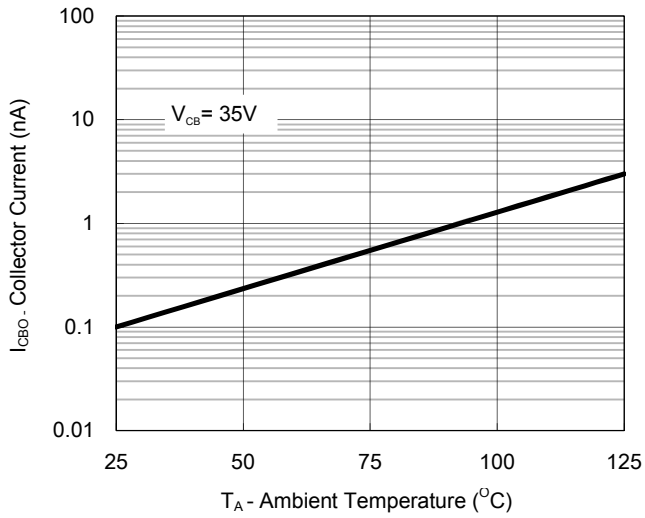
**Fig.4 Base Emitter On Voltage VS. Collector Current**



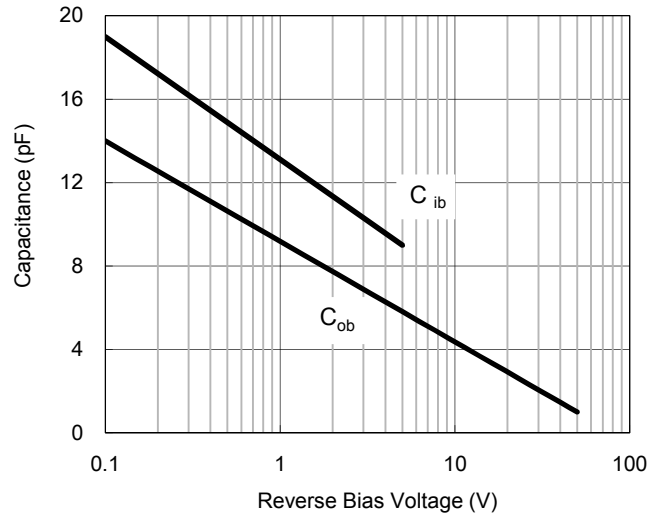
**CHARACTERISTICS CURVES**

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

**Fig.5 Collector-Cutoff Current VS. Ambient Temperature**

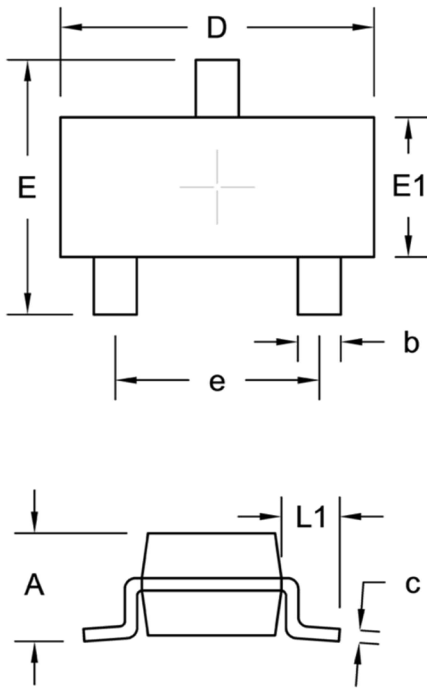


**Fig.6 Input and Output Capacitance VS. Reverse Bias Voltage**



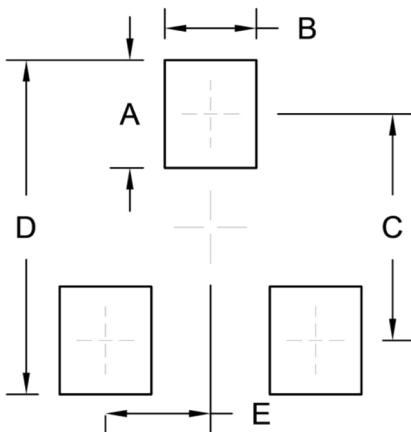
**PACKAGE OUTLINE DIMENSION**

**SOT-23**



| DIM. | Unit (mm) |      | Unit (inch) |       |
|------|-----------|------|-------------|-------|
|      | Min.      | Max. | Min.        | Max.  |
| A    | 0.89      | 1.12 | 0.035       | 0.044 |
| b    | 0.30      | 0.50 | 0.012       | 0.020 |
| c    | 0.08      | 0.20 | 0.003       | 0.008 |
| D    | 2.80      | 3.04 | 0.110       | 0.120 |
| E    | 2.10      | 2.64 | 0.083       | 0.104 |
| E1   | 1.20      | 1.40 | 0.047       | 0.055 |
| e    | 1.90 BSC  |      | 0.075 BSC   |       |
| L1   | 0.54 REF. |      | 0.021 REF.  |       |

**SUGGESTED PAD LAYOUT**



| Symbol | Unit (mm) | Unit (inch) |
|--------|-----------|-------------|
| A      | 1.00      | 0.039       |
| B      | 0.85      | 0.033       |
| C      | 2.10      | 0.083       |
| D      | 3.10      | 0.122       |
| E      | 0.98      | 0.039       |

## Notice

Specifications of the products displayed herein are subject to change without notice. TSC or anyone on its behalf, assumes no responsibility or liability for any errors or inaccuracies.

Purchasers are solely responsible for the choice, selection, and use of TSC products and TSC assumes no liability for application assistance or the design of Purchasers' products.

Information contained herein is intended to provide a product description only. No license, express or implied, to any intellectual property rights is granted by this document. Except as provided in TSC's terms and conditions of sale for such products, TSC assumes no liability whatsoever, and disclaims any express or implied warranty, relating to sale and/or use of TSC products including liability or warranties relating to fitness for a particular purpose, merchantability, or infringement of any patent, copyright, or other intellectual property right.

The products shown herein are not designed for use in medical, life-saving, or life-sustaining applications. Customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify TSC for any damages resulting from such improper use or sale.