



## Solid State Devices, Inc.

14830 Valley View Blvd \* La Mirada, Ca 90638

Phone: (562) 404-7855 \* Fax: (562) 404-1773

ssdi@ssdi-power.com \* www.ssdi-power.com

### DESIGNER'S DATA SHEET

#### Part Number / Ordering Information <sup>1/</sup>

SFT6678 M — TX

+ Screening <sup>2/</sup> — = Not Screen

TX = TX Level

TXV = TXV Level

S = S Level

+ Lead Bend <sup>3/4/</sup> — = Straight Leads

UB = Up Bend

DB = Down Bend

+ Package <sup>3/</sup> M = TO-254

Z = TO-254Z

/3 = TO-3

## SFT6678 SERIES

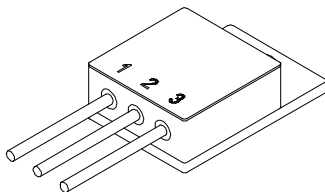
### 15 AMPS 400 Volts NPN High Speed Power Transistor

#### Application Notes:

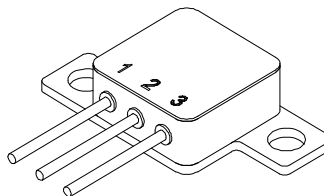
- Replaces Industry Standard 2N6678
- Designed for High Voltage, High Speed, Power Switching Applications Such as:
- Off-Line Supplies
- Converter Circuits
- Pulse Width Modulated Regulators
- Motor Controls
- Deflection Circuits

| Maximum Ratings                                                  | Symbol          | Value       | Units     |
|------------------------------------------------------------------|-----------------|-------------|-----------|
| Collector – Emitter Voltage                                      | $V_{CEO}$       | 400         | Volts     |
| Collector – Base Voltage                                         | $V_{CBO}$       | 650         | Volts     |
| Emitter – Base Voltage                                           | $V_{EBO}$       | 8.0         | Volts     |
| Continuous Collector Current                                     | $I_C$           | 15          | Amps      |
| Continuous Base Current                                          | $I_B$           | 5.0         | Amps      |
| Operating and Storage Temperature                                | $T_J, T_{STG}$  | -65 to +200 | °C        |
| Total Power Dissipation @ $T_C=25^{\circ}C$<br>Derate above 25°C | $P_D$           | 175<br>1.0  | W<br>W/°C |
| Maximum Thermal Resistance<br>(Junction to Case)                 | $R_{\theta JC}$ | 1.0         | °C/W      |

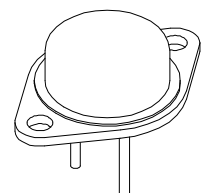
TO-254 (M)



TO-254 (Z)



TO-3 (/3)



#### Available Part Numbers:

SFT6678/3 SFT6678M SFT6678Z  
SFT6678MDB SFT6678ZDB  
SFT6678MUB SFT6678ZUB

#### PIN ASSIGNMENT (Standard)

| Package    | Collector | Emitter | Base  |
|------------|-----------|---------|-------|
| TO-3 (/3)  | Case      | Pin 2   | Pin 3 |
| TO-254 (M) | Pin 1     | Pin 2   | Pin 3 |
| TO-254 (Z) | Pin 1     | Pin 2   | Pin 3 |

**NOTE:** All specifications are subject to change without notification.  
SCD's for these devices should be reviewed by SSDI prior to release.

DATA SHEET #: TR0019C

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**SFT6678 SERIES**

| Electrical Characteristics                                                                                                 |                                                                                                                                                                      | Symbol                           | Min              | Max                      | Units           |
|----------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|------------------|--------------------------|-----------------|
| <b>Collector Cutoff Current</b><br>$V_{CE}=650V_{DC}$ , $V_{BE}(\text{off})=1.5V_{DC}$                                     | $T_C=25^{\circ}C$                                                                                                                                                    | $I_{CEV}$                        | -                | 0.1                      | mA              |
|                                                                                                                            | $T_C=100^{\circ}C$                                                                                                                                                   |                                  | -                | 1.0                      |                 |
| <b>Collector – Base Leakage Current</b>                                                                                    | $V_{CB}=650V$                                                                                                                                                        | $I_{CBO}$                        | -                | 1                        | mA              |
| <b>Emitter Cutoff Current</b>                                                                                              | $(V_{EB} = 8V, I_C = 0)$                                                                                                                                             | $I_{EBO}$                        | -                | 2                        | mA              |
| <b>Collector-Emitter Sustaining Voltage</b><br>$(I_C = 200mA, I_B = 0)$                                                    |                                                                                                                                                                      | $V_{CEO(sus)}$                   | 400              | -                        | $V_{DC}$        |
| <b>DC Current Gain *</b>                                                                                                   | $V_{CE}=3V, I_C=15A, T_A= 25^{\circ}C$                                                                                                                               | $H_{FE1}$                        | 8                | -                        |                 |
|                                                                                                                            | $V_{CE}=3V, I_C=1A, T_A= 25^{\circ}C$                                                                                                                                | $H_{FE2}$                        | 15               | -                        |                 |
|                                                                                                                            | $V_{CE}=3V, I_C=15A, T_A= -55^{\circ}C$                                                                                                                              | $H_{FE3}$                        | 4                | -                        |                 |
|                                                                                                                            |                                                                                                                                                                      |                                  |                  |                          |                 |
| <b>Base-Emitter Saturation Voltage *</b><br>$(I_C = 15A_{DC}, I_B = 3A_{DC})$                                              |                                                                                                                                                                      | $V_{BE} (SAT)$                   | -                | 1.5                      | $V_{DC}$        |
| <b>Collector-Emitter Saturation Voltage *</b><br>$(I_C = 15A, I_B = 3A)$                                                   | $(T_C = 25^{\circ}C)$<br>$(T_C = 100^{\circ}C)$                                                                                                                      | $V_{CE} (SAT)$                   |                  | 1.5<br>2.0               | $V_{DC}$        |
| <b>Second Breakdown</b><br>$(t = 1.0 \text{ sec}, T_C = 25^{\circ}C)$                                                      | $(V_{CC} = 11.7V)$                                                                                                                                                   | $I_{S/b1}$                       | 15.0             | -                        | A               |
|                                                                                                                            | $(V_{CC} = 20V)$                                                                                                                                                     | $I_{S/b2}$                       | 8.75             | -                        | A               |
|                                                                                                                            | $(V_{CC} = 100V)$                                                                                                                                                    | $I_{S/b3}$                       | 0.3              | -                        | A               |
|                                                                                                                            |                                                                                                                                                                      |                                  |                  |                          |                 |
| <b>Reverse Bias Second Breakdown</b><br>$(V_{BE}(\text{off}) = 1 \text{ to } 6V, V_{CLAMP} = 450V, T_C \leq 100^{\circ}C)$ |                                                                                                                                                                      | <b>RBSOA</b>                     | 15.0             | -                        | A               |
| <b>Current Gain</b><br>$(I_C = 1A, V_{CE} = 10V_{DC}, f = 5MHz)$                                                           |                                                                                                                                                                      | $ h_{FE} $                       | 3                | 10                       |                 |
| <b>Output Capacitance</b><br>$(V_{CB} = 10V_{DC}, f = 0.1MHz)$                                                             |                                                                                                                                                                      | $C_{ob}$                         | 150              | 500                      | pF              |
| <b>Delay Time</b><br><b>Storage Time</b><br><b>Rise Time</b><br><b>Fall Time</b>                                           | $(V_{CC} = 200V_{DC}, I_C = 15A_{DC},$<br>$I_{B1} = I_{B2} = 3A_{DC},$<br>$t_p = 50 \mu\text{sec}, \text{Duty Cycle} \leq 2\%$<br>$V_B = 6V_{DC}, R_L = 13.5\Omega)$ | $t_d$<br>$t_s$<br>$t_r$<br>$t_f$ | —<br>—<br>—<br>— | 0.1<br>0.6<br>2.5<br>0.5 | $\mu\text{sec}$ |
| <b>Cross Over Time</b><br>$(I_C = 15 A(\text{pk}), V_{CLAMP} = 450V, I_{B1} = 3 A, V_{BE}(\text{off}) = 6V)$               |                                                                                                                                                                      | $t_c$                            | —                | 0.5                      | $\mu\text{sec}$ |

**NOTES:**\* Pulse Test: Pulse Width = 300  $\mu\text{s}$ , Duty Cycle  $\leq 2\%$ 

1/ For Ordering Information, Price, and Availability Contact Factory.

2/ Screening per MIL-PRF-19500.

3/ For Package Outlines Contact Factory.

4/ Up and Down Bend Configurations Available for M and Z (TO-254 and TO-254Z) Packages Only.

5/ All Electrical Characteristics @ 25°C, Unless Otherwise Specified.

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