



**Solid State Devices, Inc.**

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 Phone: (562) 404-7855 \* Fax: (562) 404-1773  
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**SFT6678 SERIES**

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

**DESIGNER'S DATA SHEET**

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

SFT6678 M TX

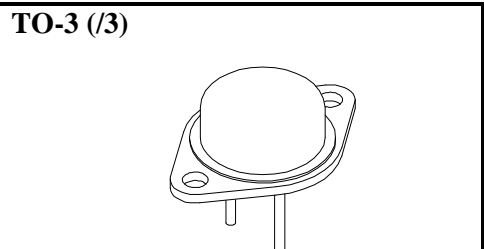
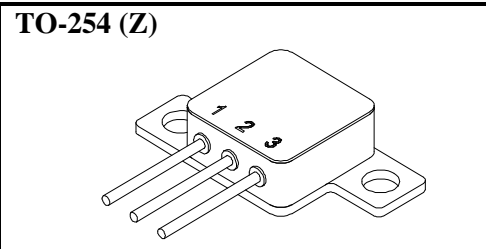
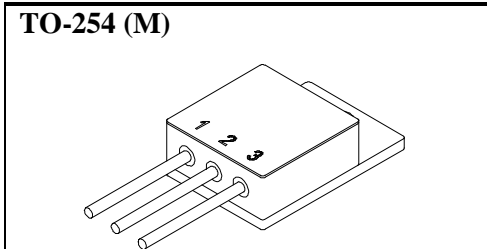
+ Screening<sup>2/</sup>    = Not Screen  
 TX = TX Level  
 TXV = TXV Level  
 S = S Level

+ 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

- 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 <sub>CEO</sub>	400	Volts
Collector – Base Voltage	V <sub>CBO</sub>	650	Volts
Emitter – Base Voltage	V <sub>EBO</sub>	8.0	Volts
Continuous Collector Current	I <sub>C</sub>	15	Amps
Continuous Base Current	I <sub>B</sub>	5.0	Amps
Operating and Storage Temperature	T <sub>J</sub> , T <sub>STG</sub>	-65 to +200	°C
Total Power Dissipation @ T <sub>C</sub> =25°C Derate above 25°C	P <sub>D</sub>	175 1.0	W W/°C
Maximum Thermal Resistance (Junction to Case)	R <sub>θJC</sub>	1.0	°C/W



**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** **DOC**



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