



**Solid State Devices, Inc.**

14701 Firestone Blvd \* La Mirada, CA 90638  
 Phone: (562) 404-4474 \* Fax: (562) 404-1773  
 ssdi@ssdi-power.com \* www.ssdi-power.com

**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**

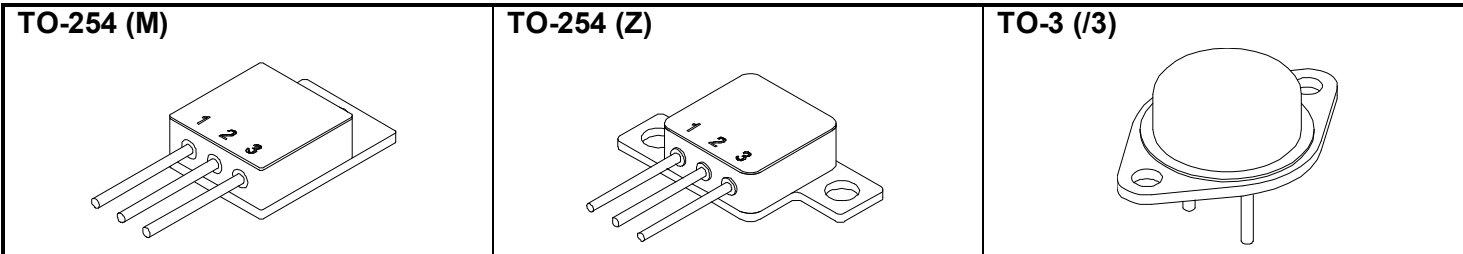
Screening <sup>2/</sup>      = Not Screened  
 TX = TX Level  
 TXV = TXV Level  
 S = S Level

Lead Bend <sup>3/</sup>      = Straight Leads  
 UB = Up Bend  
 DB = Down Bend

Package 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	P <sub>D</sub>	175	W
@ T <sub>A</sub> =25°C		6.0	W
Maximum Thermal Resistance (Junction to Case)	R <sub>θJC</sub>	1.0	°C/W
(Ambient to Case)	R <sub>θJA</sub>	29.17	



**NOTES:**

- \* Pulse Test: Pulse Width = 300 μs, Duty Cycle ≤ 2%
- 1/ For ordering information, price, and availability contact factory.
- 2/ Screening based on MIL-PRF-19500. Screening flows available on request.
- 3/ Up and down bend configurations available for M and Z (TO-254 and TO-254Z) packages only.
- 4/ All electrical characteristics @ 25°C, unless otherwise specified.



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Electrical Characteristics		Symbol	Min	Max	Units		
<b>Collector Cutoff Current</b> $V_{CE} = 400V, V_{BE(off)} = 1.5V$ $V_{CE} = 650V, V_{BE(off)} = 1.5V$ $V_{CE} = 650V, V_{BE(off)} = 1.5V$	$T_C = 25^\circ C$	$I_{CEV}$	-	0.5	$\mu A$		
	$T_C = 25^\circ C$			1.0	$\mu A$		
	$T_C = 125^\circ C$			50	$\mu A$		
<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> $(I_C = 200mA, I_B = 0)$		$V_{CEO(sus)}$	400	-	V		
<b>DC Current Gain*</b>	$V_{CE} = 3V, I_C = 15A, T_A = 25^\circ C$	$H_{FE1}$	8	20			
	$V_{CE} = 3V, I_C = 1A, T_A = 25^\circ C$	$H_{FE2}$	15	40			
	$V_{CE} = 3V, I_C = 15A, T_A = -55^\circ C$	$H_{FE3}$	4	-			
<b>Base-Emitter Saturation Voltage*</b> $(I_C = 15A, I_B = 3A)$		$V_{BE(SAT)}$	-	1.5	V		
<b>Collector-Emitter Saturation Voltage*</b> $(I_C = 15A, I_B = 3A)$	$(T_C = 25^\circ C)$ $(T_C = 125^\circ C)$	$V_{CE(SAT)}$	-	1.0 2.0	V		
<b>Current Gain</b> $(I_C = 1A, V_{CE} = 10V, f = 5MHz)$		$ h_{FE} $	3	10			
<b>Output Capacitance</b> $(V_{CB} = 10V, f = 0.1MHz)$		$C_{ob}$	150	500	pF		
<b>Delay Time</b>	$(V_{CC} = 200V, I_C = 15A, I_{B1} = I_{B2} = 3A, t_p = 50 \mu sec, \text{Duty Cycle} \leq 2\%, V_B = 6V, R_L = 13.5\Omega)$  INPUT WAVEFORM SEE NOTE 1 OUTPUT WAVEFORM $t_d$ AND $t_r$ TIME TEST CIRCUIT	$t_{(on)}$	$t_d$	-	0.1	$\mu sec$	
<b>Rise Time</b>			$t_r$	-	2.5		
<b>Storage Time</b>		 INPUT WAVEFORM SEE NOTE 1 OUTPUT WAVEFORM $t_s$ AND $t_f$ TIME TEST CIRCUIT	$t_{(off)}$	$t_s$	-		0.6
<b>Fall Time</b>				$t_f$	-		0.5
<b>Cross Over Time</b>	$(I_C = 15 A(pk), V_{CLAMP} = 450V, I_{B1} = 3 A, V_{BE(off)} = 6V)$  OUTPUT WAVEFORM $t_c$ TIME TEST CIRCUIT SAME INPUT WAVEFORM AS $t_s$ AND $t_f$ TIME TEST CIRCUIT	$t_c$	-	0.5	$\mu sec$		

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

**DATA SHEET #: TR0019D**

**DOC**

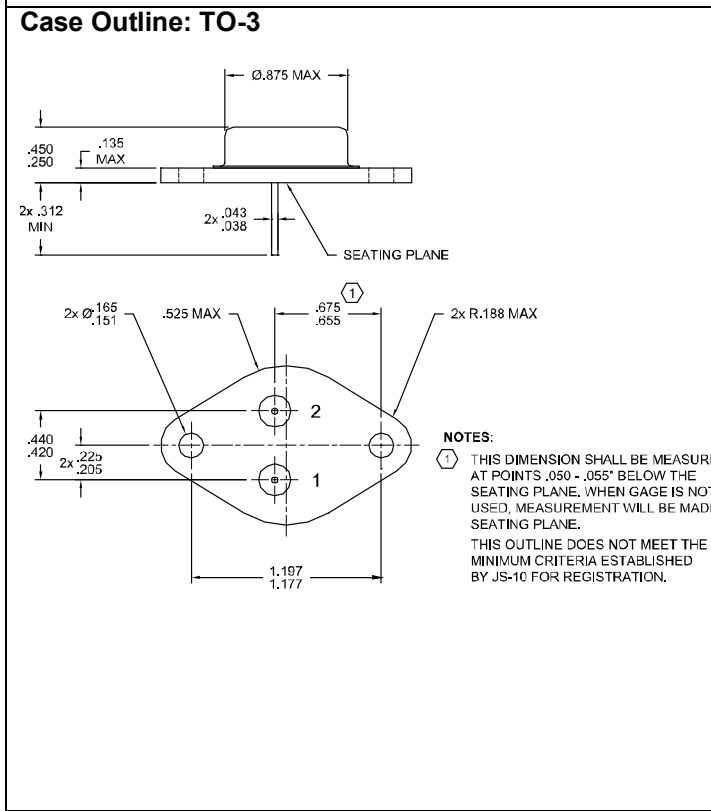
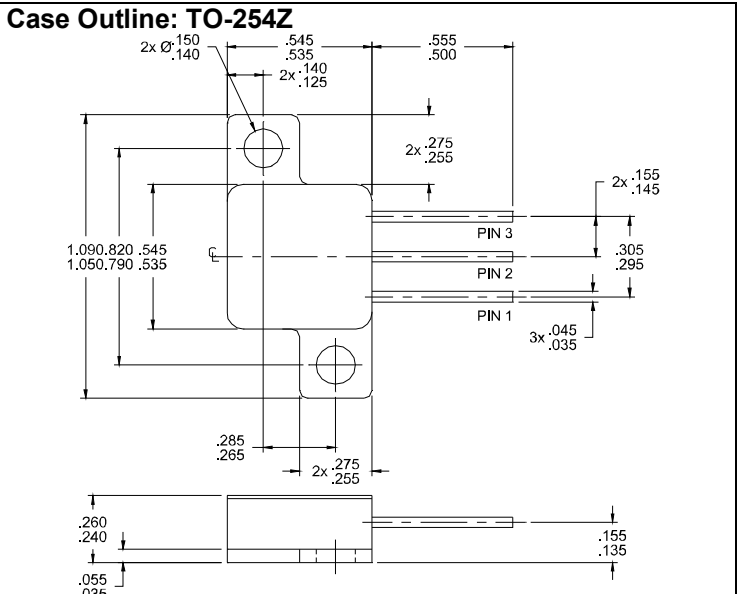
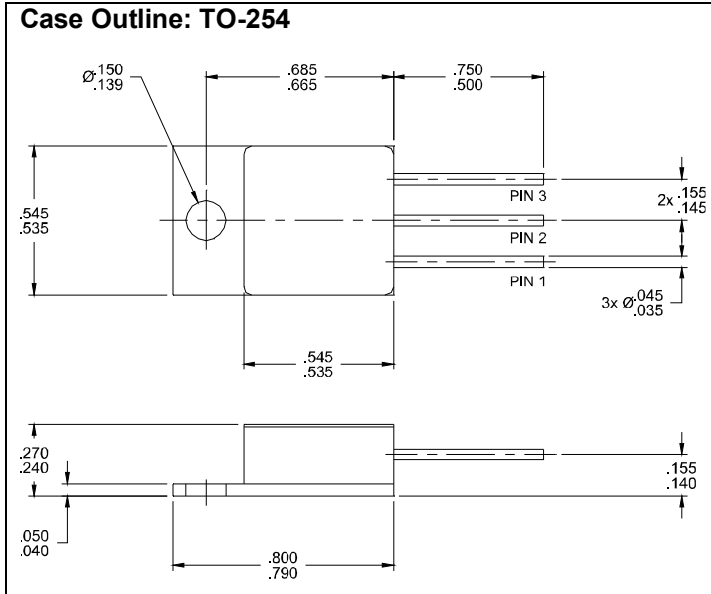


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<b>Safe Operating Area, DC</b>	$V_{CE} = 11.7 \text{ V}, I_C = 15 \text{ A}, 1 \text{ sec}$ $V_{CE} = 30 \text{ V}, I_C = 5.9 \text{ A}, 1 \text{ sec}$ $V_{CE} = 100 \text{ V}, I_C = 0.25 \text{ A}, 1 \text{ sec}$ $V_{CE} = 400 \text{ V}, I_C = 10 \text{ mA}, 1 \text{ sec}$
<b>Safe Operating Area, clamped switching</b>	$V_{CC} = 15 \text{ V}, V_{BB2} = 5 \text{ V}, R_{BB1} = 5 \Omega, R_{BB2} = 1.5 \Omega, L = 50 \mu\text{H},$ $V_{\text{clamp}} = 450 \text{ V}, I_C = 15 \text{ A}$



**Lead Options**

**DB (Down Bend)**

**UB (Up Bend)**

**PIN ASSIGNMENT (Standard)**

Package	Collector	Emitter	Base
TO-3 (I3)	Case	Pin 2	Pin 3
TO-254 (M)	Pin 1	Pin 2	Pin 3
TO-254 (Z)	Pin 1	Pin 2	Pin 3

**Available Part Numbers:**

SFT6678/3	SFT6678M SFT6678MDB SFT6678MUB	SFT6678Z SFT6678ZDB SFT6678ZUB
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