



Solid State Devices, Inc.

14701 Firestone Blvd * La Mirada, CA 90638

Phone: (562) 404-4474 * Fax: (562) 404-1773

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DESIGNER'S DATA SHEET

Part Number / Ordering Information ^{1/}

SFT6678 M TX

Screening ^{2/} = Not Screened
TX = TX Level
TXV = TXV Level
S = S Level

Lead Bend ^{3/} = Straight Leads
UB = Up Bend
DB = Down Bend

Package 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 @ $T_C=25^{\circ}C$ @ $T_A=25^{\circ}C$	P_D	175 6.0	W W
Maximum Thermal Resistance (Junction to Case) (Ambient to Case)	$R_{\theta JC}$ $R_{\theta JA}$	1.0 29.17	°C/W

TO-254 (M)	TO-254 (Z)	TO-3 (/3)

NOTES:

* Pulse Test: Pulse Width = 300 μs , Duty Cycle $\leq 2\%$

^{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.

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

DATA SHEET #: TR0019D

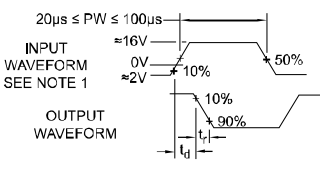
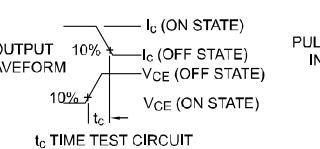
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Electrical Characteristics		Symbol	Min	Max	Units
Collector Cutoff Current $V_{CE} = 400V, V_{BE(off)} = 1.5V$ $V_{CE} = 650V, V_{BE(off)} = 1.5V$ $V_{CE} = 650V, V_{BE(off)} = 1.5V$		$T_C = 25^\circ C$ $T_C = 25^\circ C$ $T_C = 125^\circ C$		0.5 1.0 50	μA μA μA
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 Current Gain* $V_{CE} = 3V, I_C = 15A, T_A = 25^\circ C$ $V_{CE} = 3V, I_C = 1A, T_A = 25^\circ C$ $V_{CE} = 3V, I_C = 15A, T_A = -55^\circ C$		H_{FE1} H_{FE2} H_{FE3}	8 15 4	20 40 -	
Base-Emitter Saturation Voltage* $(I_C = 15A, I_B = 3A)$		$V_{BE(SAT)}$	-	1.5	V
Collector-Emitter Saturation Voltage* $(I_C = 15A, I_B = 3A)$		$V_{CE(SAT)}$	- -	1.0 2.0	V
Current Gain $(I_C = 1A, V_{CE} = 10V, f = 5MHz)$		$ h_{FE} $	3	10	
Output Capacitance $(V_{CB} = 10V, f = 0.1MHz)$		C_{ob}	150	500	pF
Delay Time	<p>$(V_{CC} = 200V, I_C = 15A, I_{B1} = I_{B2} = 3A, t_p = 50 \mu sec, \text{Duty Cycle} \leq 2\%, V_B = 6V, R_L = 13.5\Omega)$</p>  <p>20µs ≤ PW ≤ 100µs INPUT WAVEFORM SEE NOTE 1 OUTPUT WAVEFORM t_d AND t_r TIME TEST CIRCUIT</p>	t_d	-	0.1	μsec
Rise Time		t_r	-	2.5	
Storage Time		t_s	-	0.6	
Fall Time		t_f	-	0.5	
Cross Over Time	<p>$(I_C = 15 A(pk), V_{CLAMP} = 450V, I_{B1} = 3 A, V_{BE(off)} = 6V)$</p>  <p>OUTPUT WAVEFORM t_c TIME TEST CIRCUIT</p> <p>PULSE IN SCOPE -6V SAME INPUT WAVEFORM AS t_s AND t_f TIME TEST CIRCUIT</p>	t_c	-	0.5	μsec

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Safe Operating Area, DC

Safe Operating Area, clamped switching

$V_{CE} = 11.7 \text{ V}$, $I_C = 15 \text{ A}$, 1 sec

$V_{CE} = 30 \text{ V}$, $I_C = 5.9 \text{ A}$, 1 sec

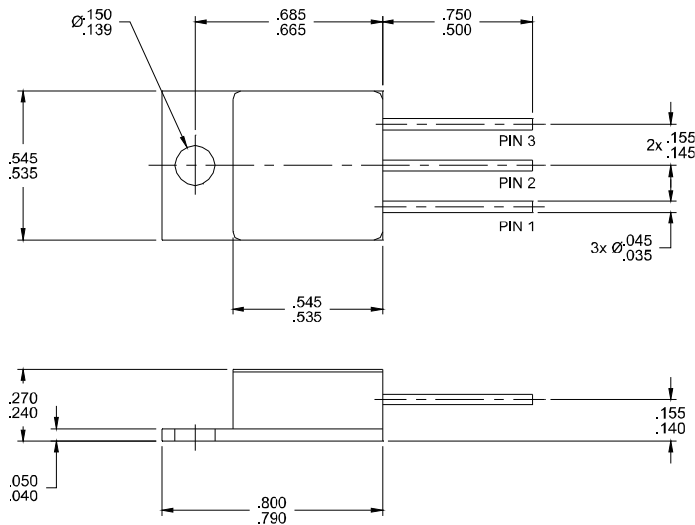
$V_{CE} = 100 \text{ V}$, $I_C = 0.25 \text{ A}$, 1 sec

$V_{CE} = 400 \text{ V}$, $I_C = 10 \text{ mA}$, 1 sec

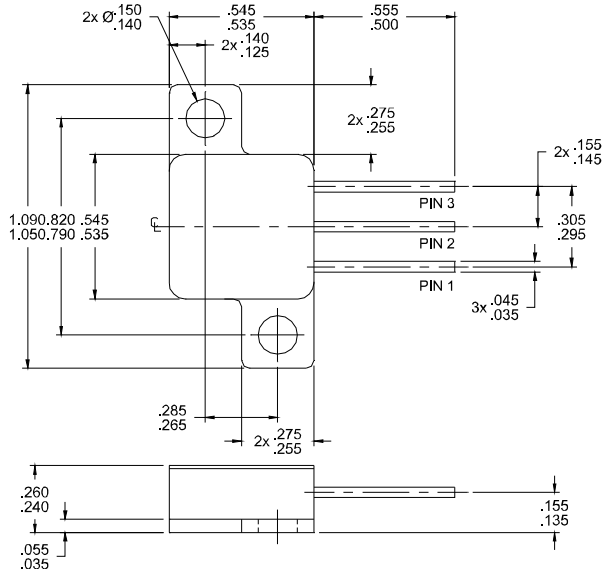
$V_{CC} = 15 \text{ V}$, $V_{BB2} = 5 \text{ V}$, $R_{BB1} = 5 \Omega$, $R_{BB2} = 1.5 \Omega$, $L = 50 \mu\text{H}$,

$V_{\text{clamp}} = 450 \text{ V}$, $I_C = 15 \text{ A}$

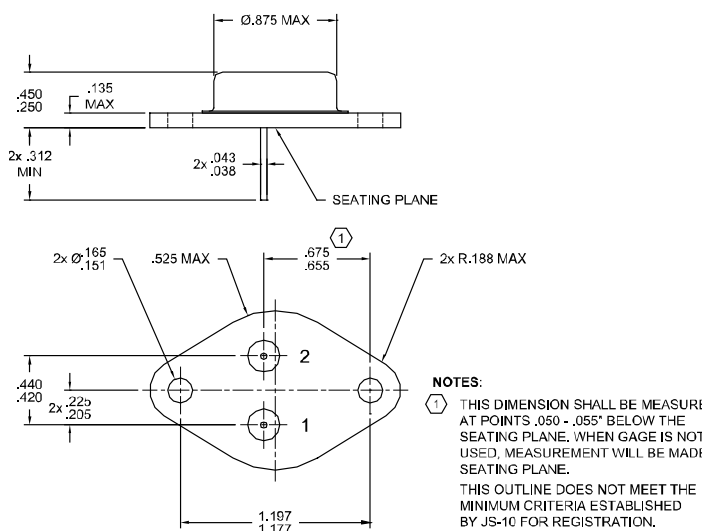
Case Outline: TO-254



Case Outline: TO-254Z



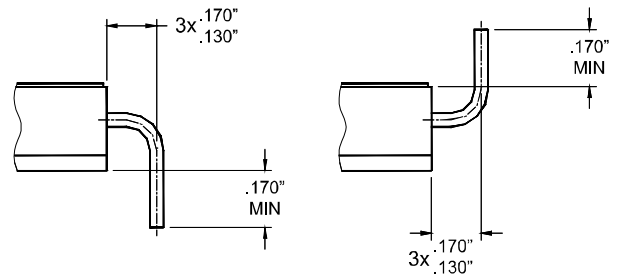
Case Outline: TO-3



Lead Options

DB (Down Bend)

UB (Up Bend)



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

Available Part Numbers:

SFT6678/3	SFT6678M SFT6678MDB SFT6678MUB	SFT6678Z SFT6678ZDB SFT6678ZUB
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