



**Solid State Devices, Inc.**

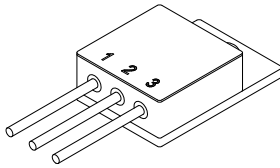
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# SFF23N60M SFF23N60Z

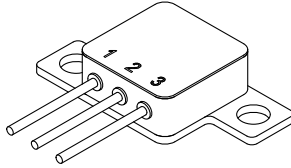
## DESIGNER'S DATA SHEET

## 15 AMP, 600 Volts, 320 mΩ Avalanche Rated N-channel MOSFET

**TO-254**



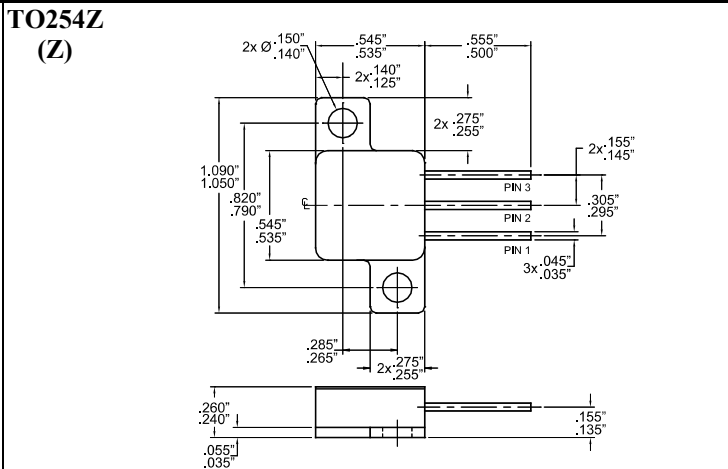
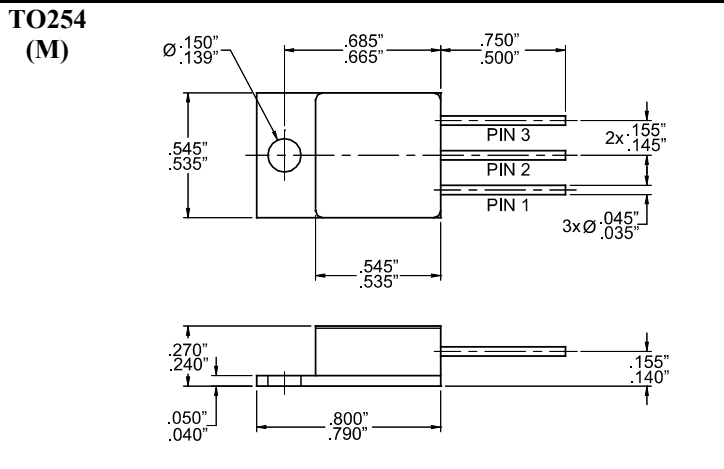
**TO-254Z**



**Note 1: maximum current limited by package configuration**

- Features:**
- Advanced low gate charge process
  - Lowest ON-resistance in the industry
  - Avalanche rated
  - Hermetically Sealed, Isolated Package
  - Low Total Gate Charge
  - Fast Switching
  - TX, TXV, S-Level screening available
  - Improved ( $R_{DS(ON)}$   $Q_G$ ) figure of merit

Maximum Ratings	Symbol	Value	Units
Drain - Source Voltage	$V_{DSS}$	600	V
Gate – Source Voltage	$V_{GS}$	±30 ±40	V
Max. Continuous Drain Current (package limited)	@ $T_C = 25^\circ C$	$I_{D1}$	15
	@ $T_C = 125^\circ C$	$I_{D2}$	7
Max. Instantaneous Drain Current ( $T_j$ limited)	@ $T_C = 25^\circ C$	$I_{D3}$	23
Max. Avalanche current	@ $L = 0.1$ mH	$I_{AR}$	23
Single / Repetitive Avalanche Energy	@ $L = 0.1$ mH	$E_{AS} / E_{AR}$	1500 / 30
Total Power Dissipation	@ $T_C = 25^\circ C$	$P_D$	150
Operating & Storage Temperature		$T_{OP} \& T_{STG}$	-55 to +150
Maximum Thermal Resistance (Junction to Case)		$R_{jc}$	0.83 (typ.0.6) $^\circ C / W$



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



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Electrical Characteristics <sup>4/</sup>		Symbol	Min	Typ	Max	Units
<b>Drain to Source Breakdown Voltage</b>	$V_{GS} = 0V, I_D = 250\mu A$	$BV_{DSS}$	600	620	—	V
<b>Drain to Source On State Resistance</b>	$V_{GS} = 10V, I_D = 11.5A, T_j = 25^\circ C$	$R_{DS(on)}$	—	300	320	mΩ
	$V_{GS} = 10V, I_D = 25A, T_j = 25^\circ C$		—	300	—	
	$V_{GS} = 10V, I_D = 11.5A, T_j = 125^\circ C$		—	670	—	
<b>Gate Threshold Voltage</b>	$V_{DS} = V_{GS}, I_D = 4mA, T_j = 25^\circ C$	$V_{GS(th)}$	2.0	3.5	4.5	V
	$V_{DS} = V_{GS}, I_D = 1mA, T_j = 25^\circ C$		—	3.4	—	
<b>Gate to Source Leakage</b>	$V_{GS} = \pm 30V, T_j = 25^\circ C$ $V_{GS} = \pm 20V, T_j = 125^\circ C$	$I_{GSS}$	—	20 30	±100 —	nA
<b>Zero Gate Voltage Drain Current</b>	$V_{DS} = 600V, V_{GS} = 0V, T_j = 25^\circ C$	$I_{DSS}$	—	0.1	25	μA mA
	$V_{DS} = 480V, V_{GS} = 0V, T_j = 125^\circ C$		—	0.085	1	
<b>Forward Transconductance</b>	$V_{DS} = 10V, I_D = 11.5A, T_j = 25^\circ C$	$g_{fs}$	10	20	—	Mho
<b>Total Gate Charge</b>	$V_{GS} = 10V$	$Q_g$	—	100	—	nC
<b>Gate to Source Charge</b>	$V_{DS} = 300V$	$Q_{gs}$	—	23	—	
<b>Gate to Drain Charge</b>	$I_D = 16.5A$	$Q_{gd}$	—	45	—	
<b>Turn on Delay Time</b>	$V_{GS} = 10V$	$t_{d(on)}$	—	28	—	nsec
<b>Rise Time</b>	$V_{DS} = 300V$	$t_r$	—	33	—	
<b>Turn off Delay Time</b>	$I_D = 16.5A$	$t_{d(off)}$	—	80	—	
<b>Fall Time</b>	$R_G = 2.0\Omega, pw = 3\mu s$	$t_f$	—	23	—	
<b>Diode Forward Voltage</b>	$I_F = 23A, V_{GS} = 0V$	$V_{SD}$	—	1.0	1.5	V
	$I_F = 16.5A, V_{GS} = 0V$		—	0.87	—	
<b>Diode Reverse Recovery Time</b>	$I_F = 16.5A, di/dt = 100A/\mu sec$	$t_{rr}$	—	210	250	nsec
<b>Peak Reverse Recovery Current</b>		$I_{RM(rec)}$	—	tbd	—	A
<b>Reverse Recovery Charge</b>		$Q_{rr}$	—	1.3	—	μC
<b>Safe Operating Area</b>	$V_{DS} = 15.2V, 1 \text{ sec}, T_a = 25^\circ C$	<b>SOA1</b>	—	—	16.5	A
	$V_{DS} = 65V, 1 \text{ sec}, T_a = 25^\circ C$	<b>SOA2</b>	—	—	1.05	
<b>Input Capacitance</b>	$V_{GS} = 0V$	$C_{iss}$	—	4100	—	pF
<b>Output Capacitance</b>	$V_{DS} = 25V$	$C_{oss}$	—	400	—	
<b>Reverse Transfer Capacitance</b>	$f = 1 \text{ MHz}$	$C_{rss}$	—	120	—	

**NOTES:**

- \* Pulse Test: Pulse Width = 300μsec, Duty Cycle = 2%.
- 1/ For Ordering Information, Price, and Availability Contact Factory.
- 2/ Screening per MIL-PRF-19500.
- 3/ For Package Outlines / lead bending options / pinout configurations Contact Factory.
- 4/ Unless Otherwise Specified, All Electrical Characteristics @25°C.

**Available Part Numbers:**

Consult Factory

**PIN ASSIGNMENT (Standard)**

Package	Drain	Source	Gate
<b>TO-254 (M)</b>	Pin 1	Pin 2	Pin 3
<b>TO-254Z (Z)</b>	Pin 1	Pin 2	Pin 3

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**DATA SHEET #: FT0028A**

**DOC**