



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

SGR15E90M

15 AMP, 900 VOLTS
GaN FET Normally-Off
160 mΩ typ

Designer's Data Sheet

Part Number/Ordering Information^{1/}

SGR15E90

L Screening^{2/}

- ___ = Not Screened
- TX = TX Level
- TXV = TXV Level
- S = S Level

Lead Bend Options

- ___ = Straight Leads
- UB = Up Bend
- DB = Down Bend

Package

M = TO-254

FEATURES:

- 3rd Generation Gallium Nitride Technology
- Combines HV Depletion mode GaN and LV Enhancement mode GaN driver (Cascode) for Superior Performance
- Inherently Rad Tolerant
- Low R_{DS(ON)}
- Low Q_G Simplifies Gate Drive Circuit
- Very Fast Switching for High Frequency Applications
- Low Thermal Resistance
- Hermetically Sealed Package
- TX, TXV, and S-Level Screening Available^{2/}

APPLICATIONS:

- High Efficiency DC-DC / PoL Converters
- Motor Controller
- Robotics / Automation
- Military and Aerospace

BENEFITS:

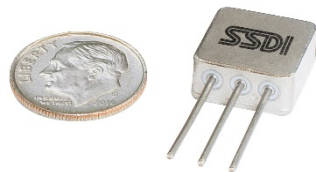
- GaN Transistor offers superior advantages over Si based MOSFET: zero Q_{RR}, low gate charge, low R_{DS(ON)}, fast switching speed and low temperature coefficient.
- Benefits circuit designer through higher efficiency, lower cross-over losses and On-state losses.
- Eliminates the need to add free-wheeling diode

Maximum Ratings ^{3/}	Symbol	Value	Units
Continuous Drain – Source Voltage	V _{DSS}	900	V
Gate – Source Voltage	V _{GS}	+6 -4	V
Continuous Drain Current	I _{D1} I _{D2}	15 10	A
		T _C = 25°C T _C = 100°C	
Pulsed Drain Current	I _{D3}	58	A
Pulse width: 10 μs			
Total Power Dissipation	P _D	62	W
Operating & Storage Temperature	T _{OP} & T _{STG}	-55 to +150	°C
Thermal Resistance	R _{θJC}	2	°C/W
Junction to Case			

NOTES:

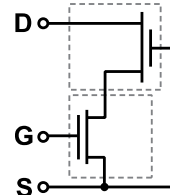
- 1/ For ordering information, price, operating curves, and availability-contact factory.
- 2/ Screening based on MIL-PRF-19500. Screening flows available on request.
- 3/ Unless otherwise specified, all electrical characteristics @ 25°C.
- 4/ Pulse Test, P_w = 300 – 500 μs, D.C. = 2%.

TO-254 (M)



*dime used for size reference

Cascode Device Structure



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

DATA SHEET #: FT0085A

DOCX



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SGR15E90M

Electrical Characteristics ^{3/}	Symbol	Min	Typ	Max	Unit	
Drain to Source Breakdown Voltage	$I_D = 100 \mu A, V_{GS} = 0 V$	BV_{DSS}	900	-	-	V
Gate to Source Forward Leakage	$V_{GS} = +5 V$	I_{GSSF}	-	10	200	μA
Gate to Source Reverse Leakage	$V_{GS} = -4 V$	I_{GSSR}	-	1	-200	μA
Drain to Source Leakage Current	$V_{DS} = 900 V, V_{GS} = 0 V$ $V_{DS} = 900 V, V_{GS} = 0 V, T_J = 150^\circ C$	I_{DSS}	-	5 300	50 -	μA
Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 11 mA$	V_{GS(TH)}	0.8	1.4	2.5	V
Drain to Source On State Resistance^{4/}	$V_{GS} = 5 V, I_D = 10 A$ $V_{GS} = 5 V, I_D = 10 A, T_J = 150^\circ C$	R_{DS(ON)}	-	160 350	190 -	m Ω
Total Gate Charge	$V_{GS} = +5 V, V_{DS} = 200 V, I_D = 10 A$	Q_G	-	10	18	nC
Gate to Source Charge		Q_{GS}	-	3	-	
Gate to Drain Charge		Q_{GD}	-	4	-	
Input Capacitance	$V_{GS} = 0 V, V_{DS} = 100 V, f = 1 MHz$	C_{ISS}	-	1400	-	pF
Output Capacitance		C_{OSS}	-	120	-	
Reverse Transfer Capacitance		C_{RSS}	-	230	-	
Turn-On Delay	$V_{DS} = 500 V, V_{GS} = 5 V, I_D = 10 A_{pk}$ $L=100\mu H, R_G = 22 \Omega$	t_{D(ON)}	-	40	70	ns
Rise Time		t_R	-	48	-	
Turn-Off Delay		t_{D(OFF)}	-	135	150	
Fall Time		t_F	-	18	-	
Reverse Current^{4/}	$V_{GS} = 0 V, T_C = 100^\circ C, d.c. \leq 25\%$	I_S	-	-	9.5	A
Reverse Voltage^{4/}	$I_S = 10 A, V_{GS} = 0 V$ $I_S = 5 A, V_{GS} = 0 V$	V_{SD}	-	3.6 2.8	- 3.4	V
Reverse Recovery Time	$I_S = 10 A, V_{DD} = 900 V,$ $di/dt = 1000 A/\mu s$	t_{RR}	-	32	-	ns
Reverse Recovery Charge	$I_S = 10 A, V_{DD} = 900 V,$ $di/dt = 1000 A/\mu s$	Q_{RR}	-	49	-	nC

Package Outline: TO-254 (M)

SUFFIX: M

SUFFIX: MDB

SUFFIX: MUB

PIN ASSIGNMENT	
TO-254	
Source	2
Drain	1
Gate	3
Substrate	*

* Substrate internally tied to Source

AVAILABLE PART NUMBERS:
 SGR15E90M, SGR15E90MUB,
 SGR15E90MDB

Dimensions in Inches

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