



PRELIMINARY

Solid State Devices, Inc.

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SGF15E100 Series

**15 AMP, 1000 VOLTS
GaN FET Normally-Off
160 mΩ typ**

Designer's Data Sheet

Part Number/Ordering Information^{1/}

SGF15E100

Screening^{2/}

— = Not Screened
TX = TX Level
TXV = TXV Level
S = S Level

Lead Bend Options (TO-257 only)

— = Straight Leads
UB = Up Bend
DB = Down Bend

Package

J = TO-257S

FEATURES:

- 3rd Generation Gallium Nitride Technology
- Combines GaN HEMT and Low Voltage Si MOSFET (Cascode) for Superior Performance
- Works with Common Gate Drivers
- 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/}
- Available as Normally On (without Si FET Driver)

APPLICATIONS:

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

BENEFITS:

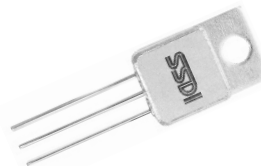
- GaN Transistor offers superior advantages over Si based MOSFET: zero Q_{RR} , low gate charge, low $R_{DS(ON)}$, fast switching speed and low temperature coefficient.
- Benefits circuit designer through higher efficiency, lower cross-over losses and On-state losses.
- Eliminates the need to add free-wheeling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

Maximum Ratings ^{3/}	Symbol	Value	Units
Continuous Drain – Source Voltage	V_{DSS}	1000	V
Gate – Source Voltage	V_{GS}	±18	V
Continuous Drain Current	I_{D1} I_{D2}	15 10	A
Pulsed Drain Current	I_{D3}	58	A
Total Power Dissipation	P_D	62	W
Operating & Storage Temperature	T_{OP} & T_{STG}	-55 to +150	°C
Thermal Resistance Junction to Case	$R_{\theta JC}$	2	°C/W

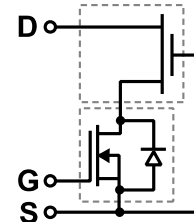
NOTES:

- 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, $P_w = 300 \mu s$, D.C. = 2%.

TO-257 (J)



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 #: FT0076A

DOC



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Electrical Characteristics ^{3/}	Symbol	Min	Typ	Max	Unit
Drain to Source Breakdown Voltage $I_D = 100 \mu A, V_{GS} = 0 V$	BV_{DSS}	1000	-	-	V
Gate to Source Forward Leakage $V_{GS} = +18 V$	I_{GSSF}	-	50	100	nA
Gate to Source Reverse Leakage $V_{GS} = -18 V$	I_{GSSR}	-	10	-100	nA
Drain to Source Leakage Current $V_{DS} = 1000 V, V_{GS} = 0 V, T_J = 150^\circ C$	I_{DSS}	-	1 12	30 -	μA
Gate Threshold Voltage $V_{DS} = V_{GS}, I_D = 0.5 mA$	$V_{GS(TH)}$	1.6	2.0	2.6	V
Drain to Source On State Resistance ^{4/} $V_{GS} = 10 V, I_D = 10 A, T_J = 150^\circ C$	$R_{DS(ON)}$	-	160 350	190 -	m Ω
Total Gate Charge $V_{GS} = 8 V, V_{DS} = 600 V, I_D = 10 A$	Q_G	-	10	-	nC
Gate to Source Charge	Q_{GS}	-	2.6	-	nC
Gate to Drain Charge	Q_{GD}	-	2.9	-	nC
Output Charge $V_{GS} = 0 V, V_{DS} = 0 V \text{ to } 600 V$	Q_{OSS}	-	53	-	nC
Input Capacitance $V_{GS} = 0 V, V_{DS} = 600 V, f = 1 MHz$	C_{ISS}	-	780	-	pF
Output Capacitance	C_{OSS}	-	41	-	pF
Reverse Transfer Capacitance	C_{RSS}	-	5	-	pF
Output Capacitance, Energy Related $V_{GS} = 0 V, V_{DS} = 0 V \text{ to } 600 V$	$C_{O(ER)}$	-	54	-	pF
Output Capacitance, Time Related $V_{GS} = 0 V, V_{DS} = 0 V \text{ to } 600 V$	$C_{O(TR)}$	-	88	-	pF
Turn-On Delay Rise Time Turn-Off Delay Fall Time $V_{DS} = 600 V, V_{GS} = 8 V, I_D = 10 A, R_G = 22 \Omega$	$t_{D(ON)}$ t_R $t_{D(OFF)}$ t_F	-	26 5 40 7.4	-	ns
Reverse Current ^{4/} $V_{GS} = 0 V, T_C = 100^\circ C, \leq 25\% \text{ duty cycle}$	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}	-	2.3 1.6	- 1.9	V
Reverse Recovery Time $I_S = 10 A, V_{DD} = 600 V, di/dt = 1000 A/\mu s$	t_{RR}	-	32	-	ns
Reverse Recovery Charge $I_S = 10 A, V_{DD} = 600 V, di/dt = 1000 A/\mu s$	Q_{RR}	-	49	-	nC

Package Outline: TO-257 (J)

PIN ASSIGNMENT	
TO-257	
Source	2
Drain	1
Gate	3
Substrate	*

* Substrate internally tied to Source

AVAILABLE PART NUMBERS:
 SGF15E100J, SGF15E100JUB,
 SGF15E100JDB

Dimensions in Inches

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