SLF65R380SS

650V N-Channel MOSFET

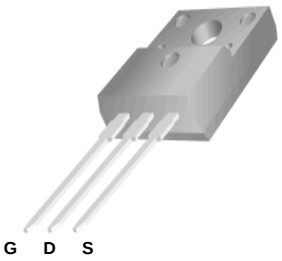
General Description

This Power MOSFET is produced using Maple semi's Advanced Super-Junction technology.
This advanced technology has been especially tailored to minimize conduction loss, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode.
These devices are well suited for AC/DC power conversion

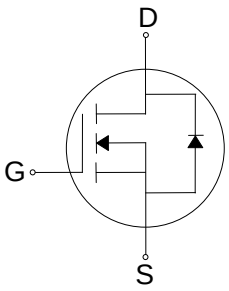
Features

- 11A, 650V, RDS(on) typ.= 330mΩ@VGS =10 V
- Low gate charge (typical 17.5nC)
- High ruggedness
- Fast switching
- 100% avalanche tested
- Improved dv/dt capability

LEAD FREE RoHS COMPLIANT



TO-220F



Absolute Maximum Ratings

TC = 25°C unless otherwise noted

Symbol	Parameter		SLF65R380SS	Units
VDSS	Drain-Source Voltage		650	V
ID	Drain Current	- Continuous (TC = 25℃)	11	A
		- Continuous (TC = 100℃)	5.5	A
IDM	Drain Current - Pulsed	(Note 1)	33	A
VGSS	Gate-Source Voltage		±30	V
EAS	Single Pulsed Avalanche Energy	(Note 2)	125	mJ
dv/dt	Peak Diode Recovery dv/dt	(Note 3)	50	V/ns
PD	Power Dissipation (TC = 25℃)		31	W
	- Derate above 25℃		0.25	W/℃
TJ, TSTG	Operating and Storage Temperature Range		-55 to +150	℃
TL	Maximum lead temperature for soldering purposes, 1/8" from case for 5 seconds		300	℃

*Drain current limited by maximum junction temperature.

Thermal Characteristics

Symbol	Parameter	Value	Units
RθJC	Thermal Resistance, Junction-to-Case	4.03	℃/W
RθJA	Thermal Resistance, Junction-to-Ambient	62.5	℃/W

Electrical Characteristics (TC = 25 °C unless otherwise noted)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
Off Characteristics						
BVDSS	Drain-Source Breakdown Voltage	VGS = 0V,ID = 250uA, TJ=25℃	650	-	-	V
		VGS = 0V,ID = 250uA, TJ=150℃	-	650	-	V
ΔBVDSS ΔTJ	Breakdown Voltage Temperature coefficient	ID = 250uA, referenced to 25°C	-	0.65	-	V/°C
IDSS	Drain-Source Leakage Current	VDS =650V, VGS = 0V	-	-	1	uA
		VDS =520V, TC = 125 °C	-	-	10	uA
IGSS	Gate-Source Leakage, Forward	VGS = 30V, VDS = 0V	-	-	100	nA
	Gate-source Leakage, Reverse	VGS = -30V, VDS = 0V	-	-	-100	nA
On Characteristics						
VGS(th)	Gate Threshold Voltage	VDS = VGS, ID = 250uA	2.5	-	4.5	V
RDS(ON)	Static Drain-Source On-state Resistance	VGS =10 V, ID = 3.2A	-	0.33	0.38	Ω
Dynamic Characteristics						
Ciss	Input Capacitance	VGS =0 V, VDS =25V, f = 1MHz	-	900	1170	pF
Coss	Output Capacitance		-	54	70	
Crss	Reverse Transfer Capacitance		-	7.0	9.5	
Dynamic Characteristics						
td(on)	Turn-on Delay Time	VDD =320V, ID =11A, RG =25Ω	`	30	70	nS
tr	Rise Time		-	17	44	
td(off)	Turn-off Delay Time		-	70	150	
tf	Fall Time		-	17	44	
Qg	Total Gate Charge	VDS =480V, VGS =10V, ID =25A	-	17.5	23	nC
Qgs	Gate-Source Charge		-	5.0	-	
Qgd	Gate-Drain Charge(Miller Charge)		-	5.5	-	

Source-Drain Diode Ratings and Characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit.
IS	Maximum Continuous Drain-Source Diode Forward Current		-	-	11	A
ISM	Maximum Pulsed Drain-Source Diode Forward Current		-	-	33	
VSD	Diode Forward Voltage	IS =25A, VGS =0V	-	-	1.4	V
trr	Reverse Recovery Time	IS =25A, VGS=0V, dIF/dt=100A/us	-	220	-	nS
Qrr	Reverse Recovery Charge		-	2.0	-	uC

NOTES

1. Repeativity rating : pulse width limited by junction temperature
2. IAS =2.1A, VDD = 50V, RG = 25Ω, Starting TJ = 25°C
3. ISD ≤ ID, di/dt ≤ 200A/us, VDD ≤ BVDSS, Starting TJ = 25°C
4. Pulse Test : Pulse Width ≤ 300us, Duty Cycle ≤ 2%
5. Essentially independent of operating temperature.

TYPICAL ELECTRICAL CHARACTERISTICS

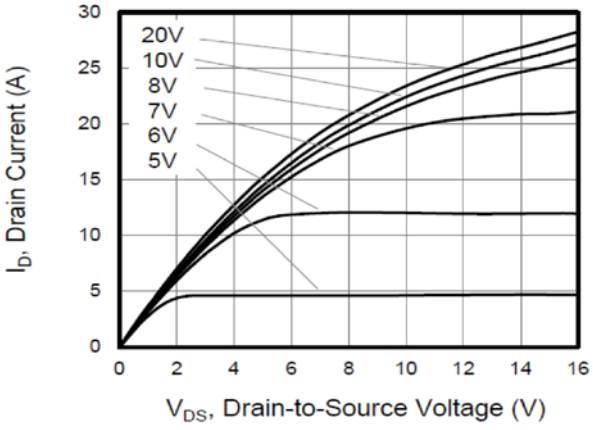


Figure 1. On Region Characteristics

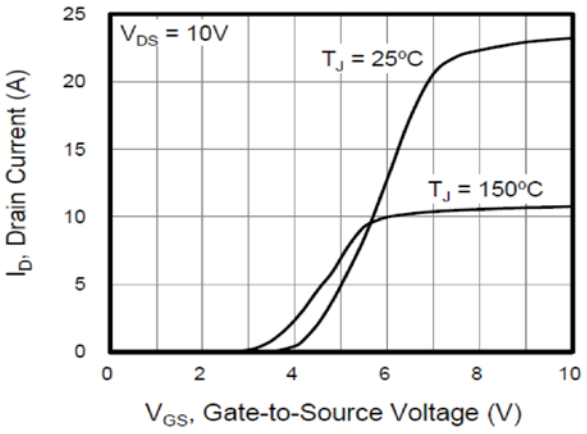


Figure 2. Transfer Characteristics

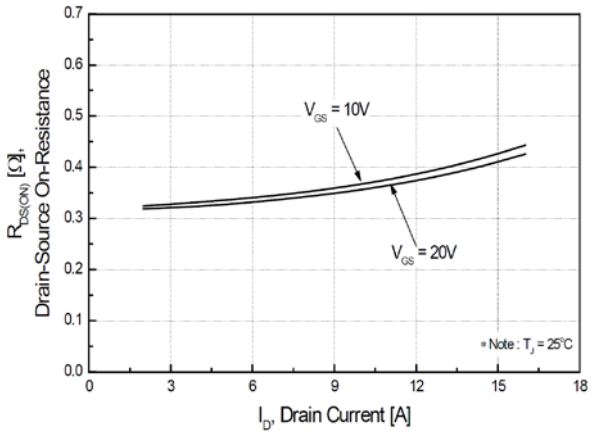


Figure 3. On Resistance Variation vs Drain Current and Gate Voltage

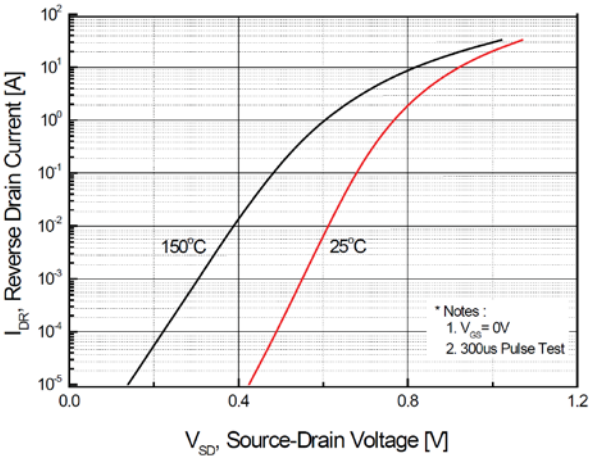


Figure 4. Body Diode Forward Voltage Variation with Source Current and Temperature

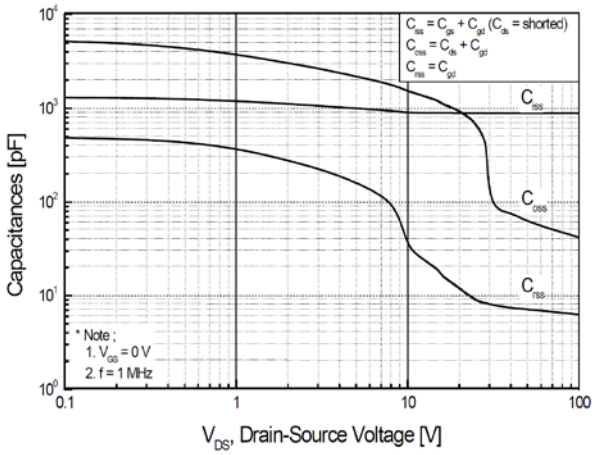


Figure 5. Capacitance Characteristics

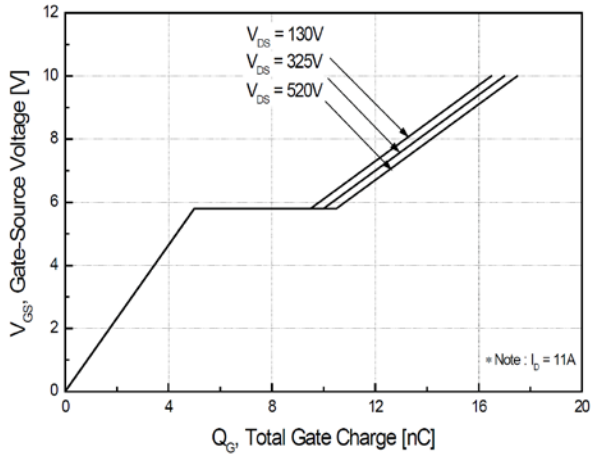


Figure 6. Gate Charge Characteristics

TYPICAL ELECTRICAL CHARACTERISTICS

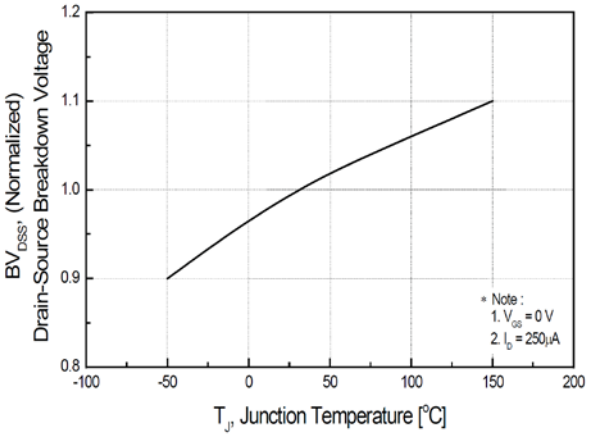


Figure 7. Breakdown Voltage Variation vs Temperature

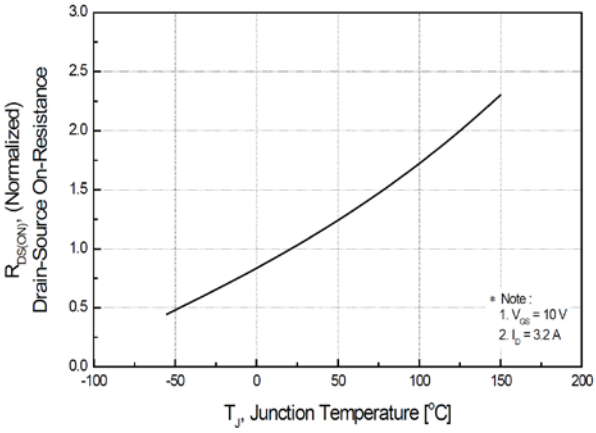


Figure 8. On-Resistance Variation VS Temperature

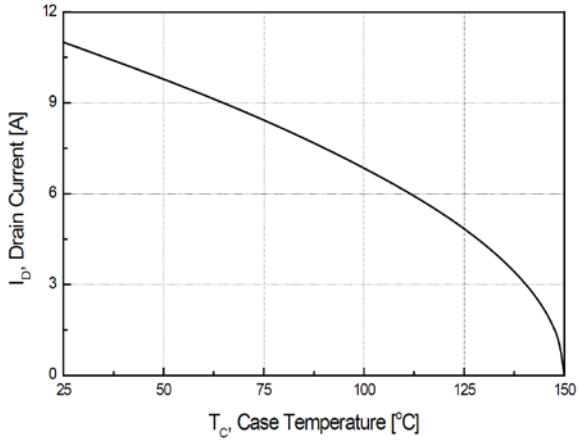


Figure 9. Maximum Safe Operating Area

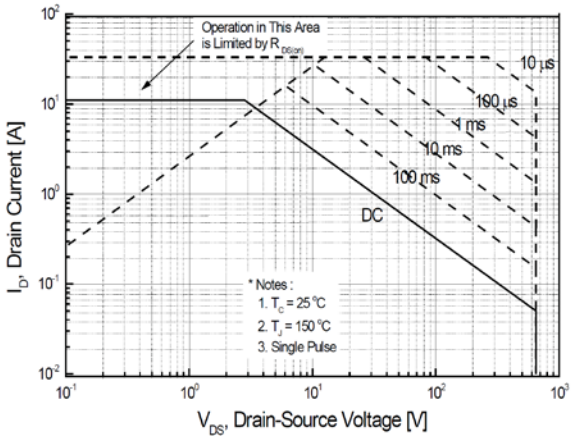


Figure 10. Maximum Drain Current vs Case Temperature

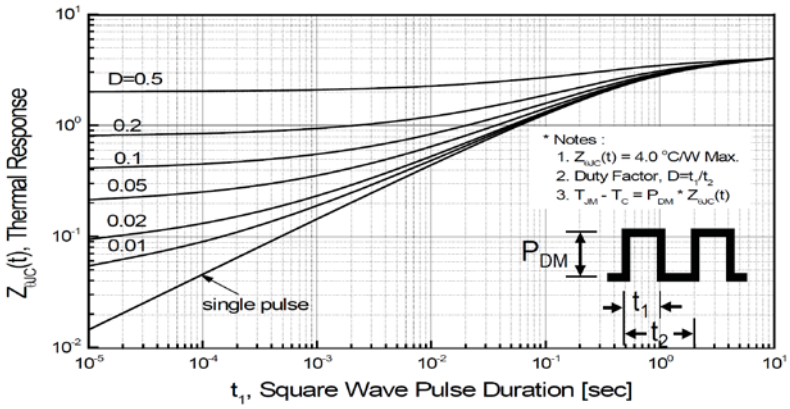
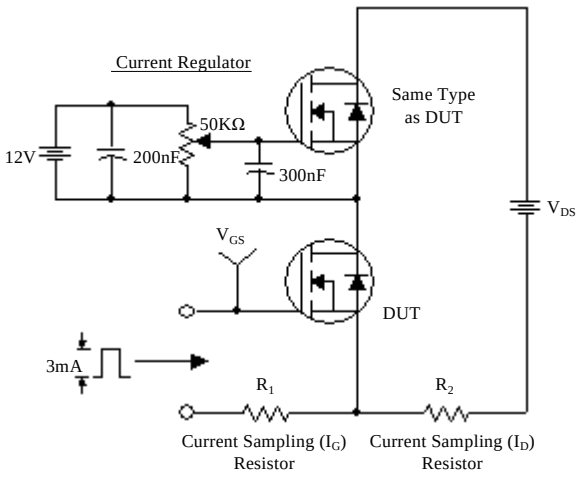
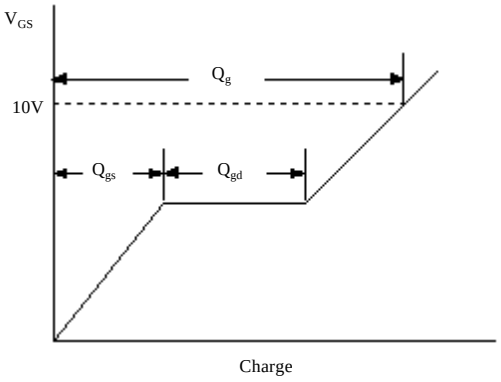


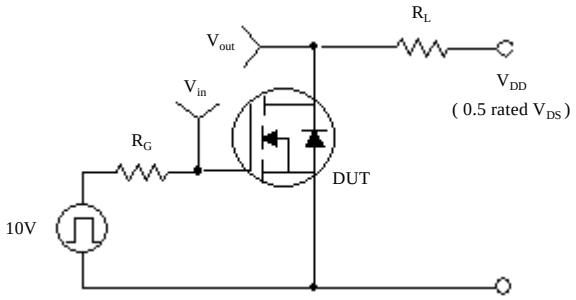
Figure 11. Transient Thermal Response Curve

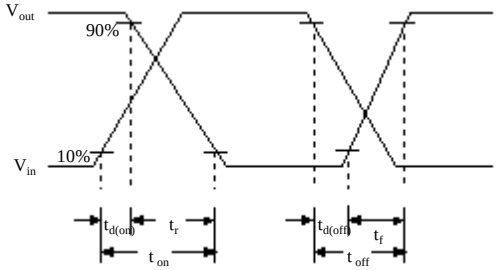
Gate Charge Test Circuit & Waveform



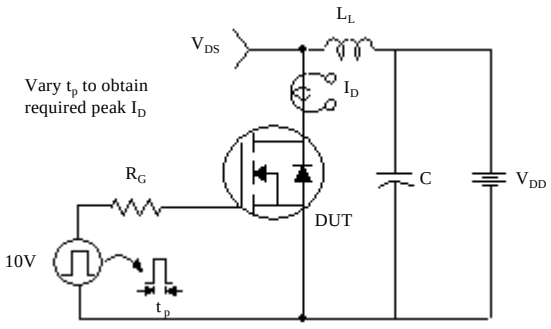


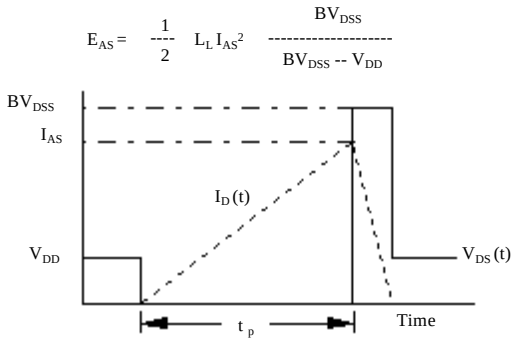
Resistive Switching Test Circuit & Waveforms





Unclamped Inductive Switching Test Circuit & Waveforms





Peak Diode Recovery dv/dt Test Circuit & Waveforms