ORIENTAL
SEMICONDUCTOR

GreenMOS™

OSG55R092HF_Datasheet

Green PRODUCT

RoHS compliant

Enhancement Mode
N-Channel Power MOSFET

Features

- Low $R_{DS(on)}$ & FOM
- Excellent low switching loss
- Excellent stability and uniformity
- Easy to drive

Applications

- PC power
- Server power supply
- Telecom
- Solar invertor
- Super charger for automobiles

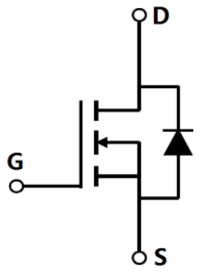
General Description

OSG55R092HF use advanced GreenMOS™ technology to provide low $R_{DS(ON)}$, low gate charge, fast switching and excellent avalanche characteristics. This device is suitable for telecom and super charger applications.

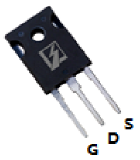
◆ $V_{DS,\ min@Tjmax}$	600 V
◆ $I_{D,\ pulse}$	120 A
◆ $R_{DS(ON),\ max\ @\ VGS=10\ V}$	92 mΩ
◆ Q_g	38.6 nC

Schematic and Package Information

SCHEMATIC DIAGRAM



PIN ASSIGNMENT-TOP VIEW



TO247
OSG55R092HF

Absolute Maximum Ratings at T_j=25℃ unless otherwise noted

PARAMETER	SYMBOL	VALUE	UNIT
Drain source voltage	V_{DS}	550	V
Gate source voltage	V_{GS}	±30	V
Continuous drain current1), T_C=25 ℃	I_D	40	A
Continuous drain current1), T_C=100 ℃		25	
Pulsed drain current2), T_C=25 ℃	$I_{D,\ pulse}$	120	A
Power dissipation3), T_C=25 ℃	P_D	101	W
Single pulsed avalanche energy5)	E_{AS}	770	mJ
MOSFET dv/dt ruggedness, V_{DS}=0...440 V	dv/dt	50	V/ns
Reverse diode dv/dt, V_{DS}=0...440 V, $I_{SD} \le I_D$	dv/dt	15	V/ns
Operation and storage temperature	T_{stg} , T_j	-55 to 150	℃

Thermal Characteristics

PARAMETER	SYMBOL	VALUE	UNIT
Thermal resistance, junction-case	$R_{\theta JC}$	0.81	°C/W
Thermal resistance, junction-ambient[4)]	$R_{\theta JA}$	62	°C/W

Electrical Characteristics at T_j=25 ℃ unless otherwise specified

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Drain-source breakdown voltage	BV_{DSS}	550			V	V_{GS}=0 V, I_D=1 mA
		600	670			V_{GS}=0 V, I_D=1 mA, T_j=150 ℃
Gate threshold voltage	$V_{GS(th)}$	2.9		3.9	V	V_{DS}=V_{GS}, I_D=1 mA
Drain-source on-state resistance	$R_{DS(ON)}$		0.078	0.092	Ω	V_{GS}=10 V, I_D=20 A
			0.183			V_{GS}=10 V, I_D=20 A, T_j=150 ℃
Gate-source leakage current	I_{GSS}			100	nA	V_{GS}=30 V
				-100		V_{GS}=-30 V
Drain-source leakage current	I_{DSS}			1	μA	V_{DS}=550 V, V_{GS}=0 V

Dynamic Characteristics

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Input capacitance	C_{iss}		2425.5		pF	V_{GS}=0 V, V_{DS}=50 V, f=100 kHz
Output capacitance	C_{oss}		244.3		pF	
Reverse transfer capacitance	C_{rss}		10.3		pF	
Turn-on delay time	$t_{d(on)}$		53.7		ns	V_{GS}=10 V, V_{DS}=400 V, R_G=2 Ω, I_D=20 A
Rise time	t_r		79.3		ns	
Turn-off delay time	$t_{d(off)}$		122.9		ns	
Fall time	t_f		59.1		ns	

Gate Charge Characteristics

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Total gate charge	Q_g		38.6		nC	I_D=20 A, V_{DS}=400 V, V_{GS}=10 V
Gate-source charge	Q_{gs}		9.0		nC	
Gate-drain charge	Q_{gd}		15.2		nC	
Gate plateau voltage	$V_{plateau}$		5.9		V	

Body Diode Characteristics

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Diode forward current	I_S			40	A	$V_{GS}<V_{th}$
Pulsed source current	I_{SP}			120		
Diode forward voltage	V_{SD}			1.4	V	I_S=40 A, V_{GS}=0 V
Reverse recovery time	t_{rr}		339.0		ns	I_S=20 A, di/dt=100 A/μs
Reverse recovery charge	Q_{rr}		4.9		μC	
Peak reverse recovery current	I_{rrm}		27.9		A	

Note

1) Calculated continuous current based on maximum allowable junction temperature.
2) Repetitive rating; pulse width limited by max. junction temperature.
3) Pd is based on max. junction temperature, using junction-case thermal resistance.
4) The value of $R_{\theta JA}$ is measured with the device mounted on 1 in 2 FR-4 board with 2oz. Copper, in a still air environment with T_a=25 °C.
5) V_{DD}=100 V, R_G=50 Ω, L=10 mH, starting T_j=25 °C.

■ Electrical Characteristics Diagrams

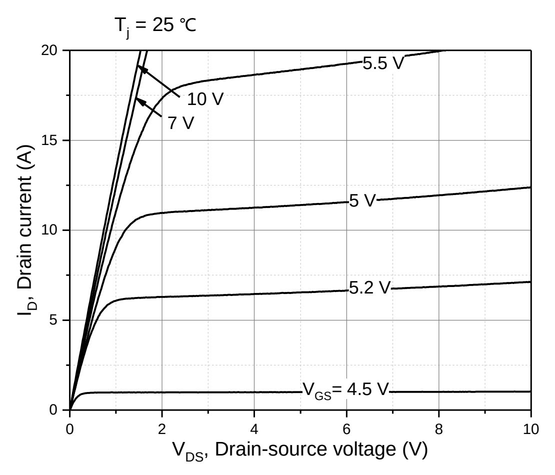


Figure 1, Typ. output characteristics

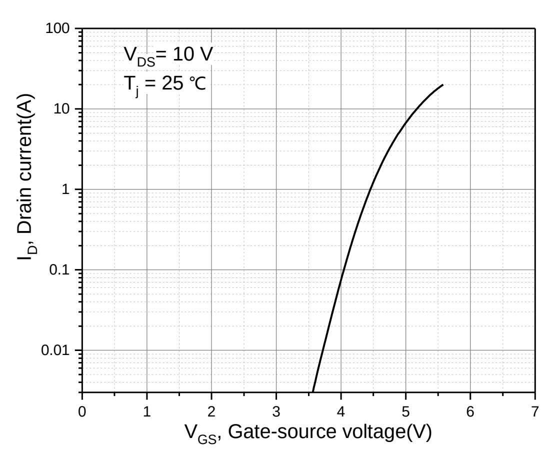


Figure 2, Typ. transfer characteristics

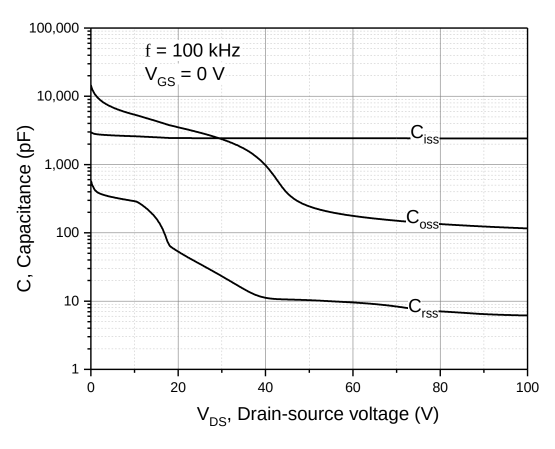


Figure 3, Typ. capacitances

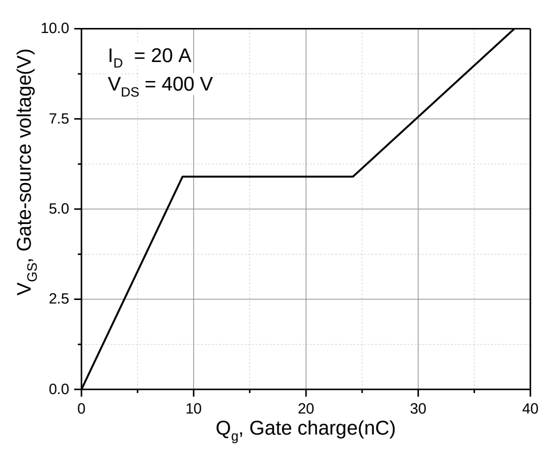


Figure 4, Typ. gate charge

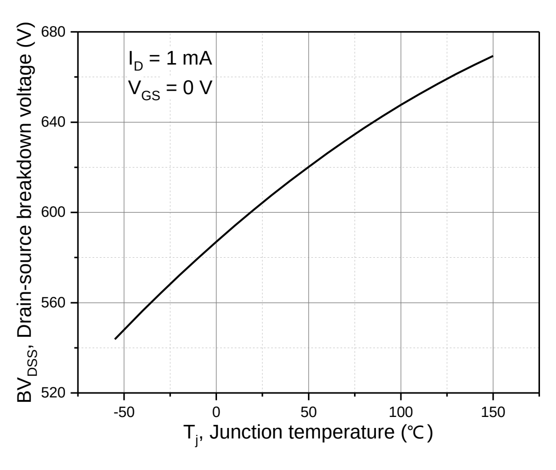


Figure 5, Drain-source breakdown voltage

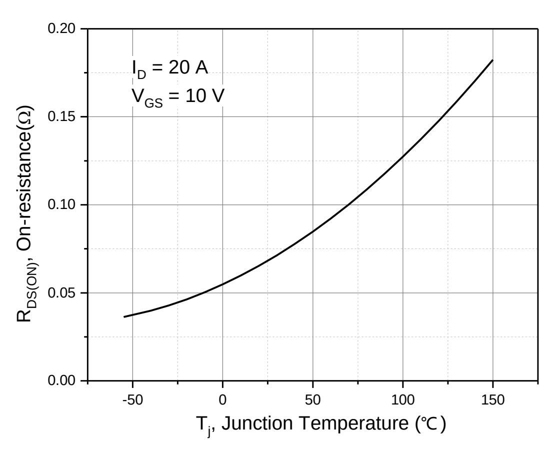


Figure 6, Drain-source on-state resistance

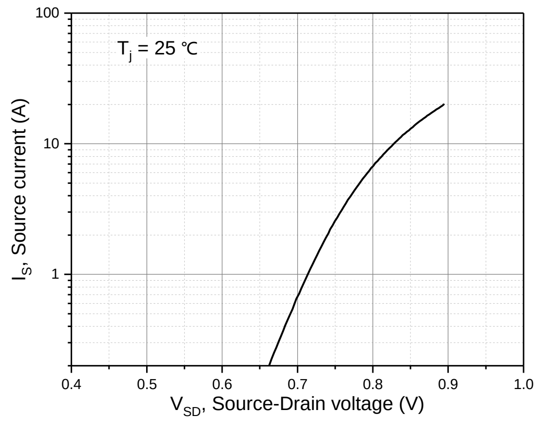


Figure 7, Forward characteristic of body diode

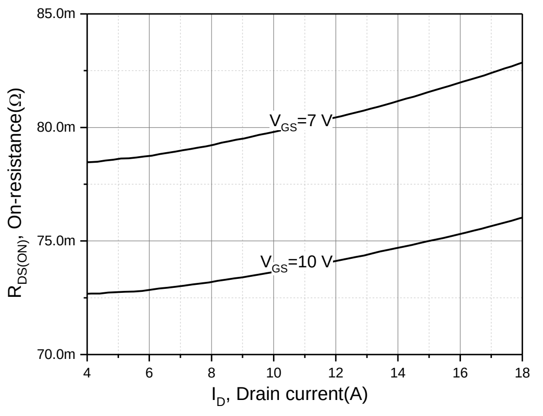


Figure 8, Drain-source on-state resistance

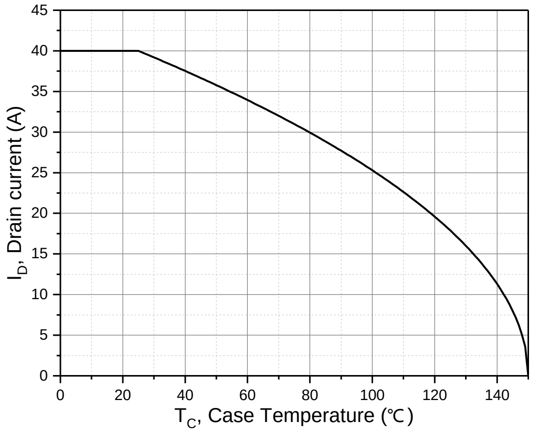


Figure 9, Drain current

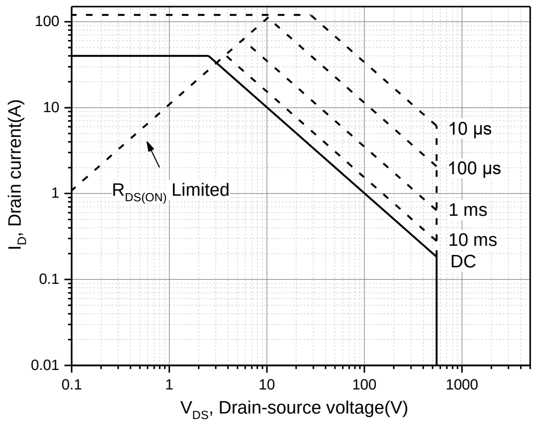


Figure 10, Safe operation area for T_C=25 ℃

■ Test circuits and waveforms

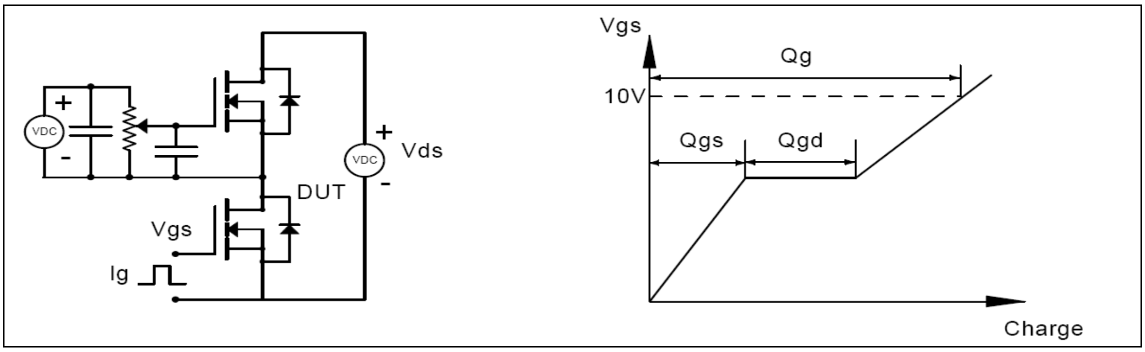


Figure 1, Gate charge test circuit & waveform

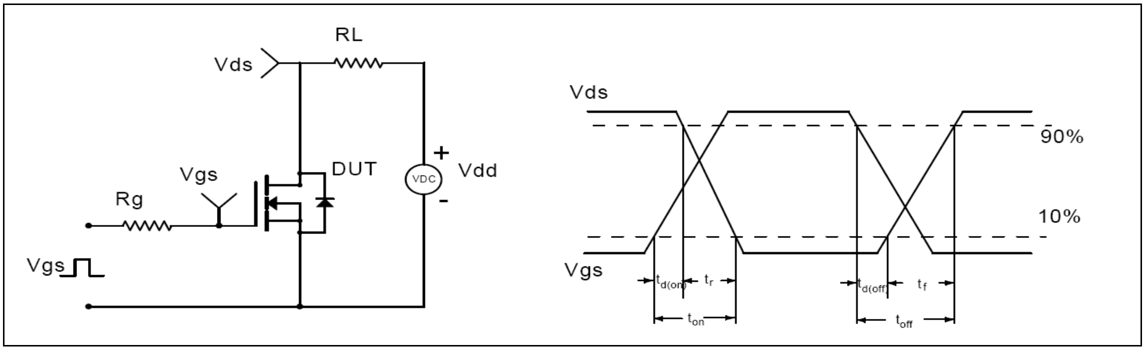


Figure 2, Switching time test circuit & waveforms

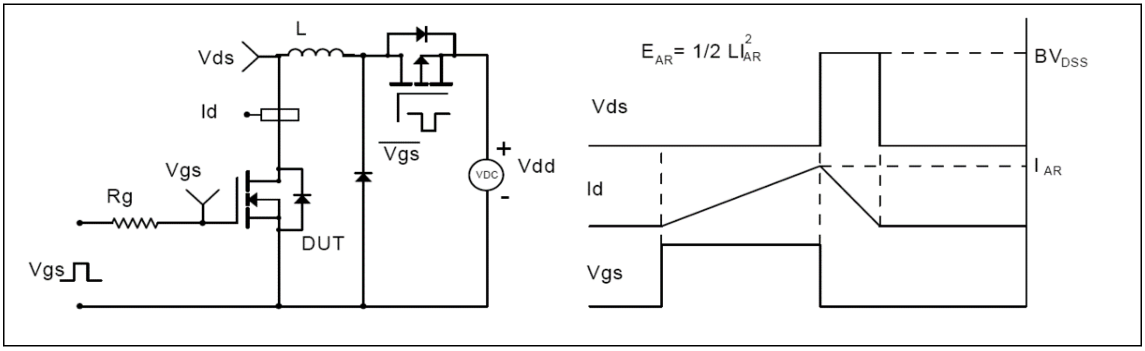


Figure 3, Unclamped inductive switching (UIS) test circuit & waveforms

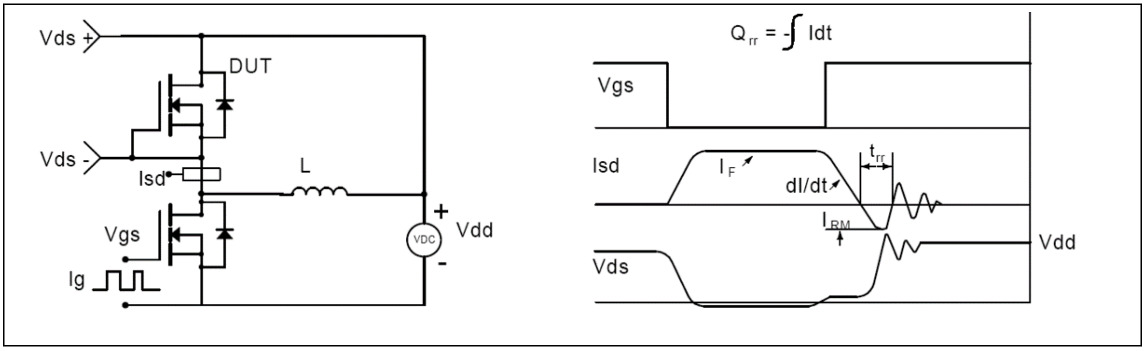
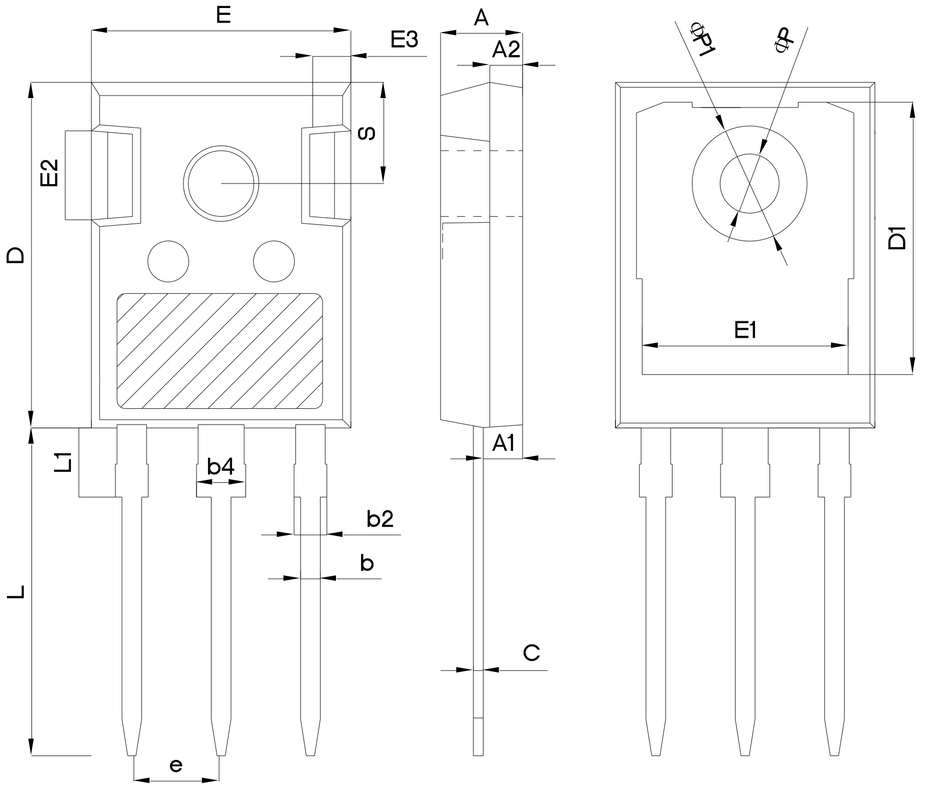


Figure 4, Diode reverse recovery test circuit & waveforms

■ Package Information

Figure1, TO247 package outline dimension



SYMBOL	mm		
	MIN	NOM	MAX
A	4.80	5.00	5.20
A1	2.21	2.41	2.59
A2	1.85	2.00	2.15
b	1.11	1.21	1.36
b2	1.91	2.01	2.21
b4	2.91	3.01	3.21
c	0.51	0.61	0.75
D	20.80	21.00	21.30
D1	16.25	16.55	16.85
E	15.50	15.80	16.10
E1	13.00	13.30	13.60
E2	4.80	5.00	5.20
E3	2.30	2.50	2.70
e		5.44BSC	
L	19.82	19.92	20.22
L1	-	-	4.30
ΦP	3.40	3.60	3.80
ΦP1	-	-	7.30
S		6.15BSC	

■ Ordering Information

Package	Units/Tube	Tubes/Inner Box	Units/Inner Box	Inner Box/Carton Box	Units/Carton Box
TO247	30	11	330	6	1980

■ Product Information

Product	Package	Pb Free	RoHS	Halogen Free
OSG55R092HF	TO247	yes	yes	yes