OSG65R099JF_Datasheet

Enhancement Mode

N-Channel Power MOSFET

Features

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

Applications

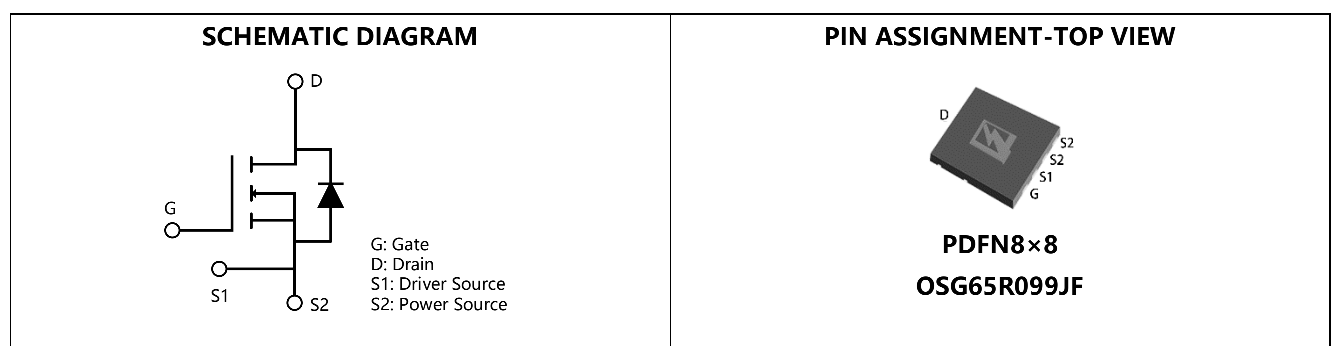
- PC power
- Server power supply
- Telecom
- Solar invertor
- Super charger for automobiles

General Description

OSG65R099JF uses 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.

- $V_{DS,\ min@Tjmax}$ 700 V
- $I_{D,\ pulse}$ 120 A
- $R_{DS(ON),\ max}$ @ VGS=10 V 99 mΩ
- Q_g 43.6 nC

Schematic and Package Information



Absolute Maximum Ratings at T_j=25℃ unless otherwise noted

Parameter	Symbol	Value	Unit
Drain source voltage	V_{DS}	650	V
Gate source voltage	V_{GS}	±30	V
Continuous drain current[1)], T_C=25 ℃	I_D	40	A
Continuous drain current[1)], T_C=100 ℃		25	
Pulsed drain current[2)], T_C=25 ℃	$I_{D,\ pulse}$	120	A
Power dissipation[3)], T_C=25 ℃	P_D	278	W
Single pulsed avalanche energy[5)]	E_{AS}	1000	mJ
MOSFET dV/dt ruggedness, V_{DS}=0...480 V	dV/dt	50	V/ns
Reverse diode dV/dt, V_{DS}=0...480 V, $I_{SD} \le I_D$	dV/dt	15	V/ns
Operation and storage temperature	T_{stg} , T_j	-55 to 150	℃

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■ Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal resistance, junction-case	$R_{\theta JC}$	0.45	℃/W
Thermal resistance, junction-ambient[4)]	$R_{\theta JA}$	62	℃/W

■ Electrical Characteristics at T_j=25 ℃ unless otherwise specified

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Drain-source breakdown voltage	BV_{DSS}	650			V	V_{GS}=0 V, I_D=1 mA
		700	770			V_{GS}=0 V, I_D=1 mA, T_j=150 ℃
Gate threshold voltage	$V_{GS(th)}$	3.0		4.0	V	V_{DS}=V_{GS}, I_D=1 mA
Drain-source on-state resistance	$R_{DS(ON)}$		0.08	0.099	Ω	V_{GS}=10 V, I_D=20 A
			0.205			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}=650 V, V_{GS}=0 V

■ Dynamic Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Input capacitance	C_{iss}		3042.6		pF	V_{GS}=0 V, V_{DS}=50 V, f=200 kHz
Output capacitance	C_{oss}		200.6		pF	
Reverse transfer capacitance	C_{rss}		3.9		pF	
Turn-on delay time	$t_{d(on)}$		68.1		ns	I_D=20 A, V_{GS}=10 V, V_{DS}=400 V, R_G=25 Ω,
Rise time	t_r		53.7		ns	
Turn-off delay time	$t_{d(off)}$		109.6		ns	
Fall time	t_f		56.4		ns	

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■ Gate Charge Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Total gate charge	Q_g		43.6		nC	I_D=20 A, V_{DS}=400 V, V_{GS}=10 V
Gate-source charge	Q_{gs}		13		nC	
Gate-drain charge	Q_{gd}		13.4		nC	
Gate plateau voltage	$V_{plateau}$		5.6		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}		441.5		ns	I_S=20 A, di/dt=100 A/μs
Reverse recovery charge	Q_{rr}		7.5		μC	
Peak reverse recovery current	I_{rrm}		31.2		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 $R_{θJA}$ 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 ℃.
5) V_{DD}=100 V, R_G=25 Ω, L=20 mH, starting T_j=25 ℃.

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■ Electrical Characteristics Diagrams

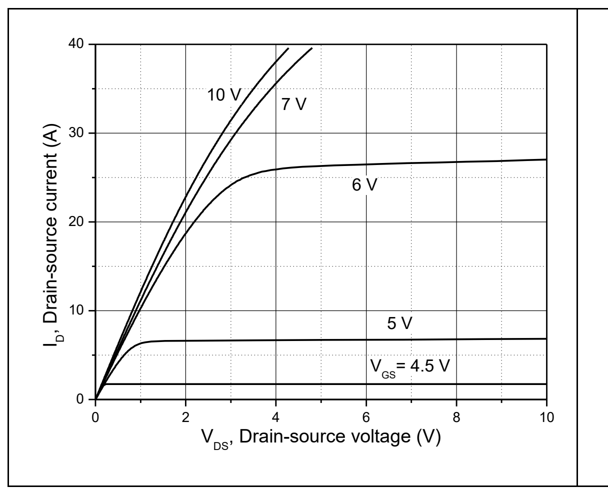

Figure 1, Typ. output characteristics

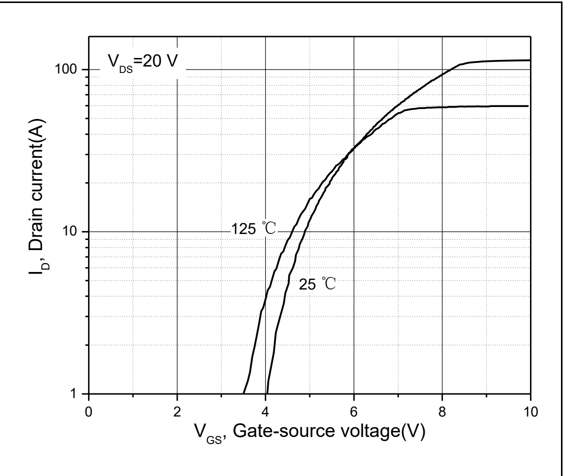

Figure 2, Typ. transfer characteristics

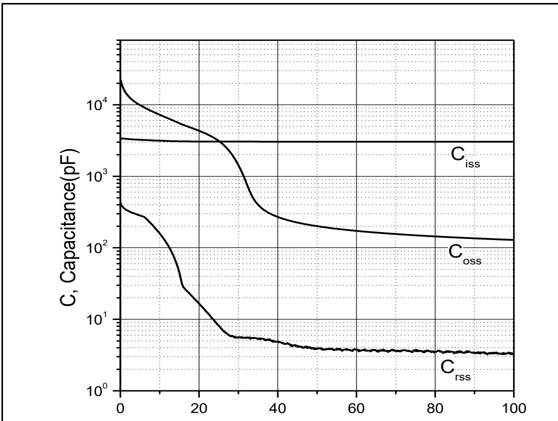

Figure 3, Typ. capacitances

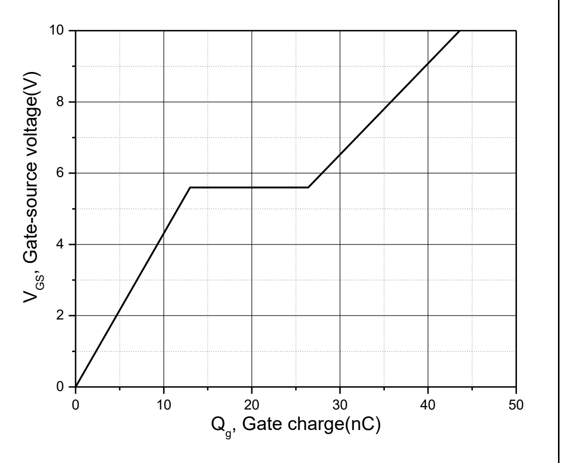

Figure 4, Typ. gate charge

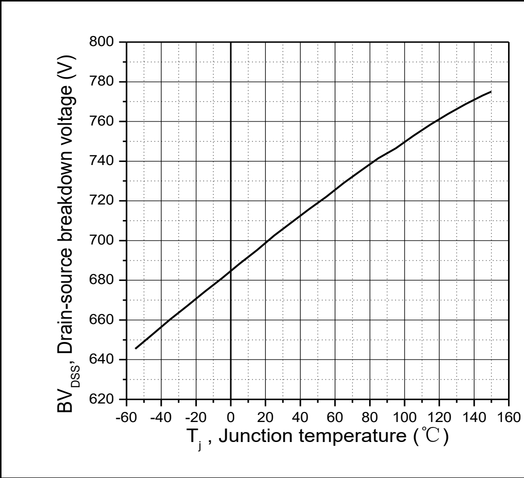

Figure 5, Drain-source breakdown voltage

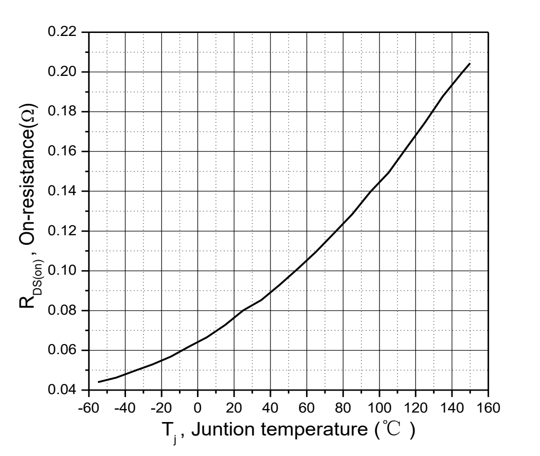

Figure 6, Drain-source on-state resistance

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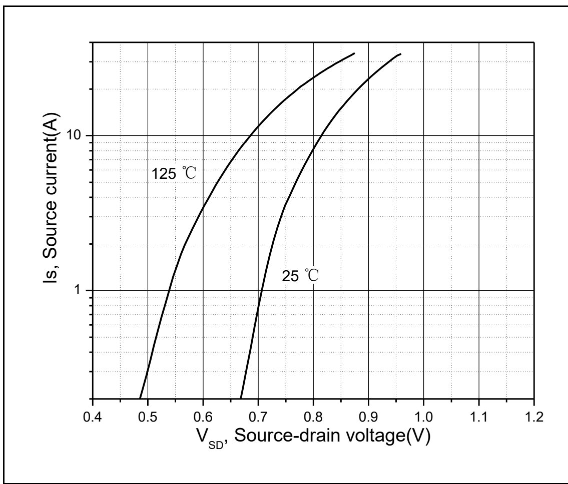

Figure 7, Forward characteristic of body diode

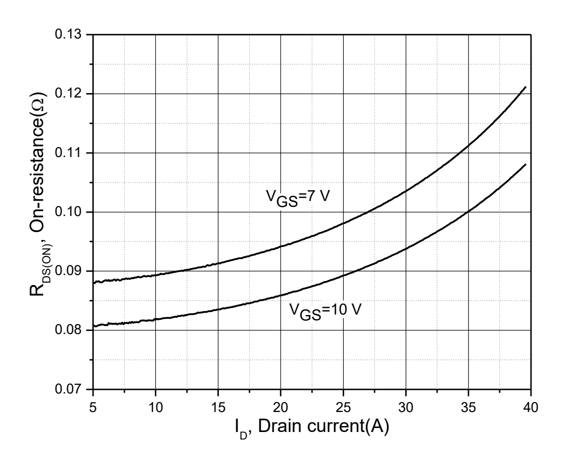

Figure 8, Drain-source on-state resistance

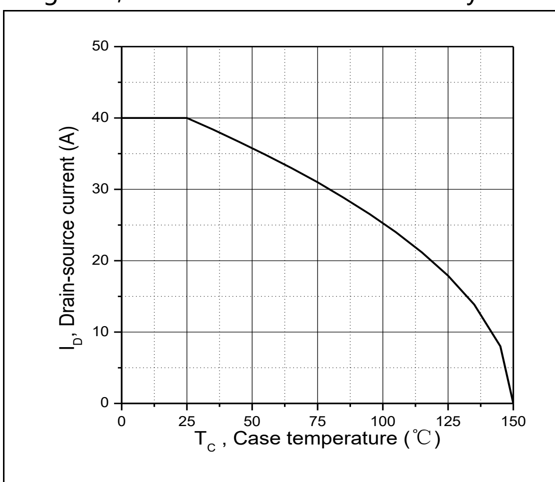

Figure 9, Drain current

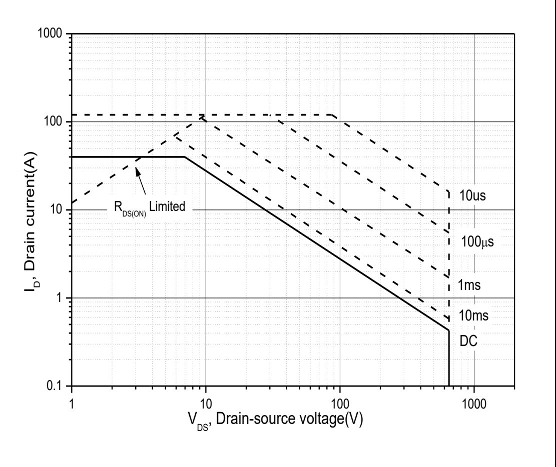

Figure 10, Safe operation area for T_C=25 ℃

■ Test circuits and waveforms

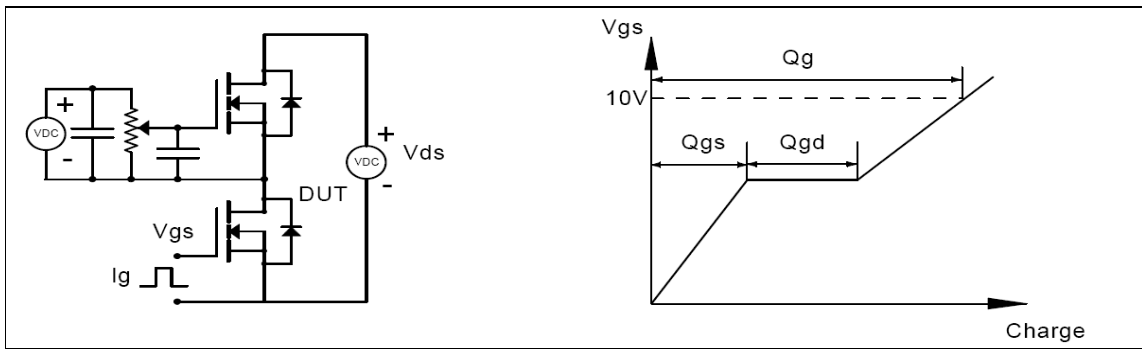

Figure 1, Gate charge test circuit & waveform

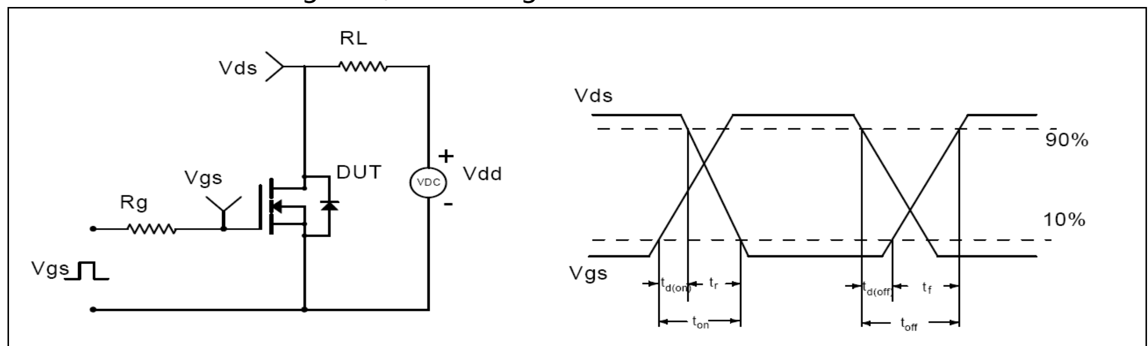

Figure 2, Switching time test circuit & waveforms

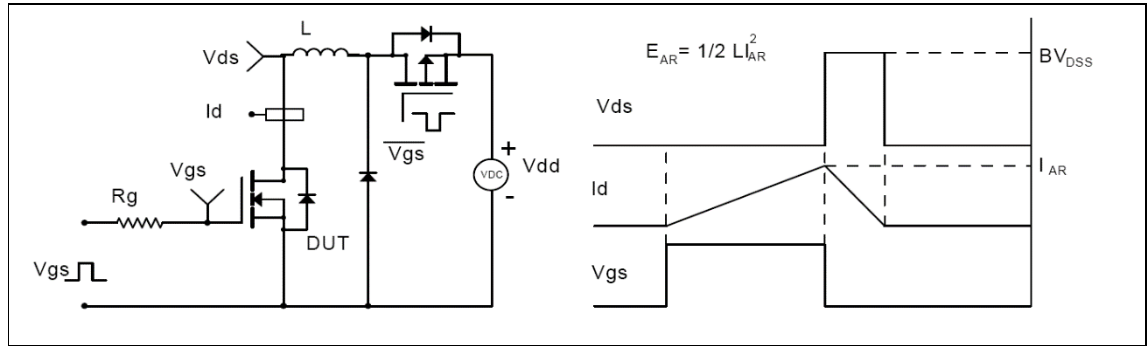

Figure 3, Unclamped inductive switching (UIS) test circuit & waveforms

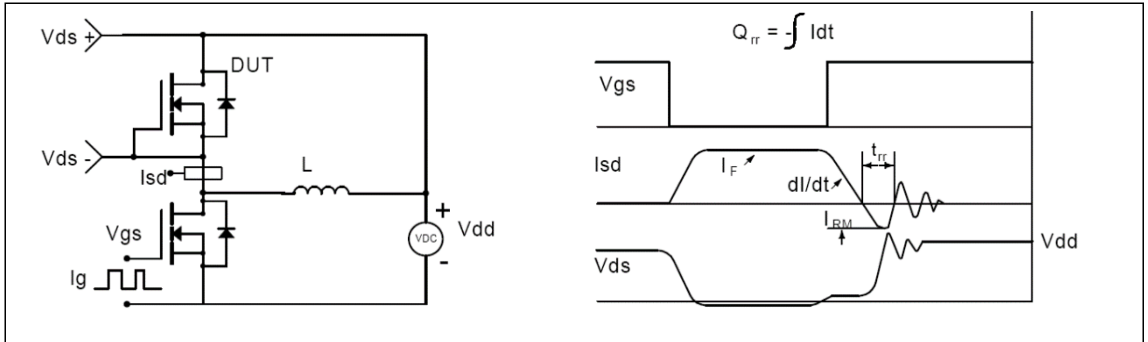

Figure 4, Diode reverse recovery test circuit & waveforms

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■ Package Information

Figure1, PDFN8×8 package outline dimension

DIM	MIN	MAX	TYP
A	0.90	1.10	1.00
b	0.90	1.10	1.00
b1	0.00	0.05	0.02
C	0.2 REF		
D	7.90	8.10	8.00
D1	7.10	7.30	7.20
E	7.90	8.10	8.00
E1	4.65	4.85	4.75
E2	2.65	2.85	2.75
E3	0.30	0.50	0.40
e	2.0 BSC		
L	0.40	0.60	0.50

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■ Ordering Information

Package	Units/Tube	Tubes/Inner Box	Units/Inner Box	Inner Box/Carton Box	Units/Carton Box
PDFN8×8	2500	2	5000	5	25000

■ Product Information

Product	Package	Pb Free	RoHS	Halogen Free
OSG65R099JF	PDFN8×8	yes	yes	yes