ORIENTAL SEMICONDUCTOR

GreenMOS™

OSG65R260FSF_NB_Datasheet

Green PRODUCT

RoHS compliant

Enhancement Mode N-Channel Power MOSFET

Features

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

Applications

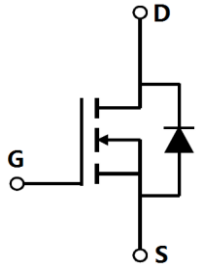
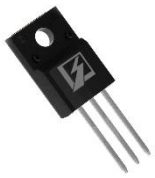
- Lighting
- Hard switching PWM
- Server power supply
- Charger

■ General Description

OSG65R260FSF_NB uses advanced GreenMOS™ technology to provide low $R_{DS(ON)}$, low gate charge, fast switching and excellent avalanche characteristics. This device is suitable for active power factor correction and switching mode power supply applications.

- $V_{DS,\ min@Tjmax}$ 700 V
- $I_{D,\ pulse}$ 45 A
- $R_{DS(ON),\ max\ @\ VGS=10\ V}$ 260 mΩ
- Q_g 26.4 nC

■ Schematic and Package Information

Schematic Diagram	Pin Assignment Top View
	 **TO220F** **OSG65R260FSF_NB**

■ 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	15	A
Continuous drain current[1], T_C=100 ℃		9.5	
Pulsed drain current[2], T_C=25 ℃	$I_{D,\ pulse}$	45	A
Continuous diode forward current[1] , T_C=25 ℃	I_S	15	A
Diode pulsed current[2] , T_C=25 ℃	$I_{S,\ pulse}$	45	A
Power dissipation[3] , T_C=25 ℃	P_D	33	W
Single pulsed avalanche energy[5]	E_{AS}	360	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}≤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	$R_{\theta JC}$	3.8	℃/W
Thermal resistance, junction-ambient[4)]	$R_{\theta JA}$	62.5	℃/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=250 μA
		700				V_{GS}=0 V, I_D=250 μA, T_j=150 ℃
Gate threshold voltage	$V_{GS(th)}$	2.9		3.9	V	V_{DS}=V_{GS}, I_D=250 μA
Drain-source on-state resistance	$R_{DS(ON)}$		0.22	0.26	Ω	V_{GS}=10 V, I_D=7.5 A
			0.54			V_{GS}=10 V, I_D=7.5 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
Gate resistance	R_G		8.3		Ω	f= 1 MHz, Open drain

■ Dynamic Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Input capacitance	C_{iss}		1227		pF	V_{GS}=0 V, V_{DS}=50 V, f=100 kHz
Output capacitance	C_{oss}		100.2		pF	
Reverse transfer capacitance	C_{rss}		7.1		pF	
Turn-on delay time	$t_{d(on)}$		24.7		ns	V_{GS}=10 V, V_{DS}=400 V, R_G=2 Ω, I_D=8 A
Rise time	t_r		7.3		ns	
Turn-off delay time	$t_{d(off)}$		56.3		ns	
Fall time	t_f		9.5		ns	

■ Gate Charge Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Total gate charge	Q_g		26.4		nC	I_D=8 A, V_{DS}=400 V, V_{GS}=10 V
Gate-source charge	Q_{gs}		7.8		nC	
Gate-drain charge	Q_{gd}		7.9		nC	
Gate plateau voltage	$V_{plateau}$		5.3		V	

■ Body Diode Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Diode forward voltage	V_{SD}			1.4	V	I_S=15 A, V_{GS}=0 V
Reverse recovery time	t_{rr}		292		ns	V_R=400 V, I_S=8 A, di/dt=100 A/μs
Reverse recovery charge	Q_{rr}		3.5		μC	
Peak reverse recovery current	I_{rrm}		21.8		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=79.9 mH, starting T_j=25 °C.

■ Electrical Characteristics Diagrams

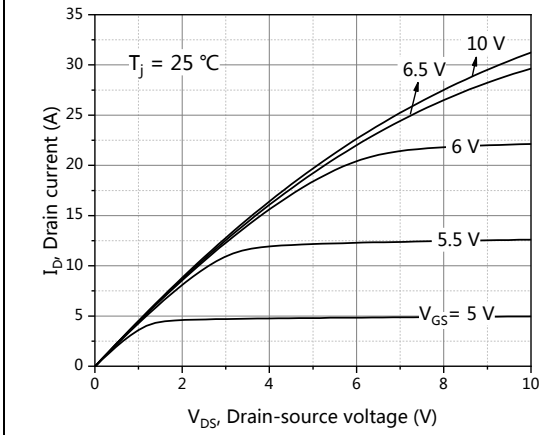


Figure 1, Typ. output characteristics

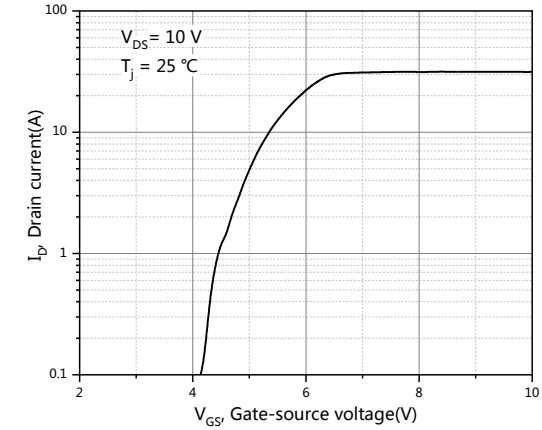


Figure 2, Typ. transfer characteristics

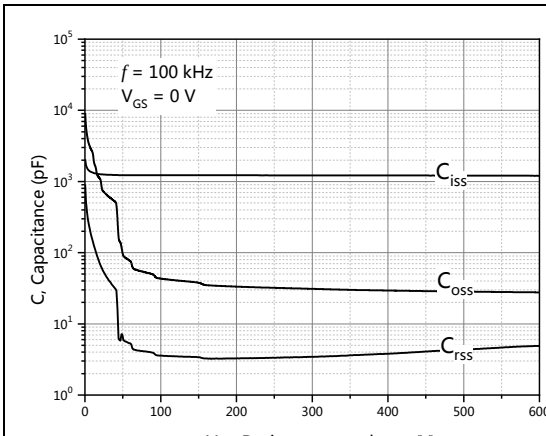


Figure 3, Typ. capacitances

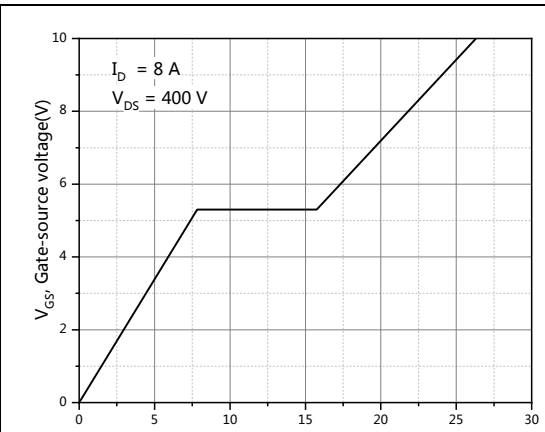


Figure 4, Typ. gate charge

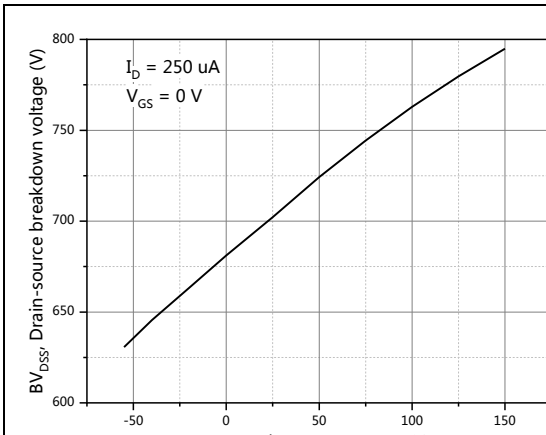


Figure 5, Drain-source breakdown voltage

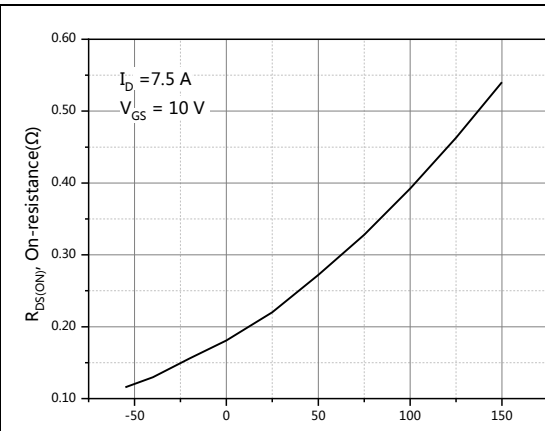


Figure 6, Drain-source on-state resistance

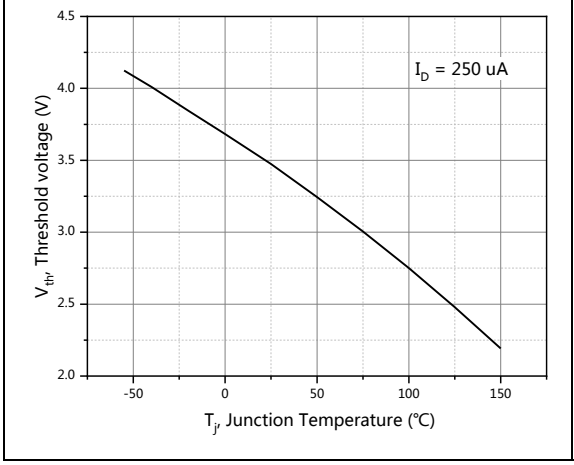


Figure 7, Threshold voltage

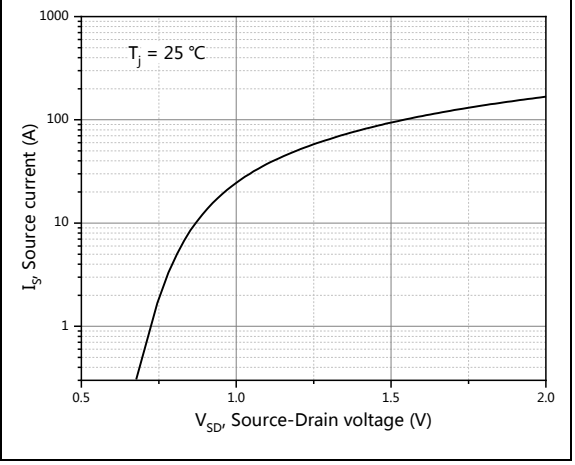


Figure 8, Forward characteristic of body diode

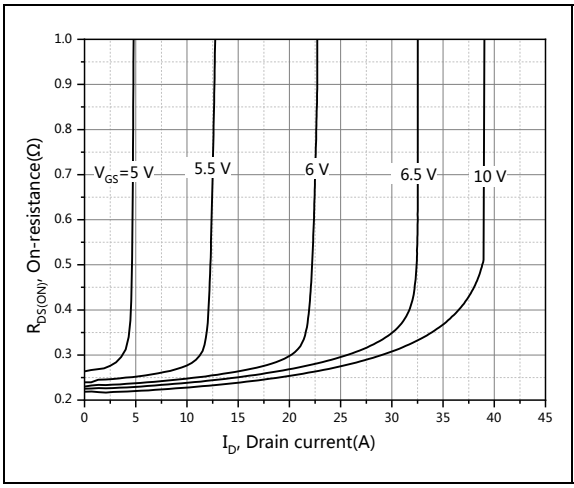


Figure 9, Drain-source on-state resistance

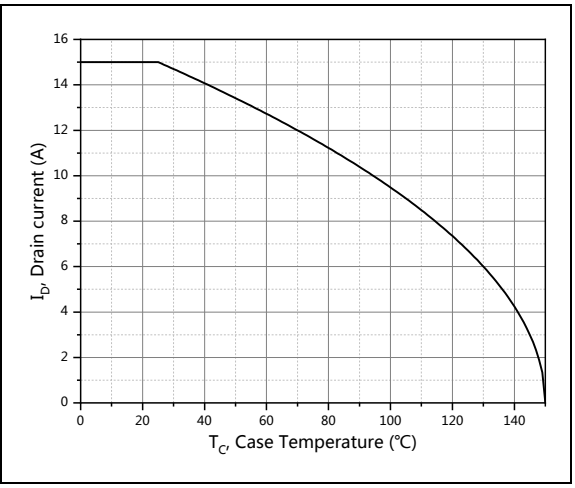


Figure 10, Drain current

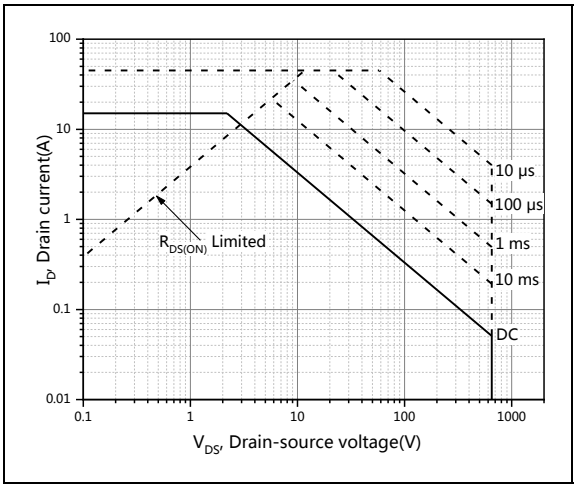


Figure 11, Safe operation area T_C=25 ℃

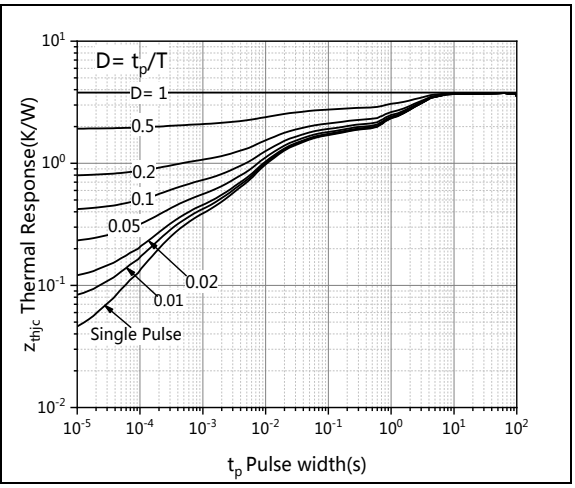


Figure 12, Max. transient thermal impedance

■ Test circuits and waveforms

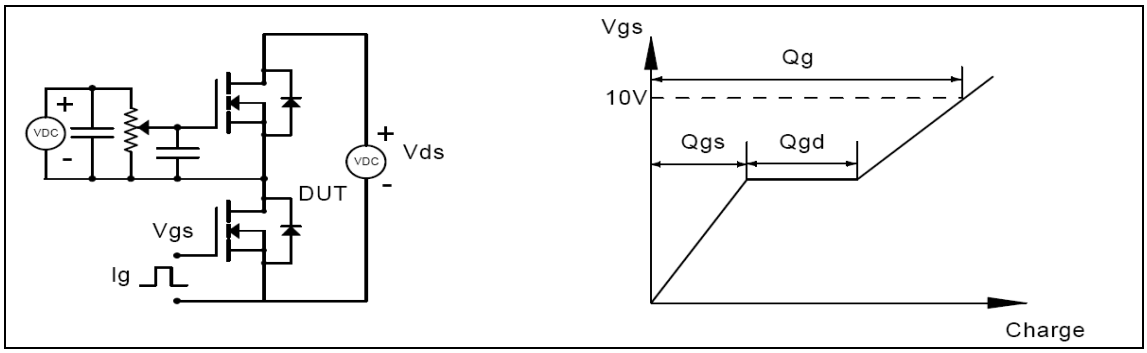


Figure 1, Gate charge test circuit & waveform

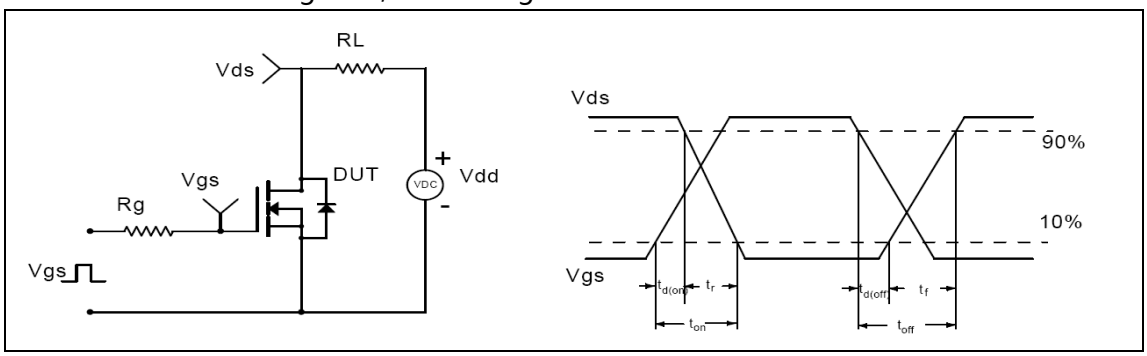


Figure 2, Switching time test circuit & waveforms

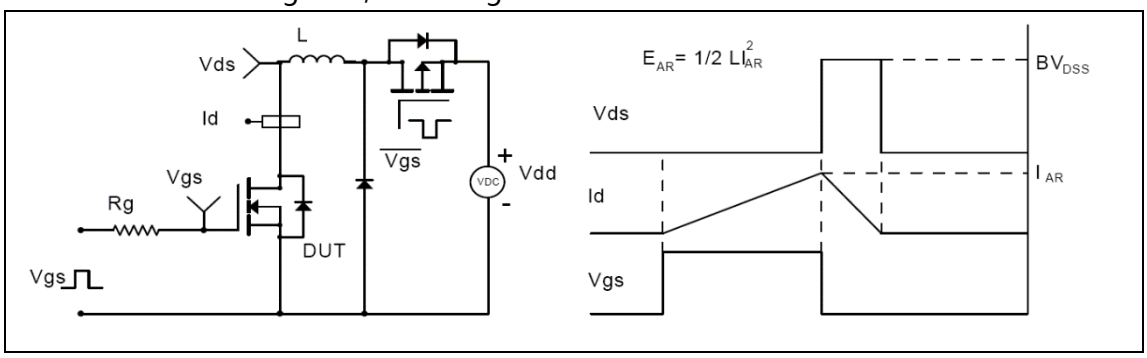


Figure 3, Unclamped inductive switching (UIS) test circuit & waveforms

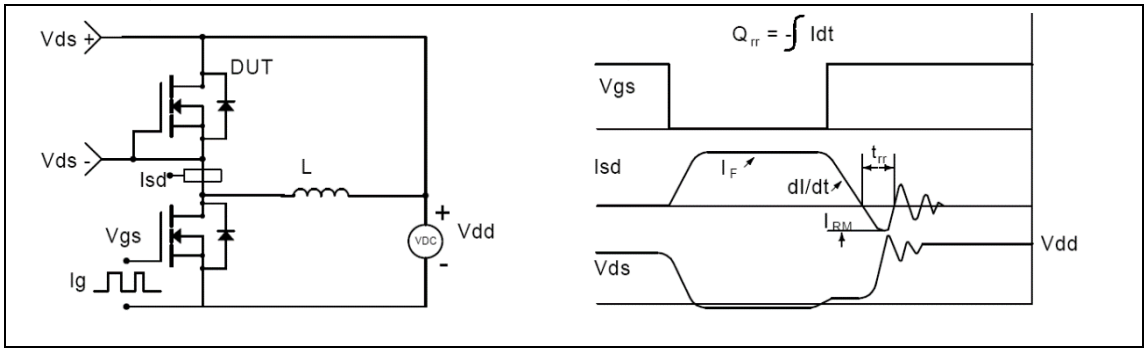
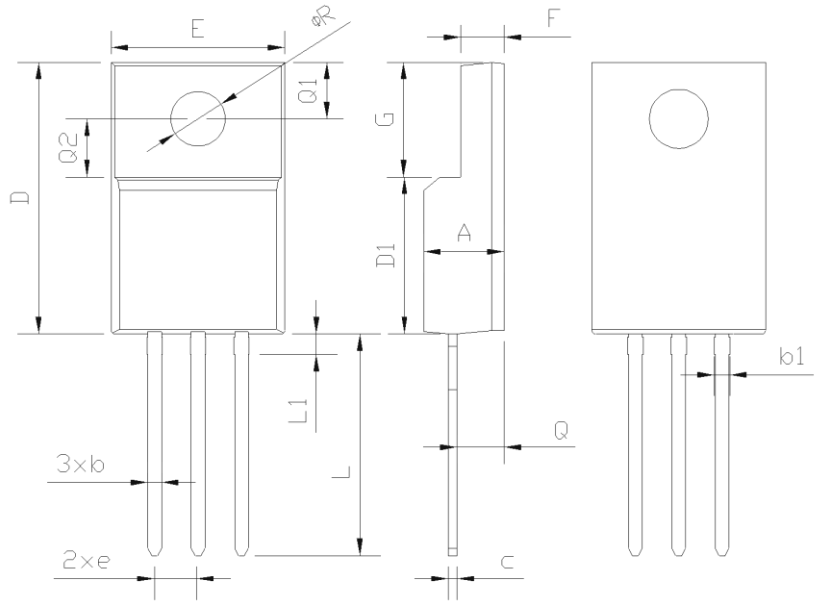


Figure 4, Diode reverse recovery test circuit & waveforms

■ Package Information

Figure1, TO220F_NL package outline dimension



SYMBOL	mm		
	MIN	NOM	MAX
A	4.30	4.50	4.70
b	0.60	0.70	0.80
b1	0.60	0.80	0.90
c	0.45	0.50	0.60
D	14.70	15.00	15.30
D1	8.50 REF.		
e	2.60 BSC.		
E	9.70	10.00	10.30
F	2.50	2.70	2.90
G	6.30	6.50	6.70
L	13.40	13.60	13.80
L1	1.00	1.10	1.20
Q	2.50	2.60	2.70
Q1	2.90	3.00	3.10
Q2	3.50 REF.		
ΦR	3.00	3.20	3.40

■ Ordering Information

Package	Units/Tube	Tubes/Inner Box	Units/Inner Box	Inner Box/Carton Box	Units/Carton Box
TO220F	50	40	2000	4	8000

■ Product Information

Product	Package	Pb Free	RoHS	Halogen Free
OSG65R260FSF_NB	TO220F	yes	yes	yes