ORIENTAL SEMICONDUCTOR

OSS60R190JF_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

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

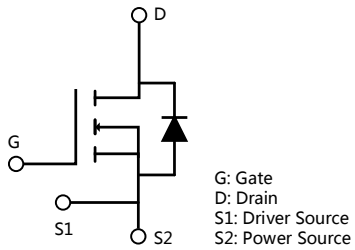
■ General Description

OSS60R190JF 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.

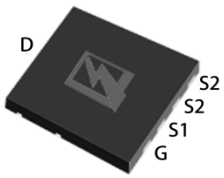
- ◆ $V_{DS,\ min@Tjmax}$ 650 V
- ◆ $I_{D,\ pulse}$ 54 A
- ◆ $R_{DS(ON),\ max\ @\ VGS=10\ V}$ 190 mΩ
- ◆ Q_g 15.8 nC

■ Schematic and Package Information

SCHEMATIC DIAGRAM



PIN ASSIGNMENT-TOP VIEW



PDFN8×8

OSS60R190JF

■ Absolute Maximum Ratings at T_j=25℃ unless otherwise noted

PARAMETER	SYMBOL	VALUE	UNIT
Drain source voltage	V_{DS}	600	V
Gate source voltage	V_{GS}	±30	V
Continuous drain current[1], T_C=25 ℃	I_D	18	A
Continuous drain current[1], T_C=100 ℃		11.5	
Pulsed drain current[2], T_C=25 ℃	$I_{D,\ pulse}$	54	A
Power dissipation[3], T_C=25 ℃	P_D	110	W
Single pulsed avalanche energy[4]	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	$R_{\theta JC}$	1.14	°C/W
Thermal resistance, junction-ambient[5)]	$R_{\theta JA}$	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}	600			V	V_{GS}=0 V, I_D=250 uA
		650				V_{GS}=0 V, I_D=250 uA, T_j=150 ℃
Gate threshold voltage	$V_{GS(th)}$	2.9		3.9	V	V_{DS}=V_{GS}, I_D=250 uA
Drain-source on-state resistance	$R_{DS(ON)}$		0.16	0.19	Ω	V_{GS}=10 V, I_D=5.6 A
			0.27			V_{GS}=10 V, I_D=5.6 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}=600 V, V_{GS}=0 V
Gate resistance	R_G		24.2		Ω	f= 1 MHz, Open drain

■ Dynamic Characteristics

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Input capacitance	C_{iss}		660.8		pF	V_{GS}=0 V, V_{DS}=50 V, f=100 kHz
Output capacitance	C_{oss}		112.9		pF	
Reverse transfer capacitance	C_{rss}		3.5		pF	
Turn-on delay time	$t_{d(on)}$		24.2		ns	V_{GS}=10 V, V_{DS}=400 V, R_G=2 Ω, I_D=10 A
Rise time	t_r		23.9		ns	
Turn-off delay time	$t_{d(off)}$		47.2		ns	
Fall time	t_f		6.3		ns	

■ Gate Charge Characteristics

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Total gate charge	Q_g		15.8		nC	I_D=10 A, V_{DS}=400 V, V_{GS}=10 V
Gate-source charge	Q_{gs}		3.0		nC	
Gate-drain charge	Q_{gd}		5.3		nC	
Gate plateau voltage	$V_{plateau}$		6.3		V	

■ Body Diode Characteristics

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Diode forward current	I_S			18	A	V_{GS}<V_{th}
Diode forward current	I_{SP}			54		
Diode forward voltage	V_{SD}			1.3	V	I_S=18 A, V_{GS}=0 V
Reverse recovery time	t_{rr}		293.3		ns	V_R=400 V, I_S=10 A, di/dt=100 A/μs
Reverse recovery charge	Q_{rr}		3.5		μC	
Peak reverse recovery current	I_{rrm}		23.9		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) V_{DD}=100 V, R_G=50 Ω, L=60 mH, starting T_j=25 °C.
5) 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.

■ Electrical Characteristics Diagrams

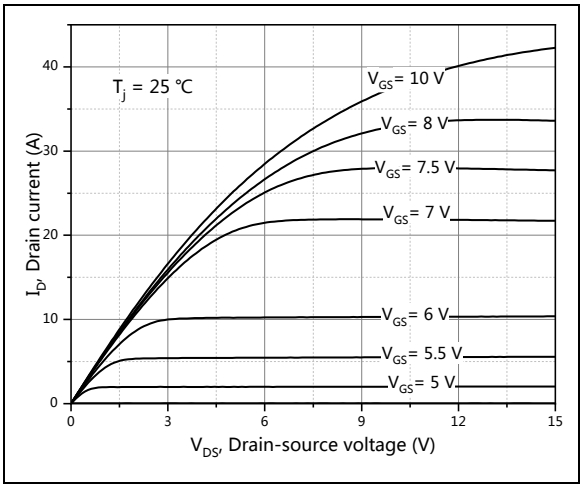


Figure 1, Typ. output characteristics

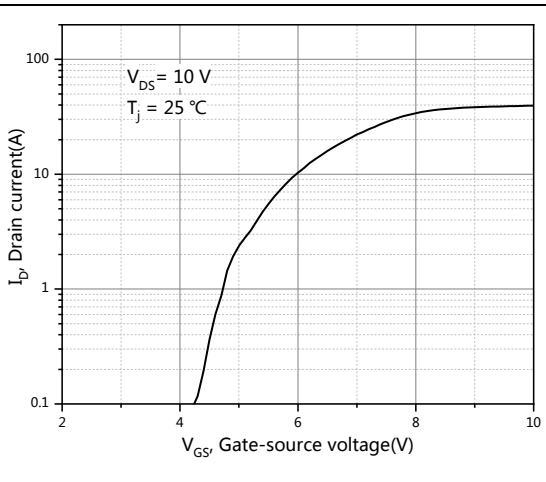


Figure 2, Typ. transfer characteristics

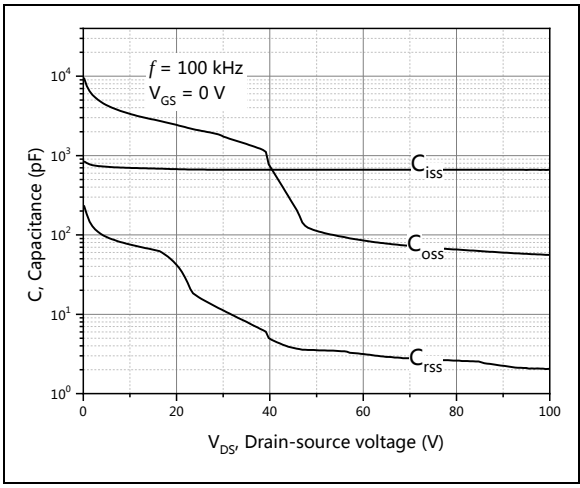


Figure 3, Typ. capacitances

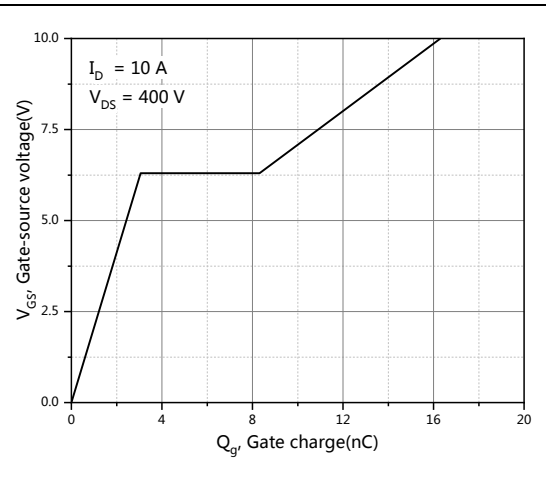


Figure 4, Typ. gate charge

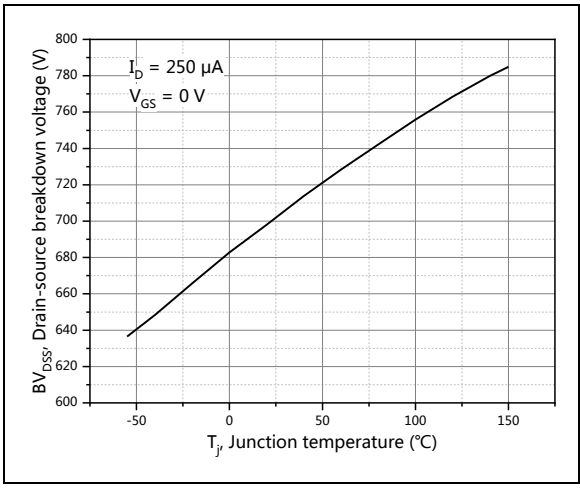


Figure 5, Drain-source breakdown voltage

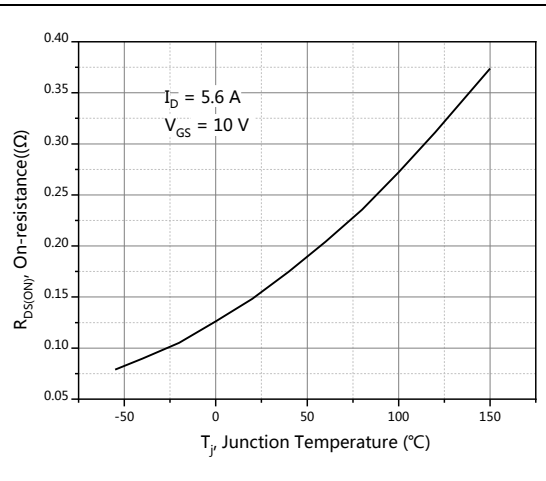


Figure 6, Drain-source on-state resistance

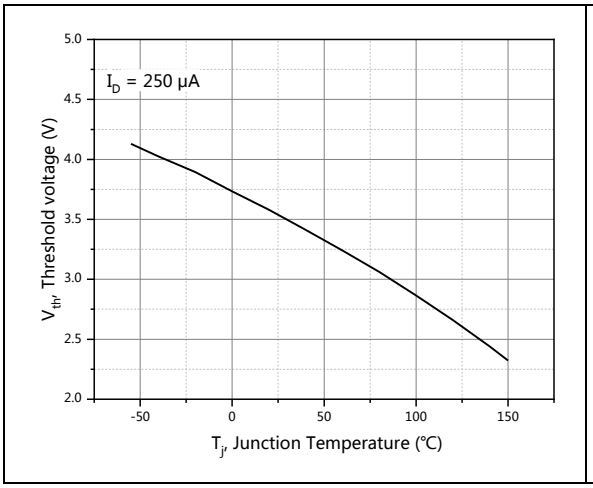


Figure 7, Threshold voltage

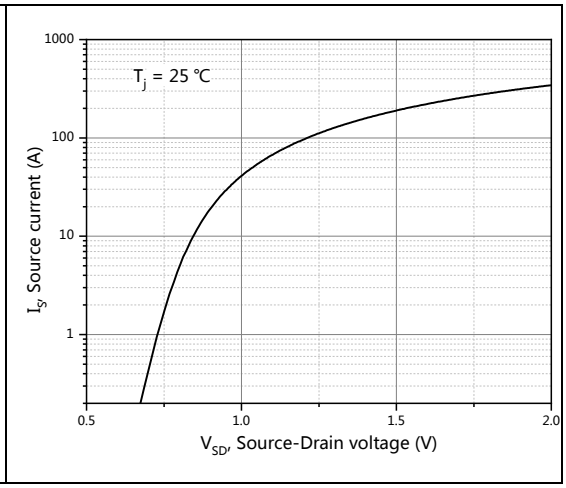


Figure 8, Forward characteristic of body diode

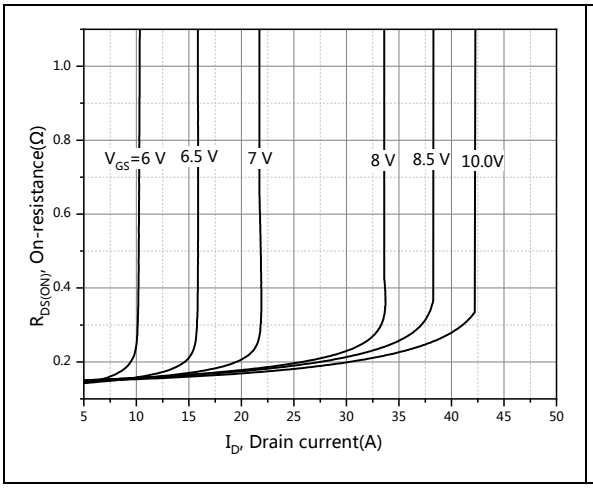


Figure 9, Drain-source on-state resistance

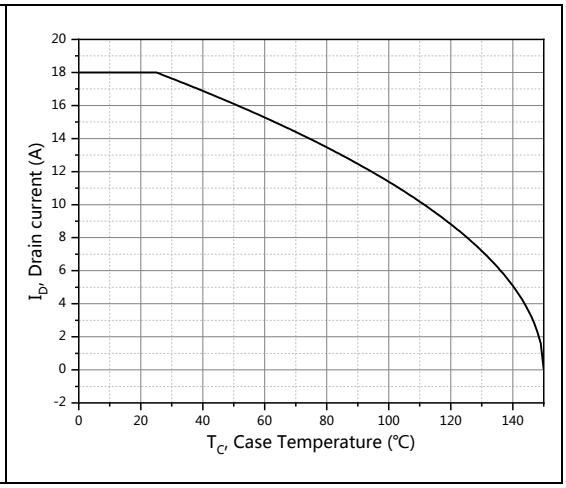


Figure 10, Drain current

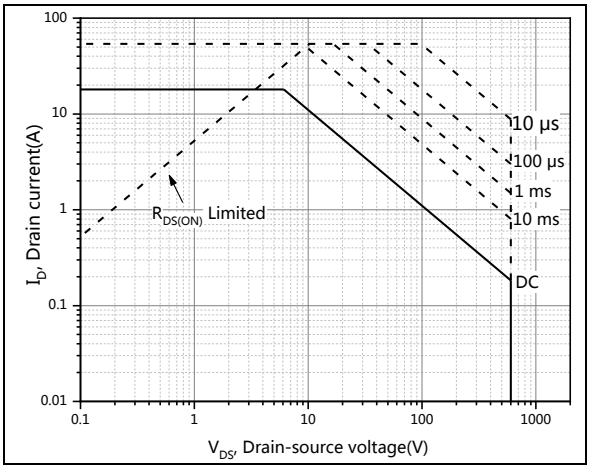


Figure 11, Safe operation area T_C=25 ℃

■ Test circuits and waveforms

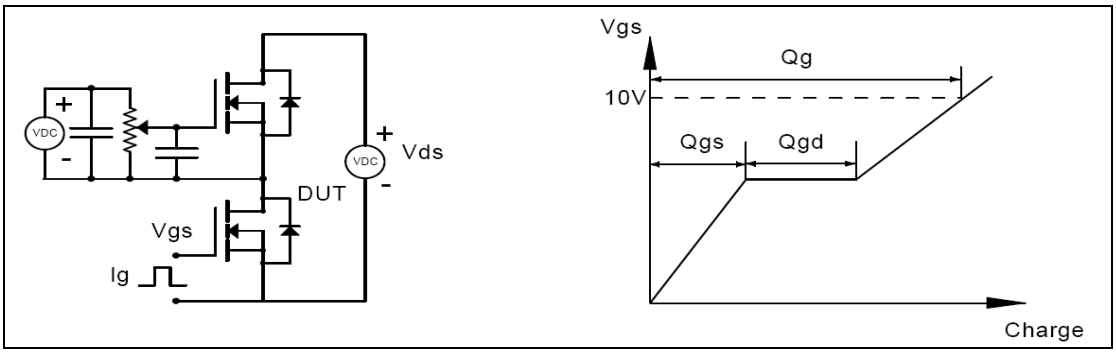


Figure 1, Gate charge test circuit & waveform

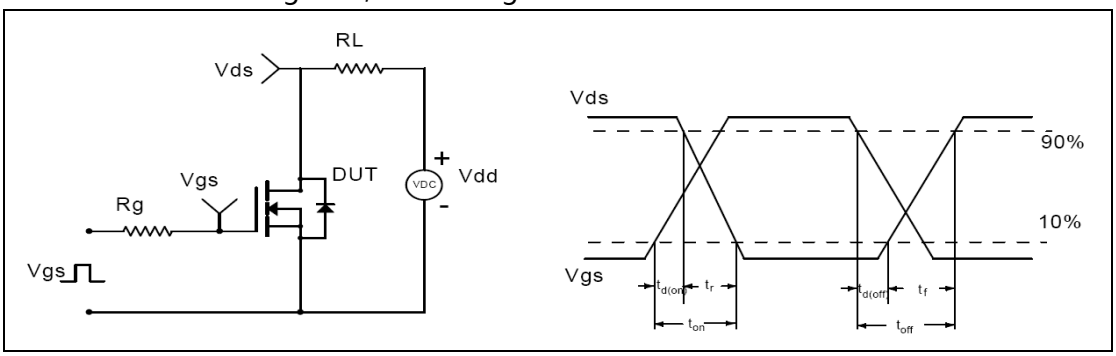


Figure 2, Switching time test circuit & waveforms

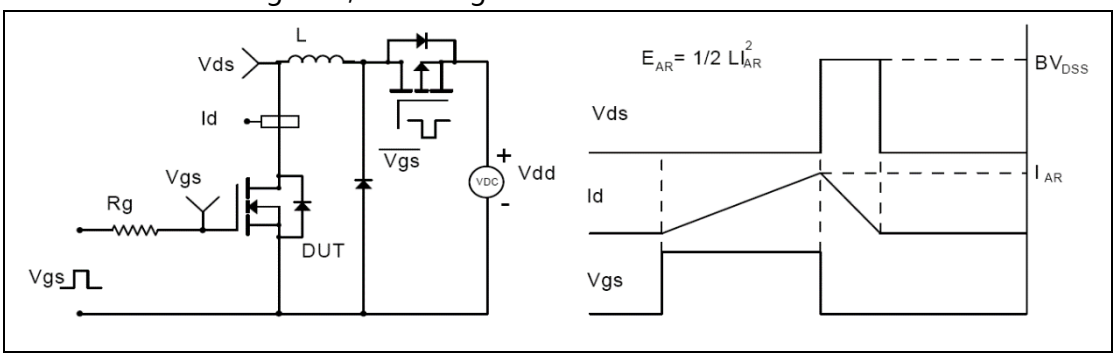


Figure 3, Unclamped inductive switching (UIS) test circuit & waveforms

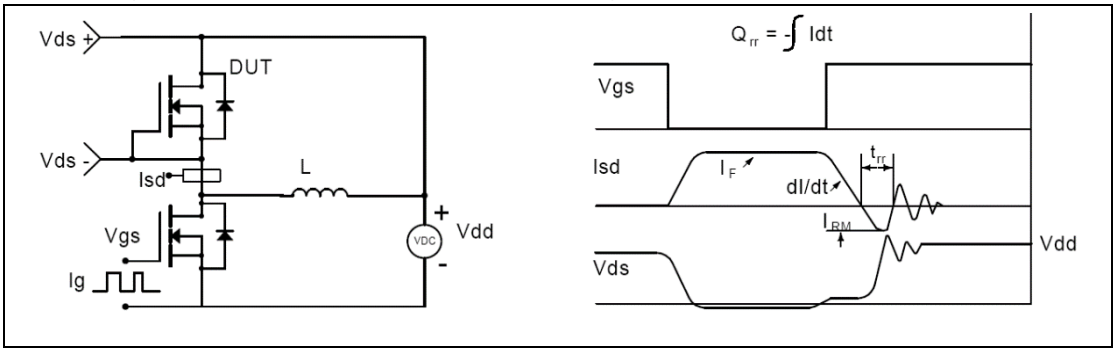
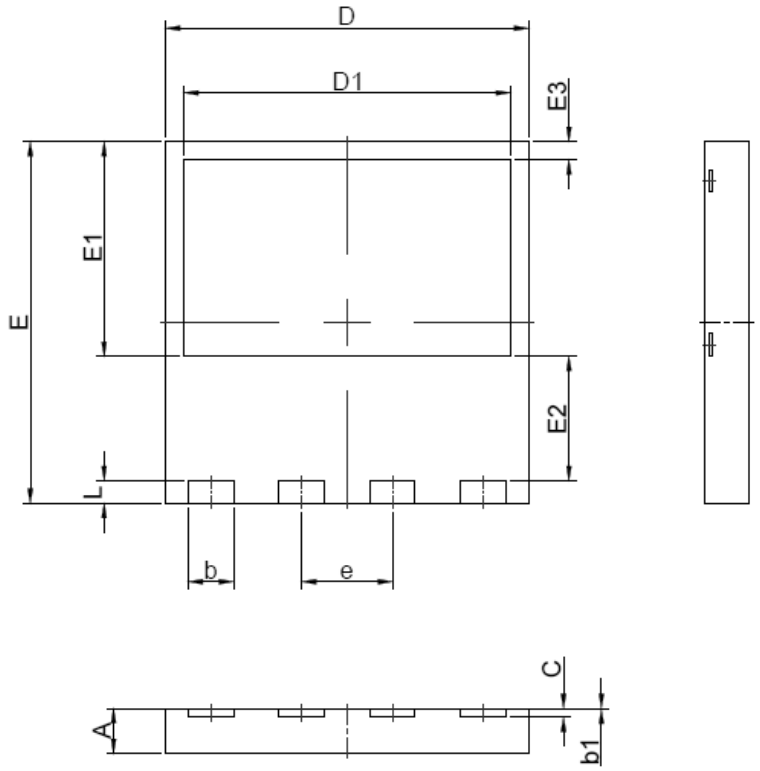


Figure 4, Diode reverse recovery test circuit & waveforms

■ Package Information

Figure1, 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

■ Ordering Information

Package	Units/Reel	Reels/Inner Box	Units/Inner Box	Inner Box/Carton Box	Units/Carton Box
PDFN8×8	2500	1	2500	10	25000

■ Product Information

Product	Package	Pb Free	RoHS	Halogen Free
OSS60R190JF	PDFN8×8	yes	yes	yes