General Description

The GreenMOS® high voltage MOSFET utilizes charge balance technology to achieve outstanding low on-resistance and lower gate charge. It is engineered to minimize conduction loss, provide superior switching performance and robust avalanche capability.

The GreenMOS® Generic series is optimized for extreme switching performance to minimize switching loss. It is tailored for high power density applications to meet the highest efficiency standards.

Features

- Low $R_{DS(ON)}$ & FOM
- Extremely low switching loss
- Excellent stability and uniformity

Applications

- PC power
- LED lighting
- Telecom power
- Server power
- EV Charger
- Solar/UPS

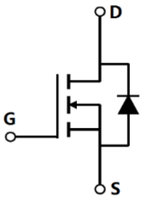
Key Performance Parameters

Parameter	Value	Unit
V_{DS}	800	V
$I_{D,\ pulse}$	33	A
$R_{DS(ON)\ ,\ max}$ @ V_{GS}=10V	380	mΩ
Q_g	22.2	nC

Marking Information

Product Name	Package	Marking
OSG80R380KF	TO263	OSG80R380K

Package & Pin Information



Absolute Maximum Ratings at T_j=25°C unless otherwise noted

Parameter	Symbol	Value	Unit
Drain-source voltage	V_{DS}	800	V
Gate-source voltage	V_{GS}	±30	V
Continuous drain current[1), T_C=25 °C	I_D	11	A
Continuous drain current[1), T_C=100 °C		6.9	
Pulsed drain current[2), T_C=25 °C	$I_{D,\ pulse}$	33	A
Continuous diode forward current[1), T_C=25 °C	I_S	11	A
Diode pulsed current[2), T_C=25 °C	$I_{S,\ pulse}$	33	A
Power dissipation[3), T_C=25 °C	P_D	151	W
Single pulsed avalanche energy[5)	E_{AS}	400	mJ
MOSFET dv/dt ruggedness, V_{DS}=0…640 V	dv/dt	50	V/ns
Reverse diode dv/dt, V_{DS}=0…640 V, $I_{SD} \leq I_D$	dv/dt	15	V/ns
Operation and storage temperature	T_{stg}, T_j	-55 to 150	°C

Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal resistance, junction-case	$R_{\theta JC}$	0.82	°C/W
Thermal resistance, junction-ambient[4)	$R_{\theta JA}$	62	°C/W

Electrical Characteristics at T_j=25°C unless otherwise specified

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Drain-source breakdown voltage	BV_{DSS}	800			V	V_{GS}=0 V, I_D=250 µA
		850				V_{GS}=0 V, I_D=250 µA, T_j=150 °C
Gate threshold voltage	$V_{GS(th)}$	2.9		3.9	V	V_{DS}=V_{GS}, I_D=250 µA
Drain-source on-state resistance	$R_{DS(ON)}$		0.30	0.38	Ω	V_{GS}=10 V, I_D=5.5 A
			0.69			V_{GS}=10 V, I_D=5.5 A, T_j=150 °C
Gate-source leakage current	I_{GSS}			100	nA	V_{GS}=30 V
				-100		V_{GS}=-30 V
Drain-source leakage current	I_{DSS}			10	µA	V_{DS}=800 V, V_{GS}=0 V

Dynamic Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Input capacitance	C_{iss}		1442.9		pF	V_{GS}=0 V, V_{DS}=50 V, f=100 kHz
Output capacitance	C_{oss}		83.7		pF	
Reverse transfer capacitance	C_{rss}		1.9		pF	
Turn-on delay time	$t_{d(on)}$		28.4		ns	V_{GS}=10 V, V_{DS}=400 V, R_G=10 Ω, I_D=6 A
Rise time	t_r		15.8		ns	
Turn-off delay time	$t_{d(off)}$		50.2		ns	
Fall time	t_f		4.7		ns	

Gate Charge Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Total gate charge	Q_g		22.2		nC	V_{GS}=10 V, V_{DS}=400 V, I_D=6 A
Gate-source charge	Q_{gs}		6.8		nC	
Gate-drain charge	Q_{gd}		6.3		nC	
Gate plateau voltage	$V_{plateau}$		5.7		V	

Body Diode Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Diode forward voltage	V_{SD}			1.3	V	I_S=11 A, V_{GS}=0 V
Reverse recovery time	t_{rr}		262.0		ns	V_R=400 V, I_S=6 A, di/dt=100 A/μs
Reverse recovery charge	Q_{rr}		3.9		μC	
Peak reverse recovery current	I_{rrm}		29.1		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 inch^2 FR-4 board with 2oz. Copper, in a still air environment with T_a=25 °C.
5) V_{DD}=100 V, V_{GS}=10 V, L=10 mH, starting T_j=25 °C.

Electrical Characteristics Diagrams

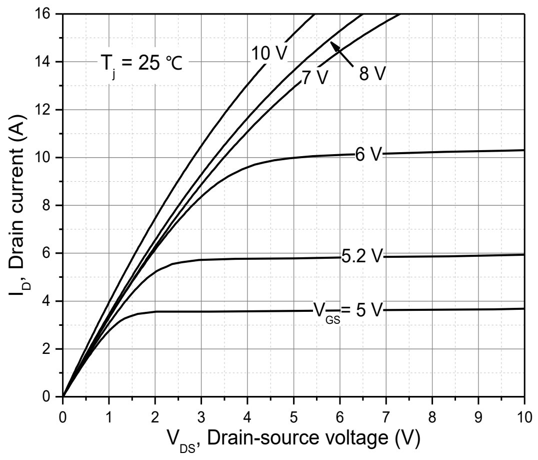


Figure 1. Typ. output characteristics

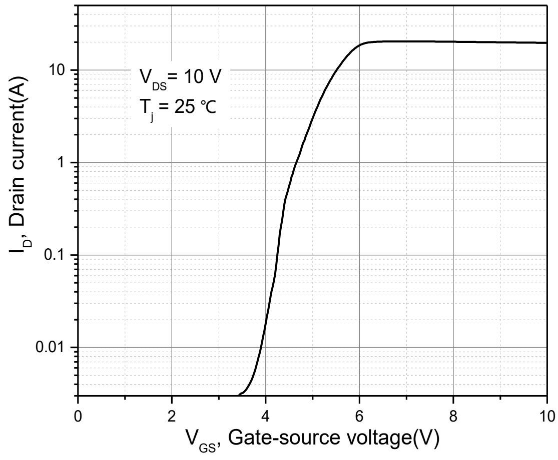


Figure 2. Typ. transfer characteristics

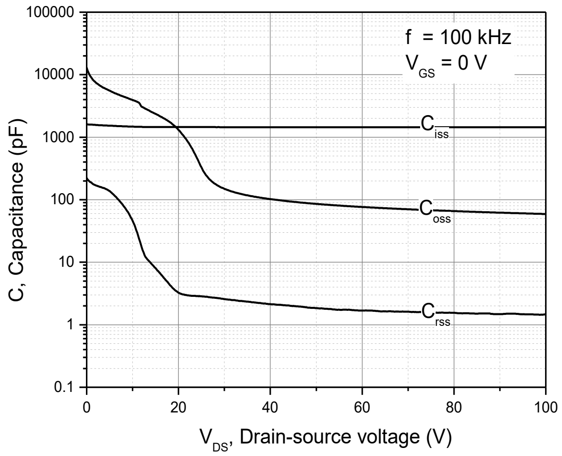


Figure 3. Typ. capacitances

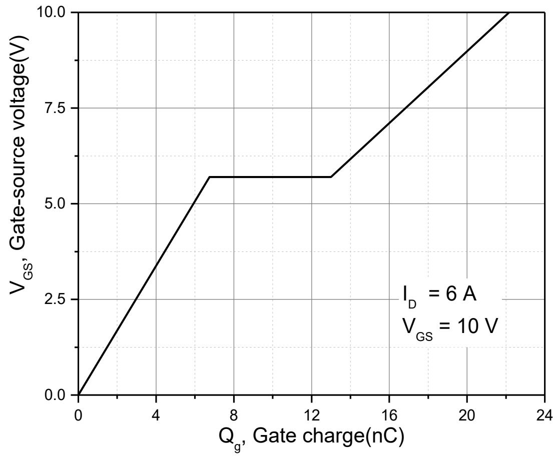


Figure 4. Typ. gate charge

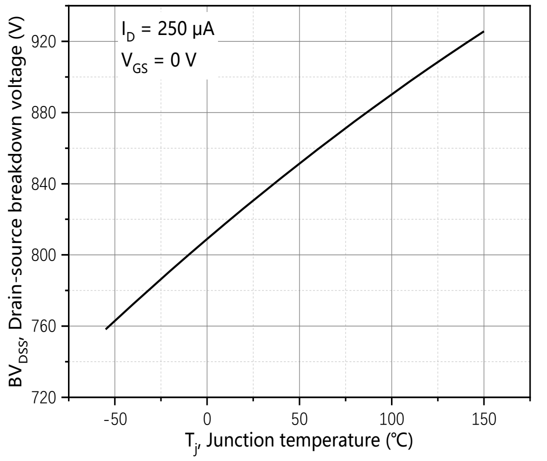


Figure 5. Drain-source breakdown voltage

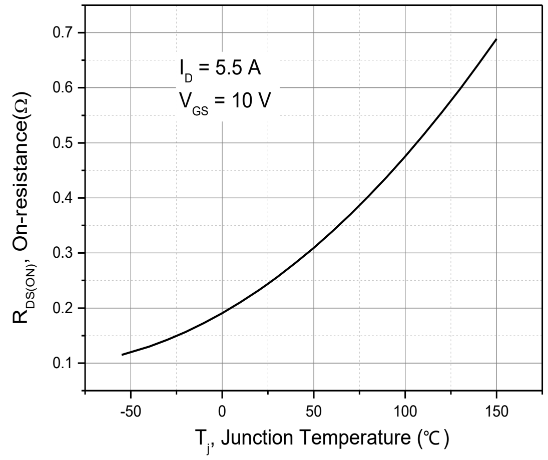


Figure 6. Drain-source on-state resistance

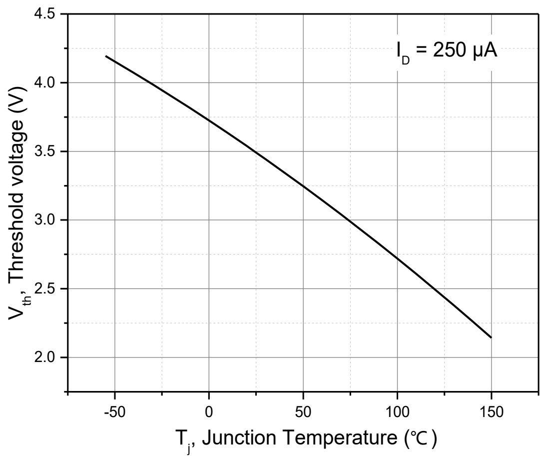


Figure 7. Threshold voltage

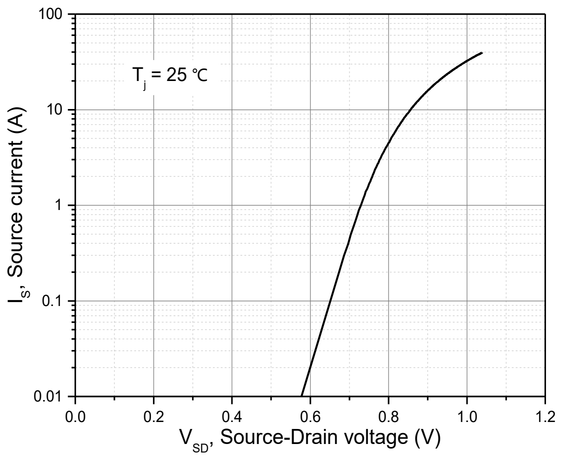


Figure 8. Forward characteristic of body diode

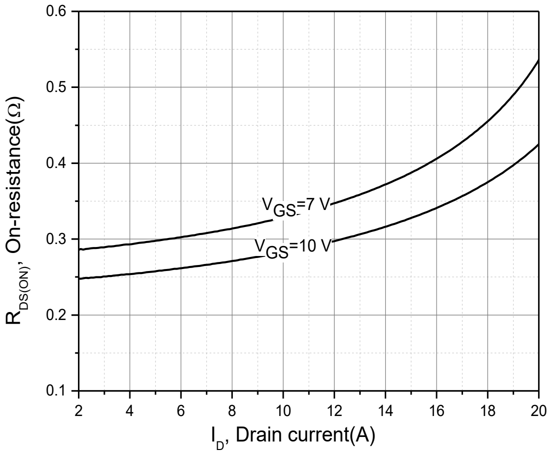


Figure 9. Drain-source on-state resistance

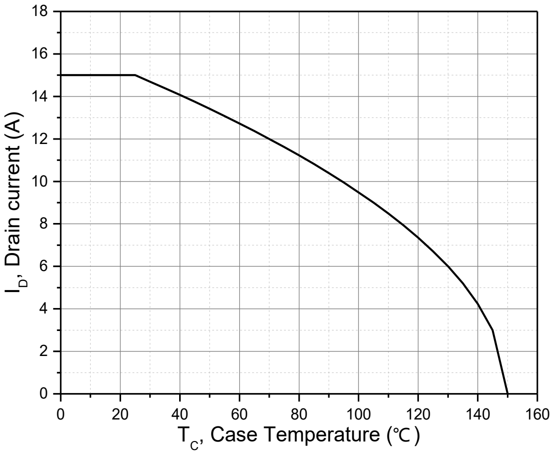


Figure 10. Drain current

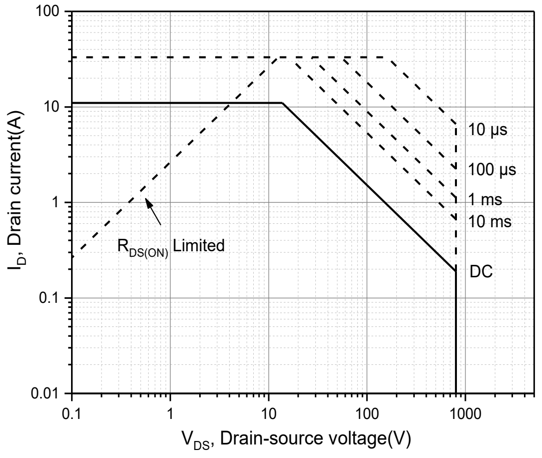


Figure 11. Safe operation area T_C=25 °C

Test circuits and waveforms

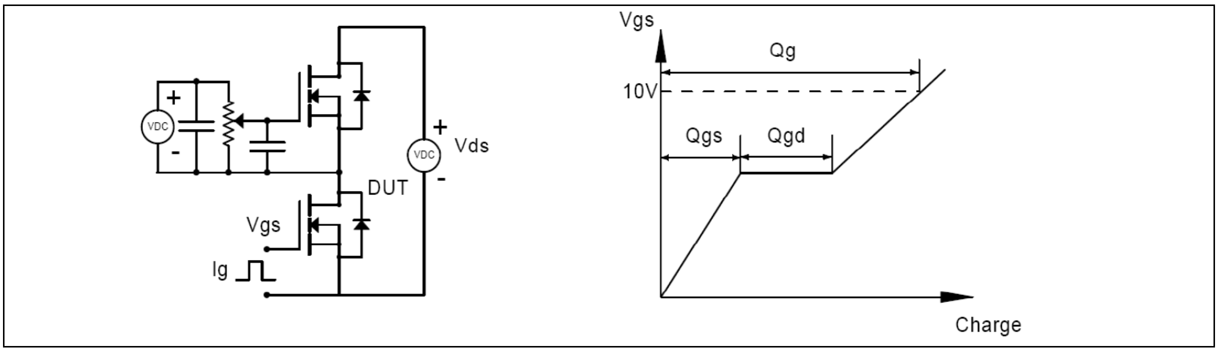


Figure 1. Gate charge test circuit & waveform

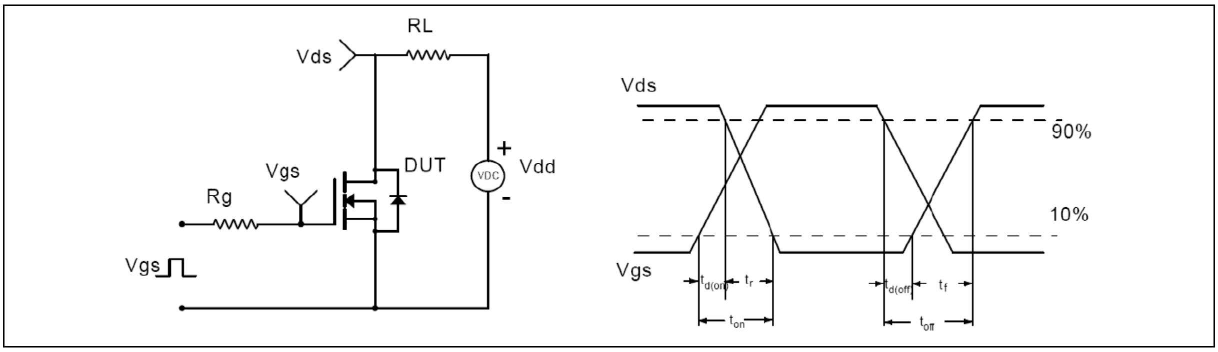


Figure 2. Switching time test circuit & waveforms

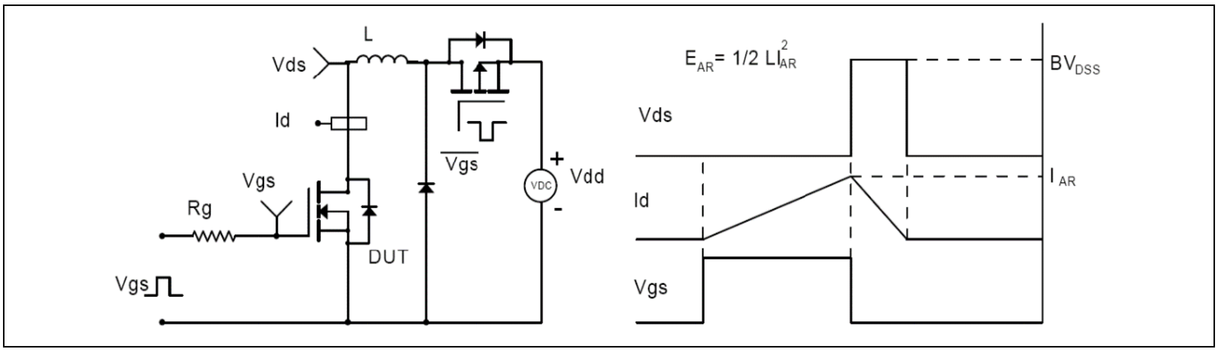


Figure 3. Unclamped inductive switching (UIS) test circuit & waveforms

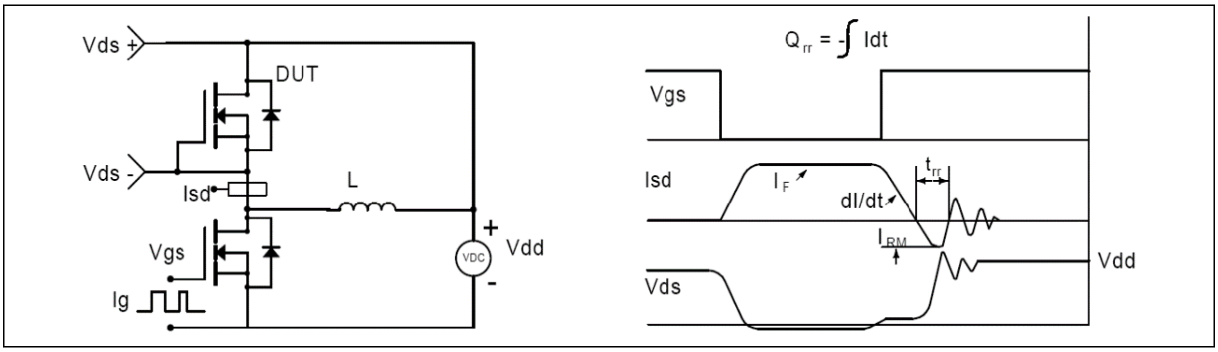
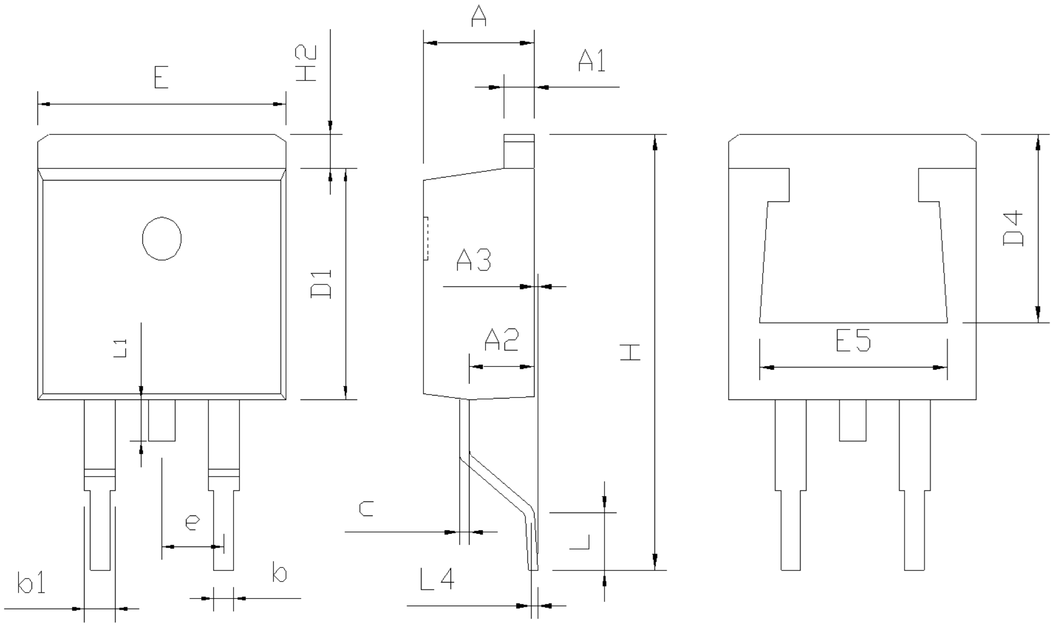


Figure 4. Diode reverse recovery test circuit & waveforms

Package Information



Symbol	mm		
	Min	Nom	Max
A	4.37	4.57	4.77
A1	1.22	1.27	1.42
A2	2.49	2.69	2.89
A3	0.00	0.13	0.25
b	0.70	0.81	0.96
b1	1.17	1.27	1.47
c	0.30	0.38	0.53
D1	8.50	8.70	8.90
D4	6.60	-	-
E	9.86	10.16	10.36
E5	7.06	-	-
e	2.54BSC		
H	14.70	15.10	15.50
H2	1.07	1.27	1.47
L	2.00	2.30	2.60
L1	1.40	1.55	1.70
L4	0.25BSC		

Version 1: TO263-P package outline dimension

Ordering Information

Package Type	Units/ Reel	Reels/ Inner Box	Units/ Inner Box	Inner Boxes/ Carton Box	Units/ Carton Box
TO263-P	800	1	800	5	4000

Product Information

Product	Package	Pb Free	RoHS	Halogen Free
OSG80R380KF	TO263	yes	yes	yes

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