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

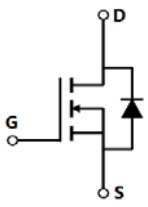
Key Performance Parameters

Parameter	Value	Unit
$V_{DS,\ min}$ @ $T_{j(max)}$	650	V
$I_{D,\ pulse}$	4.5	A
$R_{DS(ON)\ ,\ max}$ @ V_{GS}=10V	2.8	Ω
Q_g	4.2	nC

Marking Information

Product Name	Package	Marking
OSG60R2K8AF	TO251	OSG60R2K8A

Package & Pin Information



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Absolute Maximum Ratings at T_j=25°C 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 °C	I_D	1.5	A
Continuous drain current[1], T_C=100 °C		0.95	
Pulsed drain current[2], T_C=25 °C	$I_{D,\ pulse}$	4.5	A
Continuous diode forward current[1], T_C=25 °C	I_S	1.5	A
Diode pulsed current[2], T_C=25 °C	$I_{S,\ pulse}$	4.5	A
Power dissipation[3], T_C=25 °C	P_D	18.1	W
Single pulsed avalanche energy[5]	E_{AS}	10	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	°C

Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal resistance, junction-case	$R_{\theta JC}$	6.9	°C/W

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Dynamic Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Input capacitance	C_{iss}		111.9		pF	V_{GS}=0 V, V_{DS}=50 V, f=1 MHz
Output capacitance	C_{oss}		10.28		pF	
Reverse transfer capacitance	C_{rss}		0.86		pF	
Turn-on delay time	$t_{d(on)}$		23.9		ns	V_{GS}=10 V, V_{DS}=400 V, R_G=25 Ω, I_D=0.8 A
Rise time	t_r		8.1		ns	
Turn-off delay time	$t_{d(off)}$		52.7		ns	
Fall time	t_f		14.1		ns	

Gate Charge Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Total gate charge	Q_g		4.2		nC	V_{GS}=10 V, V_{DS}=400 V, I_D=1 A
Gate-source charge	Q_{gs}		1		nC	
Gate-drain charge	Q_{gd}		2.3		nC	
Gate plateau voltage	$V_{plateau}$		5.6		V	

Body Diode Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Diode forward voltage	V_{SD}			1.3	V	I_S=1.5 A, V_{GS}=0 V
Reverse recovery time	t_{rr}		81.9		ns	V_R=400 V, I_S=0.8 A, di/dt=100 A/μs
Reverse recovery charge	Q_{rr}		0.26		μC	
Peak reverse recovery current	I_{rrm}		6.5		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}=50 V, V_{GS}=10 V, L=22.5 mH, starting T_j=25 °C.

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Electrical Characteristics Diagrams

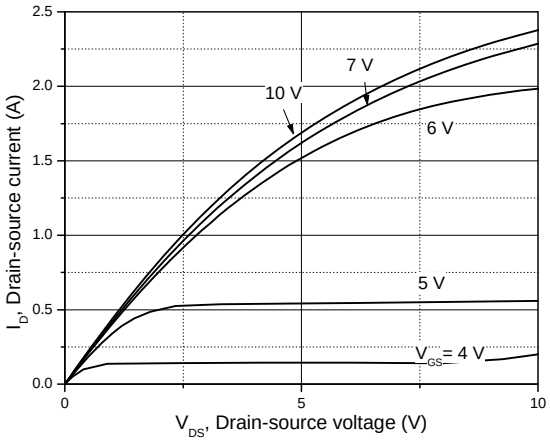

Figure 1. Typ. output characteristics

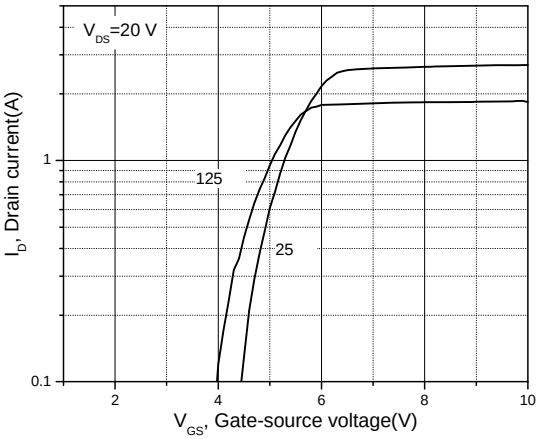

Figure 2. Typ. transfer characteristics

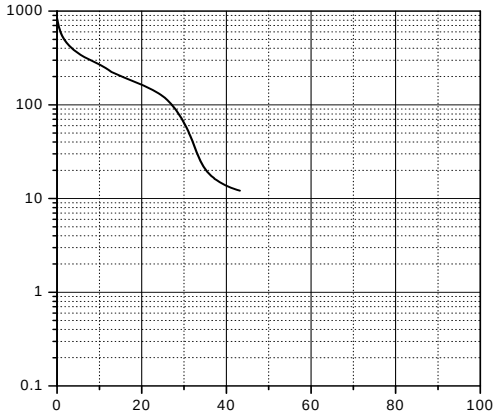

Figure 3. Typ. capacitances

Figure 4. Typ. gate charge

Figure 5. Drain-source breakdown voltage

Figure 6. Drain-source on-state resistance

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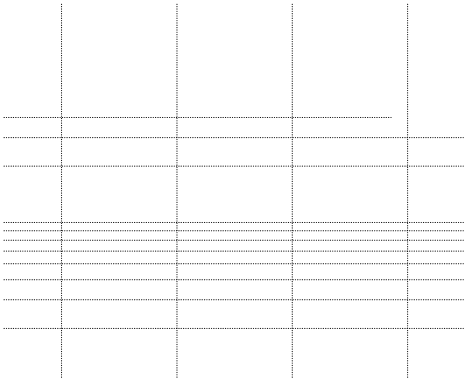

Figure 7. Forward characteristic of body diode

Figure 8. Drain-source on-state resistance

Figure 9. Drain current

Figure 10. Safe operation area T_C=25 °C

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Test circuits and waveforms

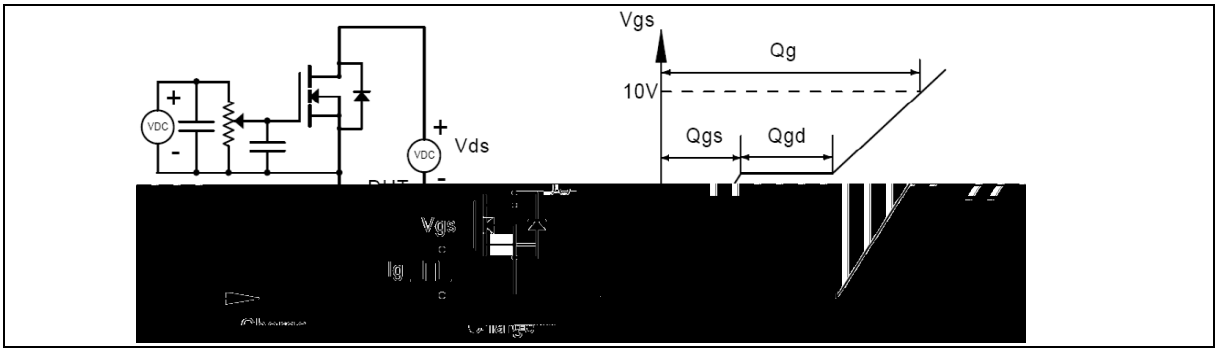


Figure 1. Gate charge test circuit & waveform

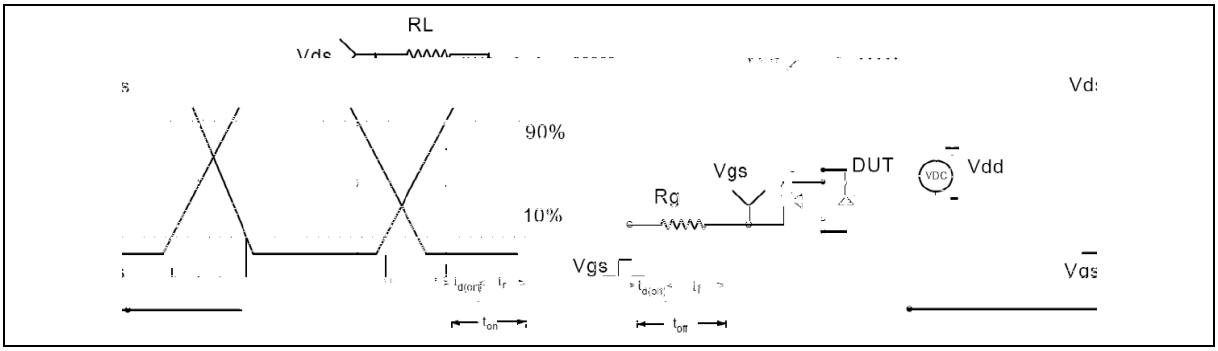


Figure 2. Switching time test circuit & waveforms

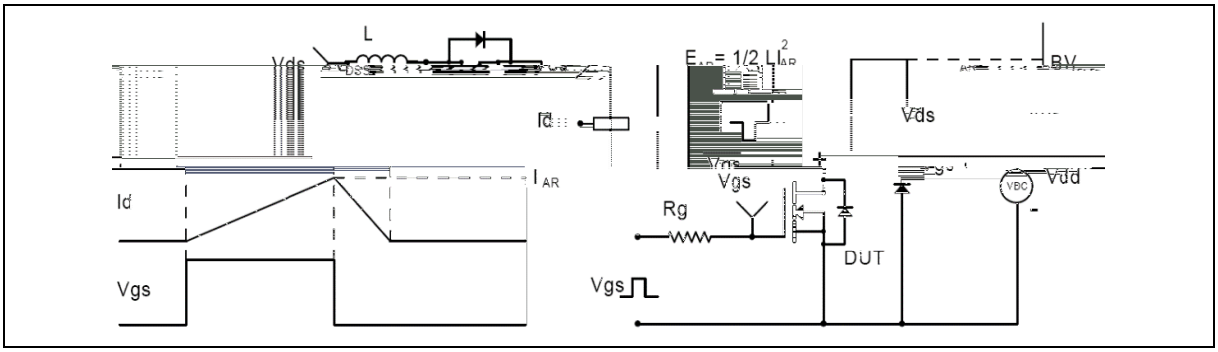


Figure 3. Unclamped inductive switching (UIS) test circuit & waveforms

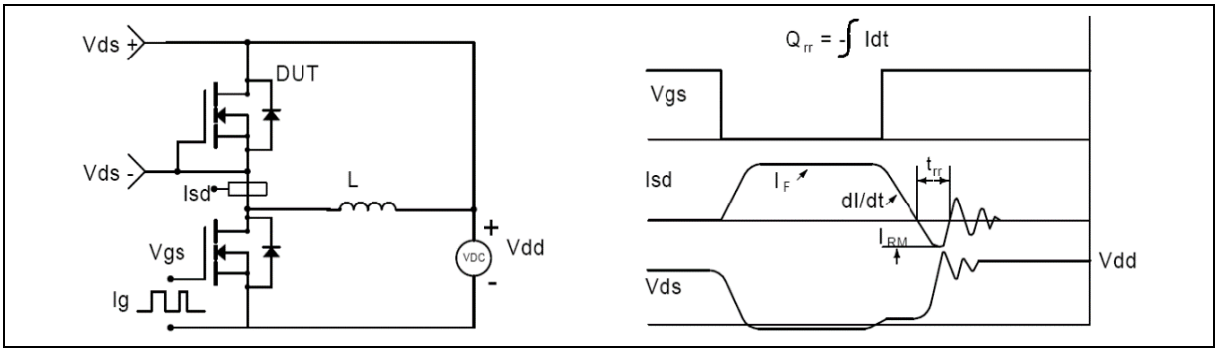
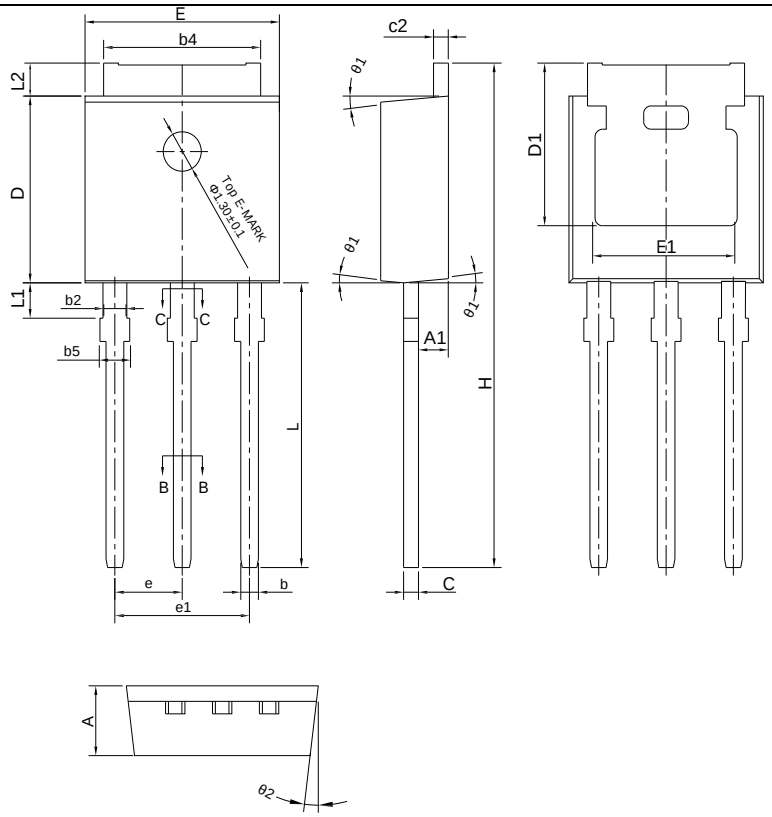


Figure 4. Diode reverse recovery test circuit & waveforms

Package Information



Symbol	mm		
	Min	Nom	Max
A	2.20	2.30	2.35
A1	0.90	1.01	1.10
b	0.56	-	0.69
b1	0.55	0.60	0.65
b2	0.77	-	0.90
b3	0.76	0.81	0.86
b4	5.23	5.33	5.43
b5	-	-	1.05
c	0.46	-	0.59
c1	0.45	0.51	0.55
c2	0.46	-	0.59
D	6.00	6.10	6.20
D1	5.20	-	-
E	6.50	6.60	6.70
E1	4.60	4.83	5.00
e	2.24	2.29	2.34
e1	4.47	4.57	4.67
H	16.18	16.48	16.78
L	9.00	9.30	9.60
L1	0.95	1.16	1.35
L2	0.90	1.08	1.25
θ1	3°	5°	7°
θ2	1°	3°	5°

Version 1: TO251-J package outline dimension

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Ordering Information

Package Type	Units/ Reel	Reels / Inner Box	Units/ Inner Box	Inner Box/ Carton Box	Units/ Carton Box
TO251-J	75	60	4500	5	22500

Product Information

Product	Package	Pb Free	RoHS	Halogen Free
OSG60R2K8AF	TO251	yes	yes	yes

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