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® E series is optimized for its switching characteristics to achieve balance between EMI and efficiency. It is designed to enable power supply systems to reach the highest efficiency while still meeting EMI standards.

Features

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

Applications

- LED lighting
- Charger
- Adapter
- TV power
- Server power
- Solar/UPS

Key Performance Parameters

Parameter	Value	Unit
$V_{DS, min}$ @ $T_{j(max)}$	700	V
$I_{D, pulse}$	ETQq Tm0 g[	

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Absolute Maximum Ratings at T_j=25°C 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 °C	I_D	12	A
Continuous drain current[1], T_C=100 °C		7.6	
Pulsed drain current[2], T_C=25 °C	$I_{D, pulse}$	36	A
Continuous diode forward current[1], T_C=25 °C	I_S	12	A
Diode pulsed current[2], T_C=25 °C	$I_{S, pulse}$	36	A
Power dissipation[3], T_C=25 °C	P_D	83	W
Single pulsed avalanche energy[5]	E_{AS}	194	mJ
MOSFET dv/dt ruggedness, V_{DS}	dv/dt	50	V/ns
Reverse diode dv/dt, V_{DS} SD 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	1.51	°C/W
Thermal resistance, junction-ambient[4]	R	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}	650			V	V_{GS}=0 V, I_D=250 A
		700				V_{GS}=0 V, I_D , T_j=150 °C
Gate threshold voltage	$V_{GS(th)}$	2.9		3.9	V	V_{DS}=V_{GS}, I_D=250 A
Drain-source on-state resistance	$R_{DS(ON)}$		0.31	0.36		V_{GS}=10 V, I_D=3 A
			0.75			V_{GS}=10 V, I_D=3 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}			1	A	V_{DS}=650 V, V_{GS}=0 V
Gate resistance	R_G		30			

Dynamic Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Input capacitance	C_{iss}		897		pF	V_{GS}=0 V, V_{DS}=50 V, 00 kHz
Output capacitance	C_{oss}		57		pF	
Reverse transfer capacitance	C_{rss}		3.2		pF	
Effective output capacitance, energy related	$C_{o(er)}$		33.6		pF	V_{GS}=0 V, V_{DS}=0V-400 V
Effective output capacitance, time related	$C_{o(tr)}$		150		pF	
Turn-on delay time	$t_{d(on)}$		32		ns	V_{GS}=10 V, V_{DS}=400 V, R_G=2 I_D=6 A
Rise time	t_r		19		ns	
Turn-off delay time	$t_{d(off)}$		70.4		ns	
Fall time	t_f		16		ns	

Gate Charge Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Total gate charge	Q_g		19.7		nC	V_{GS}=10 V, V_{DS}=400 V, I_D=6 A
Gate-source charge	Q_{gs}		6.5		nC	
Gate-drain charge	Q_{gd}		5.6		nC	
Gate plateau voltage	$V_{plateau}$		5.9		V	

Body Diode Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Diode forward voltage	V_{SD}			1.3	V	I_S=12 A, V_{GS}=0 V
Reverse recovery time	t_{rr}		230		ns	, I_S=6 A, di/dt=100 A/
Reverse recovery charge	Q_{rr}		2.2		C	
Peak reverse recovery current	I_{rrm}		17.7		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 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, V_{GS}=10 V, L=80 mH, starting T_j=25 °C.

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Electrical Characteristics Diagrams

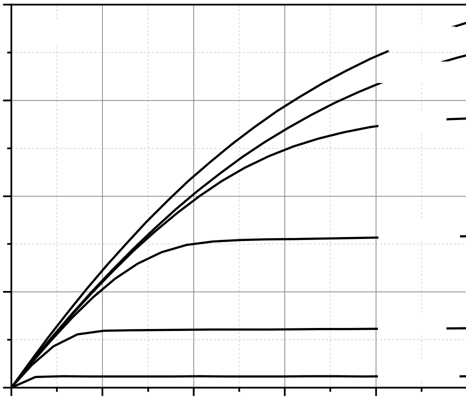

Figure 1. Typ. output characteristics

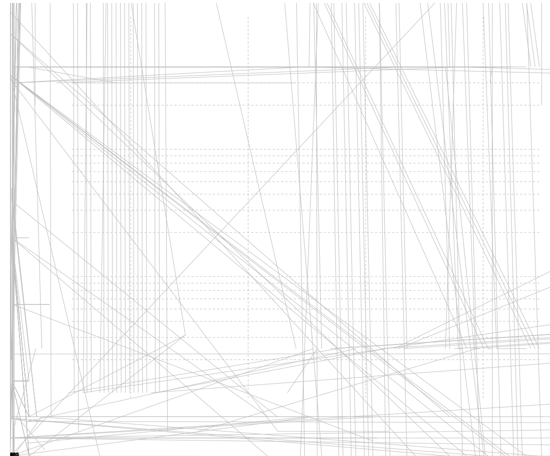

Figure 2. Typ. transfer characteristics

Figure 3. Typ. capacitances

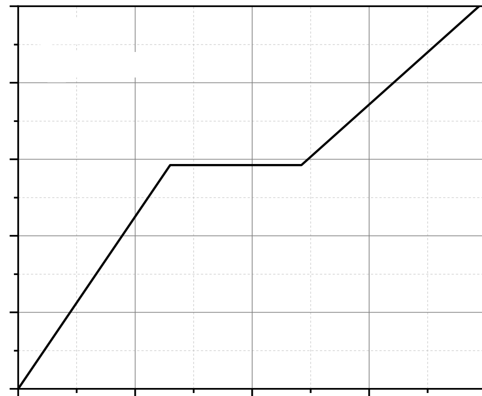

Figure 4. Typ. gate charge

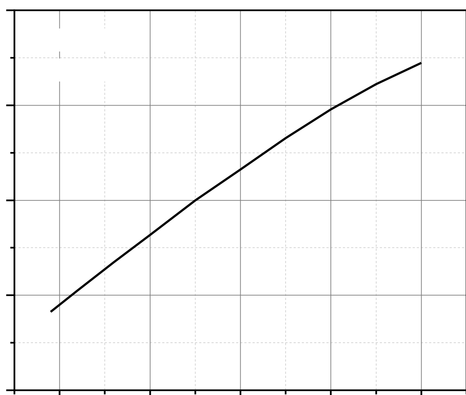

Figure 5. Drain-source breakdown voltage

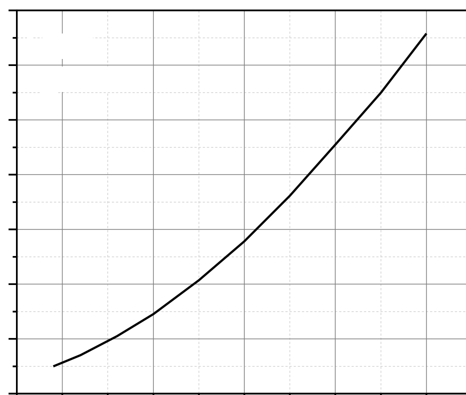

Figure 6. Drain-source on-state resistance

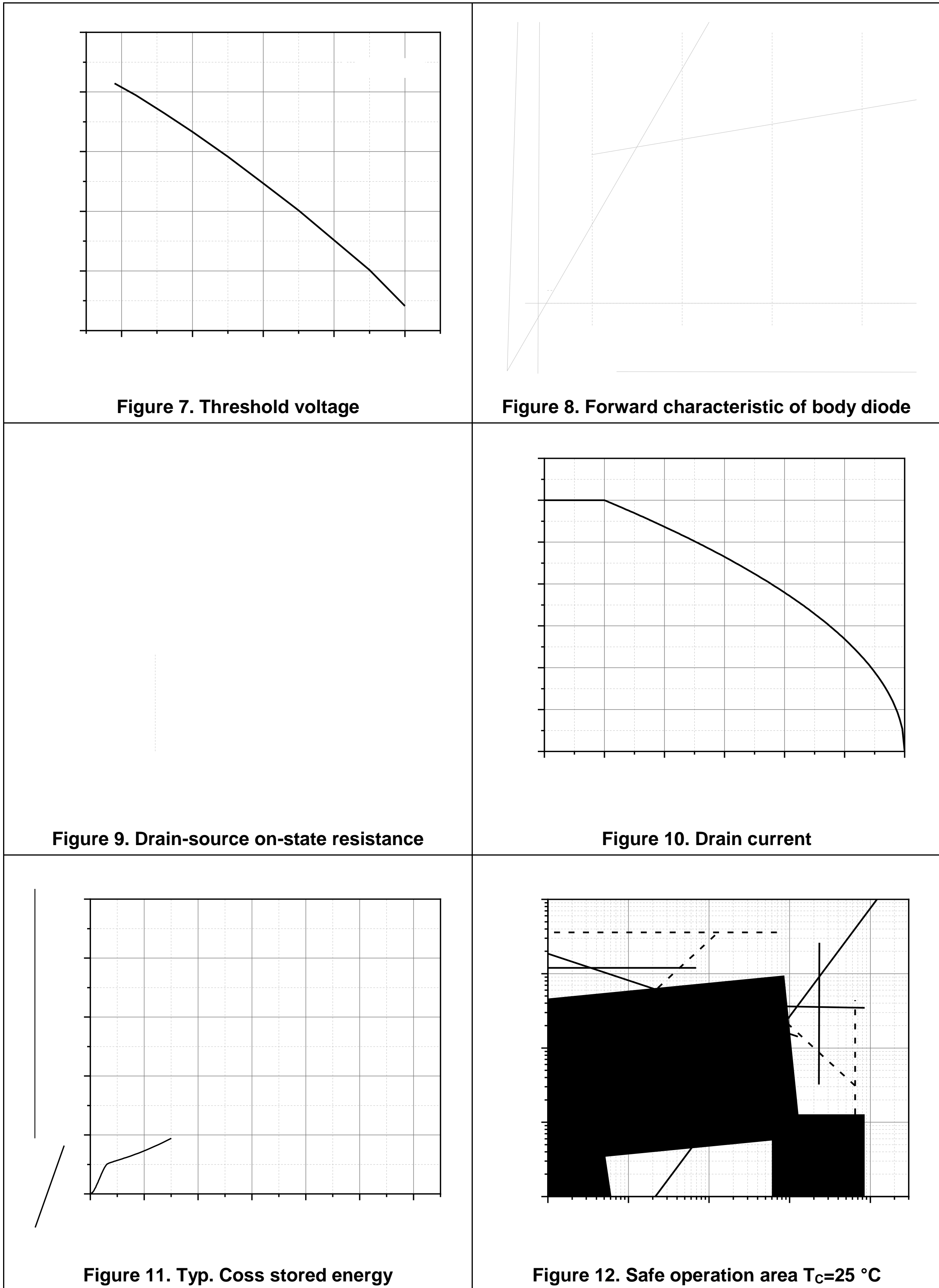

Figure 7. Threshold voltage

Figure 8. Forward characteristic of body diode

Figure 9. Drain-source on-state resistance

Figure 10. Drain current

Figure 11. Typ. Coss stored energy

Figure 12. Safe operation area T_C=25 °C

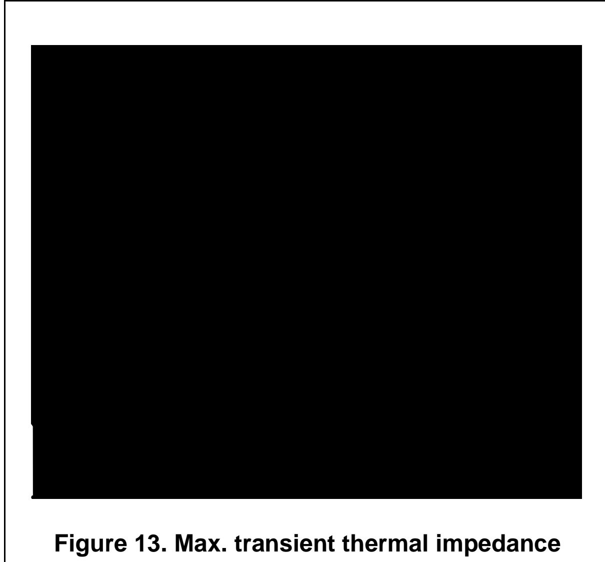

Figure 13. Max. transient thermal impedance

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Test circuits and waveforms

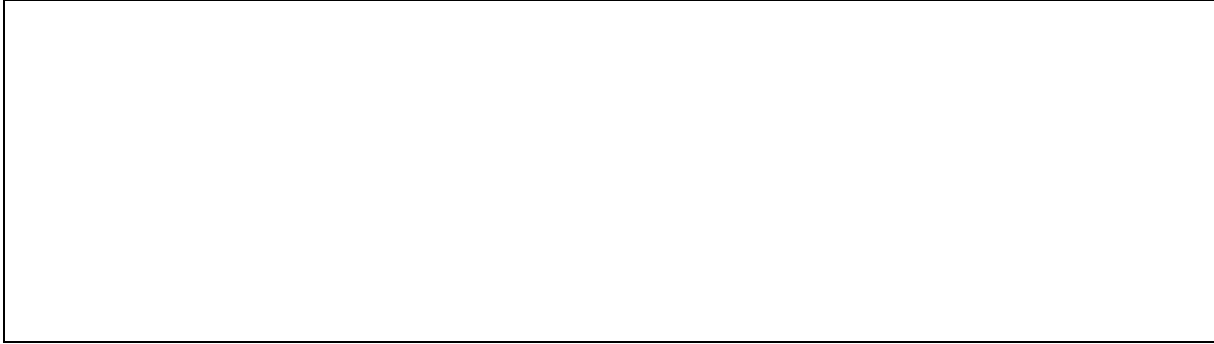

Figure 1. Gate charge test circuit & waveform

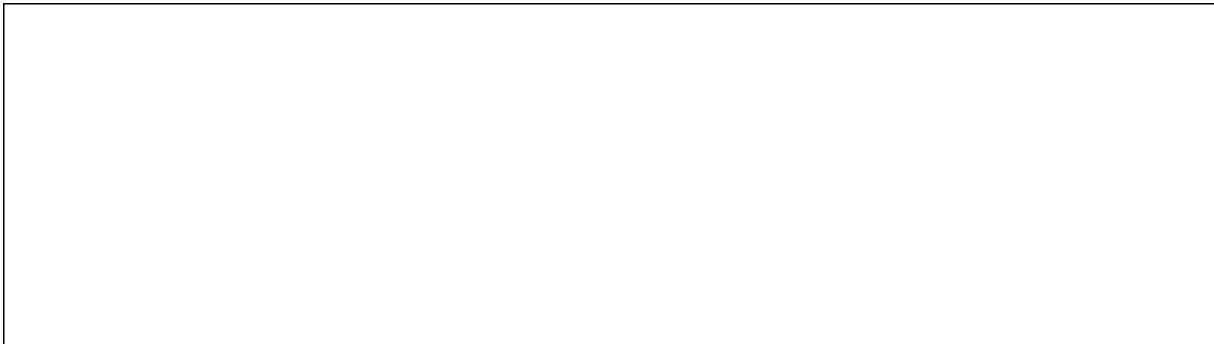

Figure 2. Switching time test circuit & waveforms

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

Figure 4. Diode reverse recovery test circuit & waveforms

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Ordering Information

Package Type	Units/ Reel	Reels/ Inner Box	Units/ Inner Box	Inner Boxes/ Carton Box	Units/ Carton Box
PDFN5*6-P	5000	2	10000	5	50000

Product Information

Product	Package	Pb Free	RoHS	Halogen Free
OSG65R360GEF	PDFN5*6	yes	yes	yes

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