

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.

-
-
-

-
-

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⁾ , $T_C=25$ °C	I_D	4	A
Continuous drain current ¹⁾ , $T_C=100$ °C		2.5	
Pulsed drain current ²⁾ , $T_C=25$ °C	$I_{D, pulse}$	12	A
Continuous diode forward current ¹⁾ , $T_C=25$ °C	I_S	4	A
Diode pulsed current ²⁾ , $T_C=25$ °C	$I_{S, pulse}$	12	A
Power dissipation ³⁾ , $T_C=25$ °C	P_D	28.4	W
Single pulsed avalanche energy ⁵⁾	E_{AS}	112	mJ
MOSFET dv/dt ruggedness, V_{DS}	dv/dt	50	V/ns
Reverse diode dv/dt, V_{DS}	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	4.4	°C/W
Thermal resistance, junction-ambient ⁴⁾	R	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}	650			V	$V_{GS}=0$ V, $I_D=250$ A
		700	770			$V_{GS}=0$ V, I_D , $T_j=150$ °C
Gate threshold voltage	$V_{GS(th)}$	2.0		4.0	V	$V_{DS}=V_{GS}$, $I_D=250$ A
Drain-source on-state resistance	$R_{DS(ON)}$		1.2	1.4		$V_{GS}=10$ V, $I_D=2$ A
			2.9			$V_{GS}=10$ V, $I_D=2$ 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

Dynamic Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Input capacitance	C_{iss}		259.9		pF	$V_{GS}=0\text{ V}$, $V_{DS}=50\text{ V}$, Hz
Output capacitance	C_{oss}		21.1		pF	
Reverse transfer capacitance	C_{rss}		0.9		pF	
Turn-on delay time	$t_{d(on)}$		30.9		ns	$V_{GS}=10\text{ V}$, $V_{DS}=380\text{ V}$, $R_G=25$ $I_D=4\text{ A}$
Rise time	t_r		20.7		ns	
Turn-off delay time	$t_{d(off)}$		56.3		ns	
Fall time	t_f		28.7		ns	

Gate Charge Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Total gate charge	Q_g		6.7		nC	$V_{GS}=10\text{ V}$, $V_{DS}=400\text{ V}$, $I_D=4\text{ A}$
Gate-source charge	Q_{gs}		1.5		nC	
Gate-drain charge	Q_{gd}		3.2		nC	
Gate plateau voltage	$V_{plateau}$		6.4		V	

Body Diode Characteristics

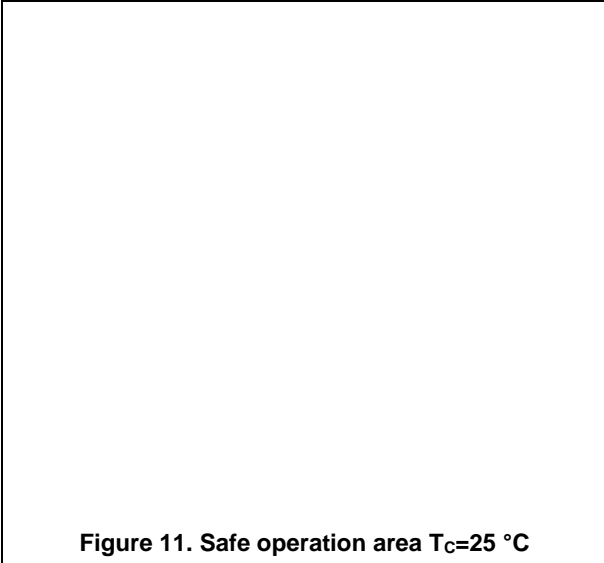
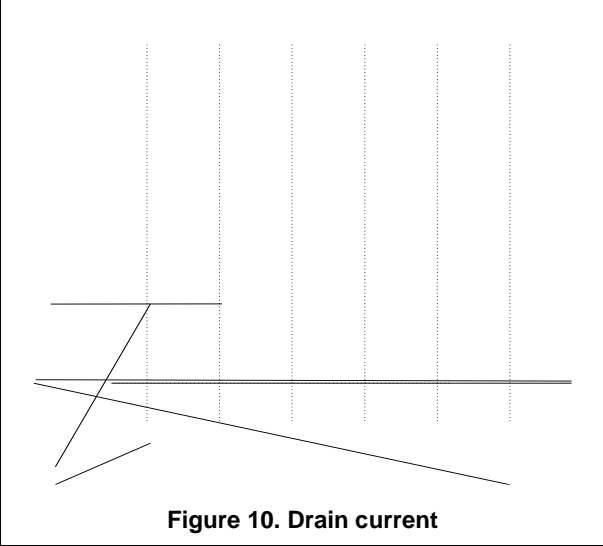
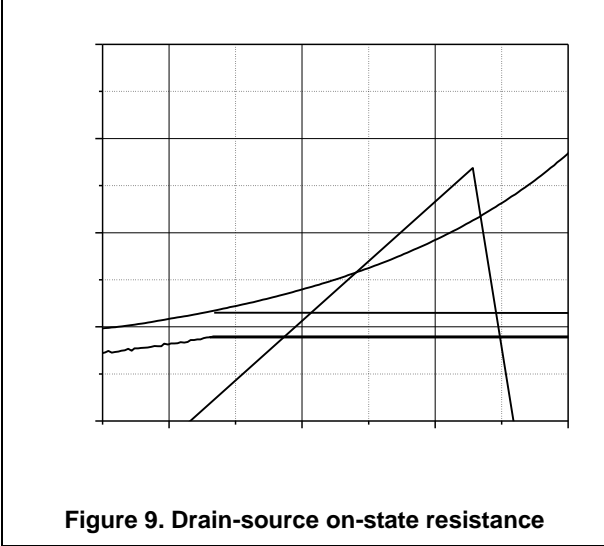
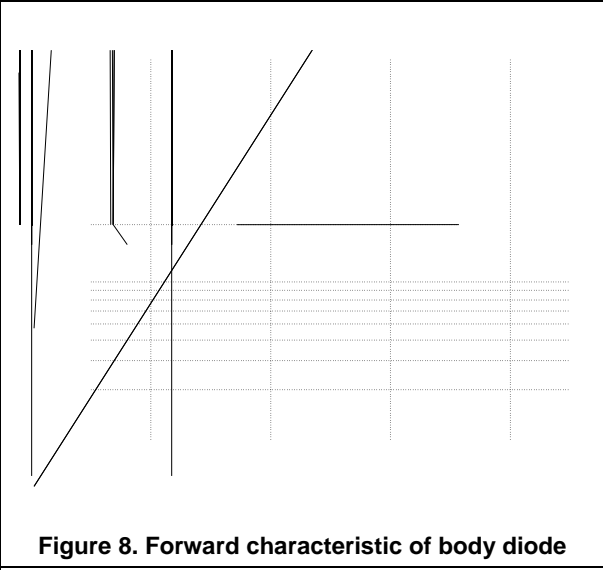
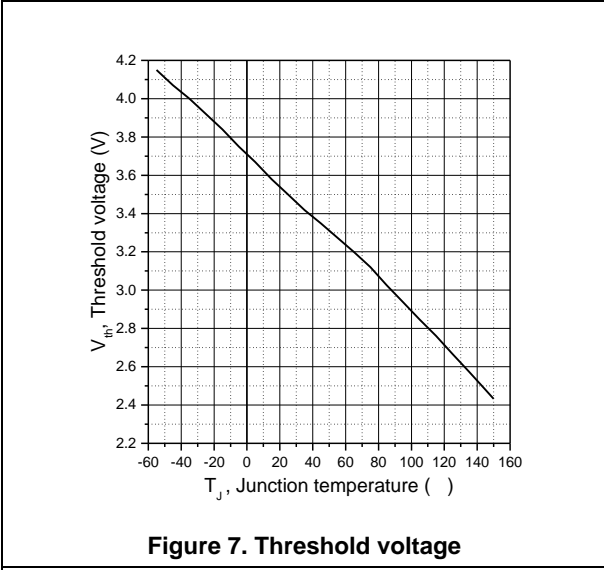
Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Diode forward voltage	V_{SD}			1.3	V	$I_S=4\text{ A}$, $V_{GS}=0\text{ V}$
Reverse recovery time	t_{rr}		162		ns	$I_S=4\text{ A}$,
Reverse recovery charge	Q_{rr}		1.2		C	
Peak reverse recovery current	I_{rrm}		7		A	

Note

- 1) Calculated continuous current based on maximum allowable junction temperature.
- 2) Repetitive rating; pulse width limited by max. junction temperature.
- 3) P_d is based on max. junction temperature, using junction-case thermal resistance.
- 4) The value of R_{θ} is measured with the device mounted on 1 in 2 FR-4 board with 2oz. Copper, in a still air environment with $T_a=25\text{ }^\circ\text{C}$.
- 5) $V_{DD}=50\text{ V}$, $V_{GS}=10\text{ V}$, $L=20\text{ mH}$, starting $T_j=25\text{ }^\circ\text{C}$.

Electrical Characteristics Diagrams

<p>Figure 1. Typ. output characteristics</p>	<p>Figure 2. Typ. transfer characteristics</p>
<p>Figure 3. Typ. capacitances</p>	<p>Figure 4. Typ. gate charge</p>
<p>Figure 5. Drain-source breakdown voltage</p>	<p>Figure 6. Drain-source on-state resistance</p>



Test circuits and waveforms

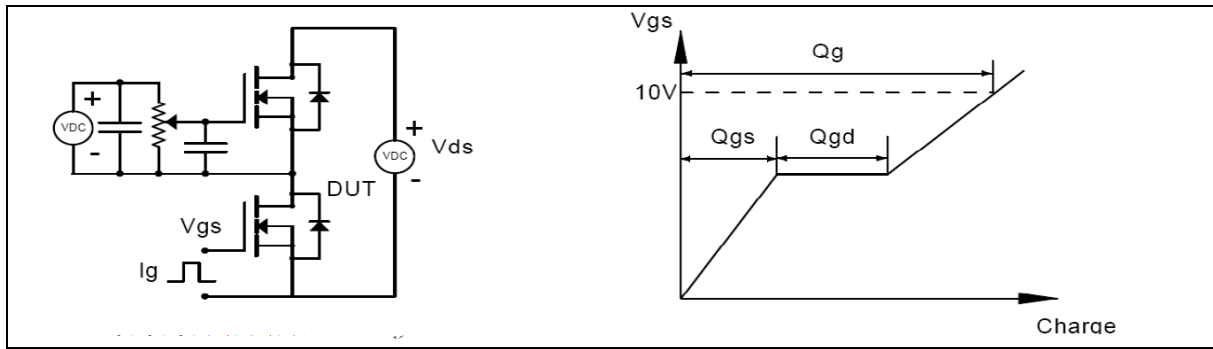


Figure 1. Gate charge test circuit & waveform

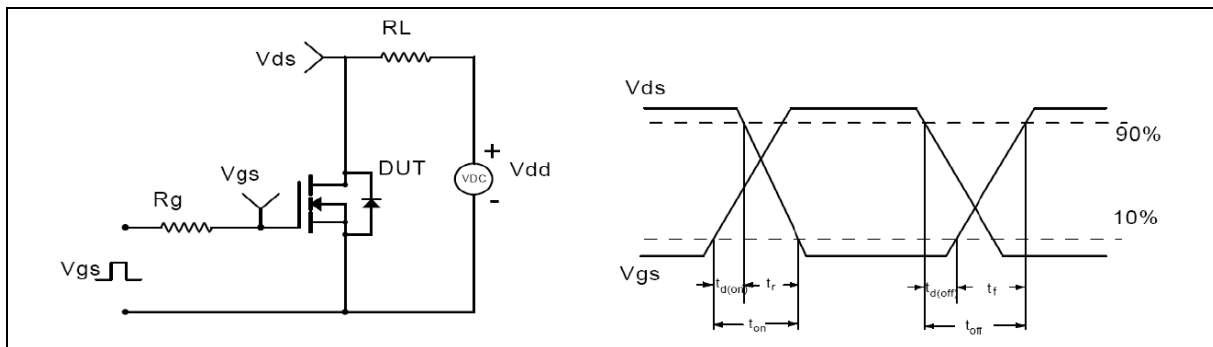


Figure 2. Switching time test circuit & waveforms

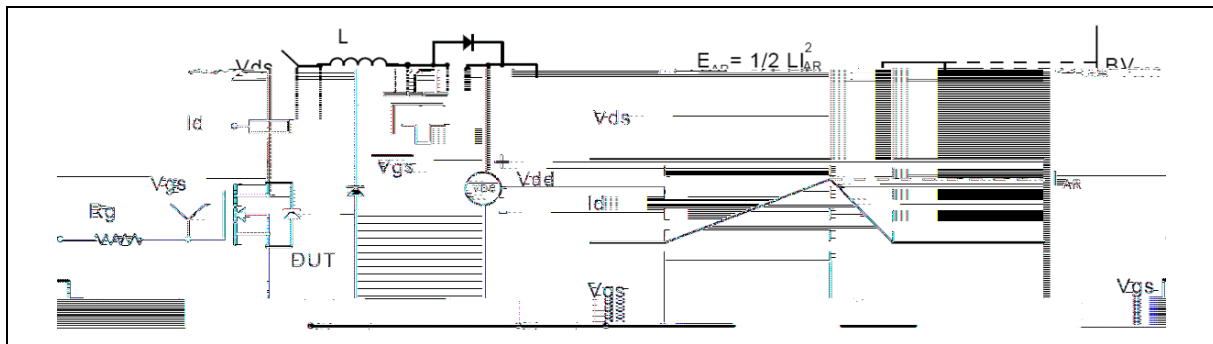


Figure 3. Unclamped inductive switching (UIS) test circuit & waveforms

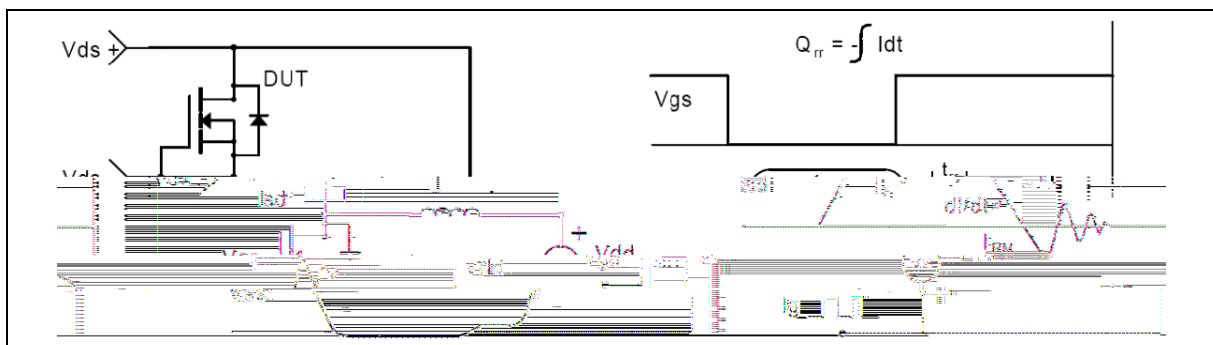


Figure 4. Diode reverse recovery test circuit & waveforms

OSG65R1K4PF
Enhancement Mode N-Channel Power MOSFET 

Ordering Information

Package Type	Units/ Tube	Tubes/ Inner Box	Units/ Inner Box	Inner Boxes/ Carton Box	Units/ Carton Box
TO220-P	50	20	1000	6	6000

Product Information

Product	Package	Pb Free	RoHS	Halogen Free
OSG65R1K4PF	TO220	yes	yes	yes
