

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.

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Parameter

Value

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	25	A
Continuous drain current ¹⁾ , $T_C=100$ °C		16	
Pulsed drain current ²⁾ , $T_C=25$ °C	$I_{D, pulse}$	75	A
Continuous diode forward current ¹⁾ , $T_C=25$ °C	I_S	25	A
Diode pulsed current ²⁾ , $T_C=25$ °C	$I_{S, pulse}$	75	A
Power dissipation ³⁾ , $T_C=25$ °C	P_D	34	W
Single pulsed avalanche energy ⁵⁾	E_{AS}	1000	mJ
MOSFET dv/dt ruggedness, V_{DS}	dv/dt	50	V/ns
Reverse diode dv/dt, V_{DS}	dv/dt	50	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	3.7	°C/W
Thermal resistance, junction-ambient ⁴⁾	R	62.5	°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, $I_D=1$ mA
		700	750			$V_{GS}=0$ V, $I_D=1$ mA, $T_j=150$ °C
Gate threshold voltage	$V_{GS(th)}$	3.0		4.5	V	$V_{DS}=V_{GS}$, $I_D=1$ mA
Drain-source on-state resistance	$R_{DS(ON)}$		0.12	0.14		$V_{GS}=10$ V, $I_D=12.5$ A
			0.30			$V_{GS}=10$ V, $I_D=12.5$ 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	A	$V_{DS}=650$ V, $V_{GS}=0$ V
Gate resistance	R_G		16.7		Ω	= 1 MHz, Open drain

Dynamic Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Input capacitance	C_{iss}		2855.4		pF	$V_{GS}=0\text{ V}$, $V_{DS}=50\text{ V}$, 00 kHz
Output capacitance	C_{oss}		151.1		pF	
Reverse transfer capacitance	C_{rss}		7.7		pF	
Turn-on delay time	$t_{d(on)}$		56.3		ns	$V_{GS}=10\text{ V}$, $V_{DS}=400\text{ V}$, R_G $I_D=16\text{ A}$
Rise time	t_r		68.8		ns	
Turn-off delay time	$t_{d(off)}$		108.5		ns	
Fall time	t_f		31.6		ns	

Gate Charge Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Total gate charge	Q_g		55.2		nC	$V_{GS}=10\text{ V}$, $V_{DS}=400\text{ V}$, $I_D=16\text{ A}$
Gate-source charge	Q_{gs}		13.7		nC	
Gate-drain charge	Q_{gd}		24.0		nC	
Gate plateau voltage	$V_{plateau}$		6.8		V	

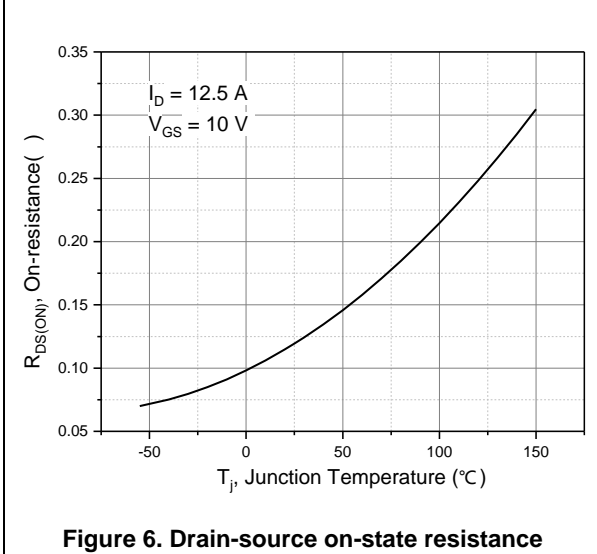
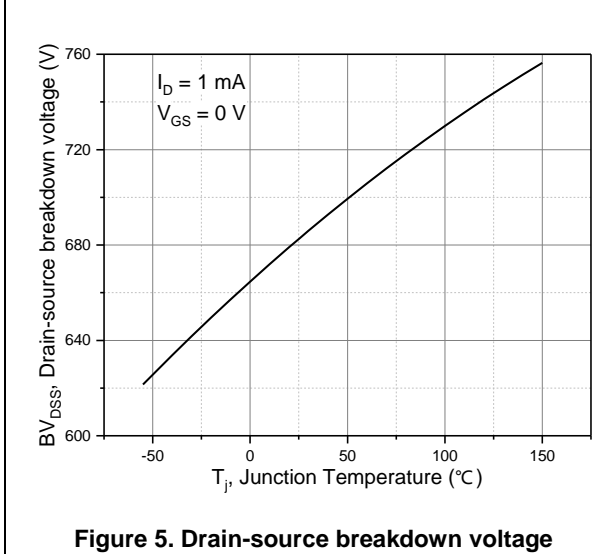
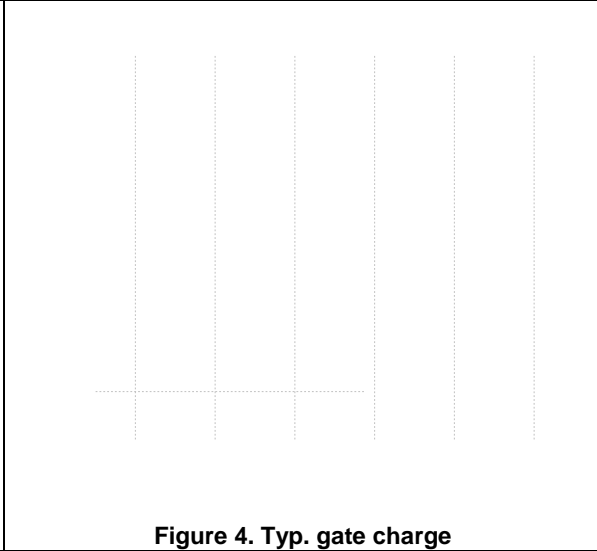
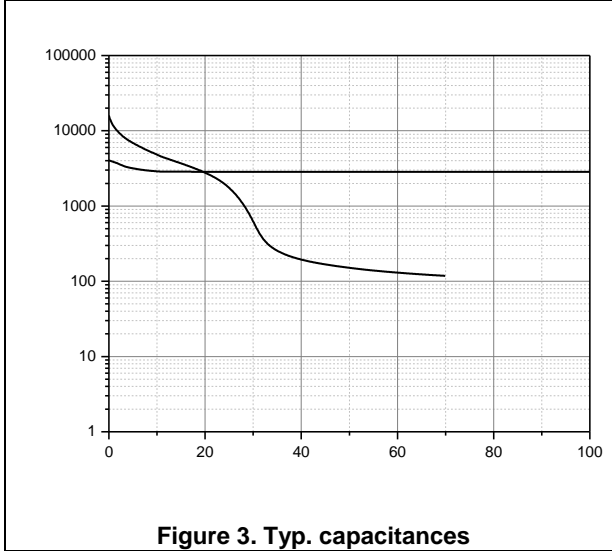
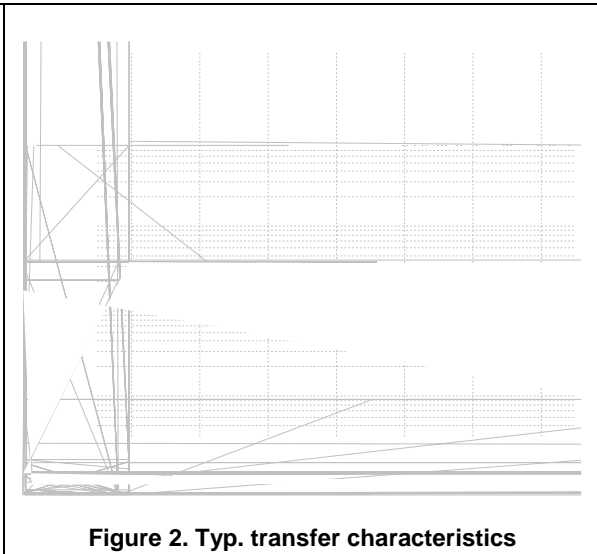
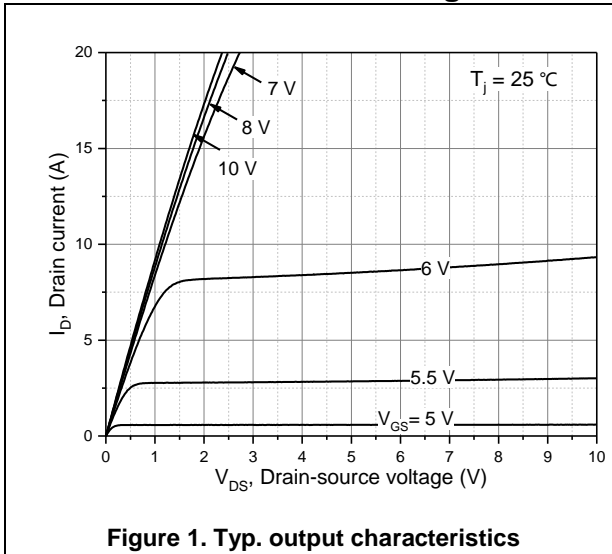
Body Diode Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Diode forward voltage	V_{SD}			1.3	V	$I_S=25\text{ A}$, $V_{GS}=0\text{ V}$
Reverse recovery time	t_{rr}		126.0		ns	$I_S=20\text{ A}$, $di/dt=100$
Reverse recovery charge	Q_{rr}		0.7		C	
Peak reverse recovery current	I_{rrm}		10.6		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) $V_{DD}=100\text{ V}$, $V_{GS}=10\text{ V}$, $L=60\text{ mH}$, starting $T_j=25\text{ }^\circ\text{C}$.

Electrical Characteristics Diagrams



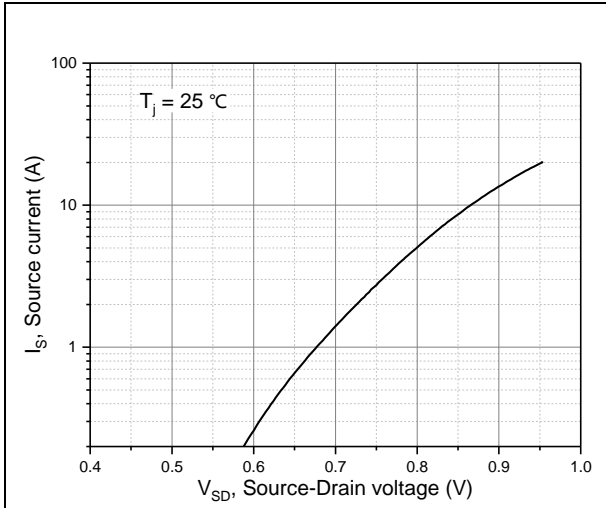


Figure 7. Forward characteristic of body diode

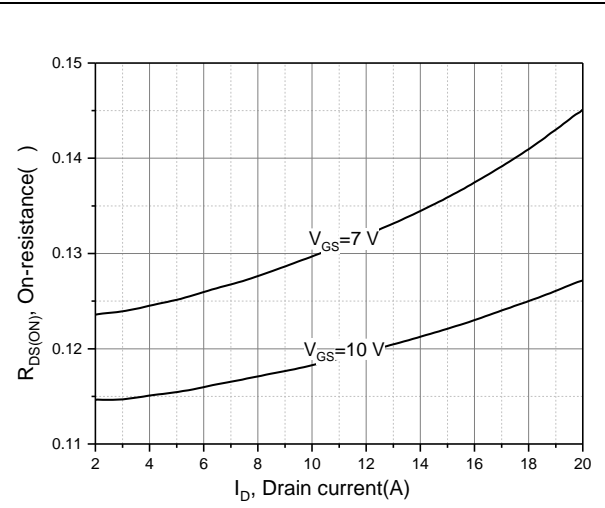


Figure 8. Drain-source on-state resistance

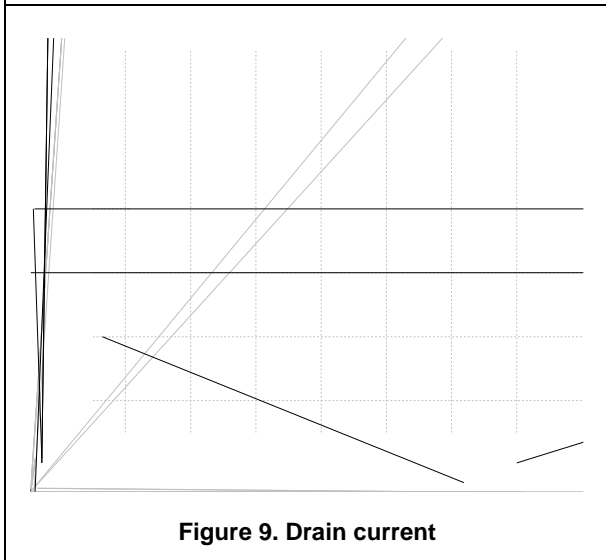


Figure 9. Drain current

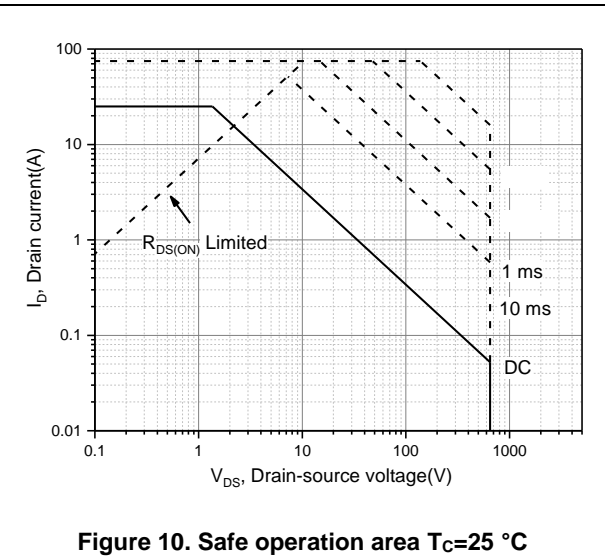


Figure 10. Safe operation area $T_C=25\text{ }^\circ\text{C}$

Test circuits and waveforms

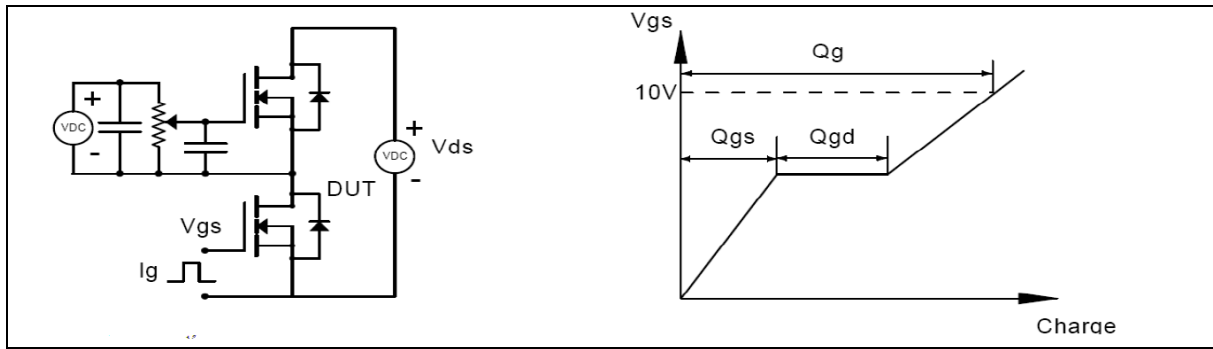


Figure 1. Gate charge test circuit & waveform

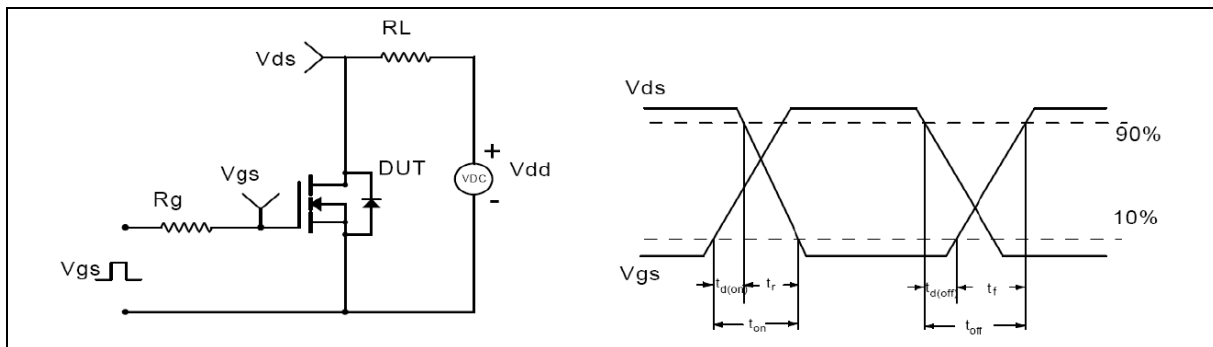


Figure 2. Switching time test circuit & waveforms

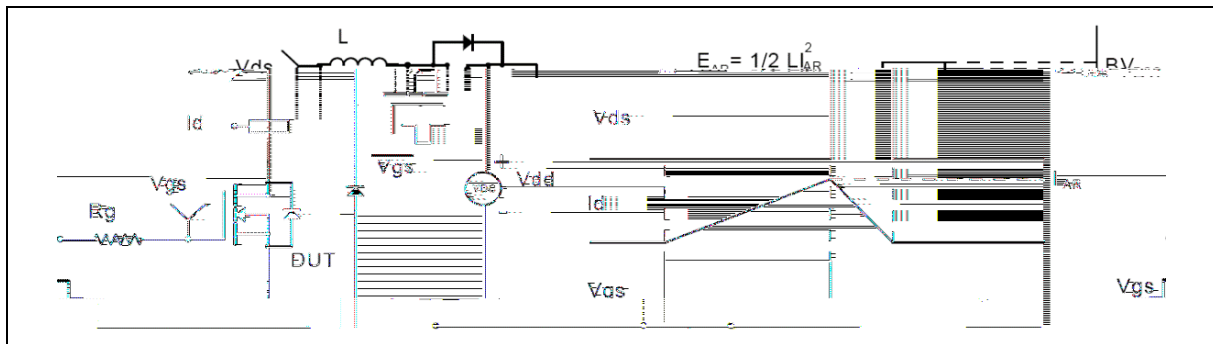


Figure 3. Unclamped inductive switching (UIS) test circuit & waveforms

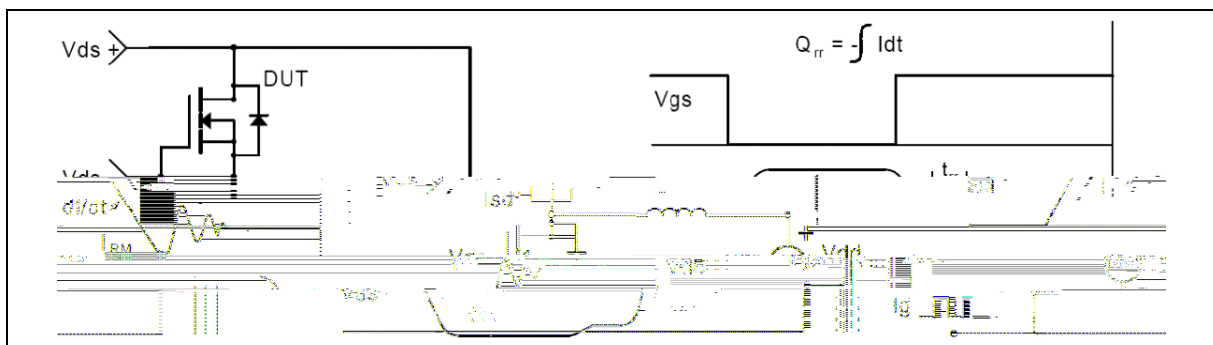
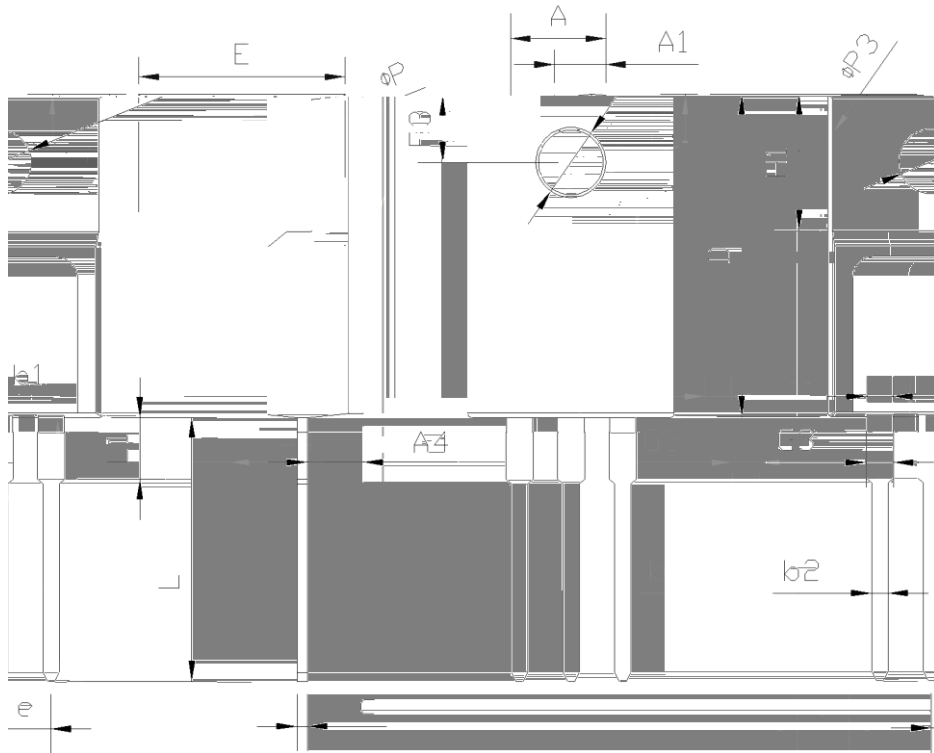


Figure 4. Diode reverse recovery test circuit & waveforms

Package Information



Symbol	mm		
	Min	Nom	Max
E	9.96	10.16	10.36
A	4.50	4.70	4.90
A1	2.34	2.54	2.74
A4	2.56	2.76	2.96
c	0.40	0.50	0.65
D	15.57	15.87	16.17
H1	6.70 REF		
e	2.54 BSC		
L	12.68	12.98	13.28
L1	2.88	3.03	3.18
	3.03	3.18	3.38
	3.15	3.45	3.65
F3	3.15	3.30	3.45
G3	1.25	1.35	1.55
b1	1.18	1.28	1.43
b2	0.70	0.80	0.95

Version1: TO220F-C package outline dimension

Ordering Information

Package Type	Units/ Tube	Tubes/ Inner Box	Units/ Inner Box	Inner Boxes/ Carton Box	Units/ Carton Box
TO220F-C	50	20	1000	6	6000

Product Information

Product	Package	Pb Free	RoHS	Halogen Free
OSG65R140FSZF	TO220F	yes	yes	yes

