

The GreenMOS<sup>®</sup> 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<sup>®</sup> 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.

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**Absolute Maximum Ratings** at  $T_j=25$  unless otherwise noted

Parameter	Symbol	Value	Unit
Drain-source voltage	$V_{DS}$	650	V
Gate-source voltage	$V_{GS}$	$\pm 30$	V
Continuous drain current <sup>1)</sup> , $T_C=25$ °C	$I_D$	15	A
Continuous drain current <sup>1)</sup> , $T_C=100$ °C		9.3	
Pulsed drain current <sup>2)</sup> , $T_C=25$ °C	$I_{D, pulse}$	45	A
Continuous diode forward current <sup>1)</sup> , $T_C=25$ °C	$I_S$	15	A
Diode pulsed current <sup>2)</sup> , $T_C=25$ °C	$I_{S, pulse}$	45	A
Power dissipation <sup>3)</sup> , $T_C=25$ °C	$P_D$	32	W
Single pulsed avalanche energy <sup>5)</sup>	$E_{AS}$	400	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	3.9	°C/W
Thermal resistance, junction-ambient <sup>4)</sup>	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, $I_D=$ A
		700	770			$V_{GS}=0$ V, $I_D=$ A, $T_j=150$ °C
Gate threshold voltage	$V_{GS(th)}$	2.0		4.0	V	$V_{DS}=V_{GS}$ , $I_D=$ A
Drain-source on-state resistance	$R_{DS(ON)}$		0.26	0.29		$V_{GS}=10$ V, $I_D=7.5$ A
			0.68			$V_{GS}=10$ V, $I_D=7.5$ 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	$I_{DSS}$			1	A	$V_{DS}=650$ V, $V_{GS}=0$ V

**Dynamic Characteristics**

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Input capacitance	$C_{iss}$		986		pF	$V_{GS}=0\text{ V}$ , $V_{DS}=50\text{ V}$ , MHz
Output capacitance	$C_{oss}$		67.7		pF	
Reverse transfer capacitance	$C_{rss}$		3.36		pF	
Turn-on delay time	$t_{d(on)}$		30.9		ns	$V_{GS}=10\text{ V}$ , $V_{DS}=520\text{ V}$ , $R_G=25$ $I_D=15\text{ A}$
Rise time	$t_r$		39.9		ns	
Turn-off delay time	$t_{d(off)}$		44.1		ns	
Fall time	$t_f$		49.7		ns	

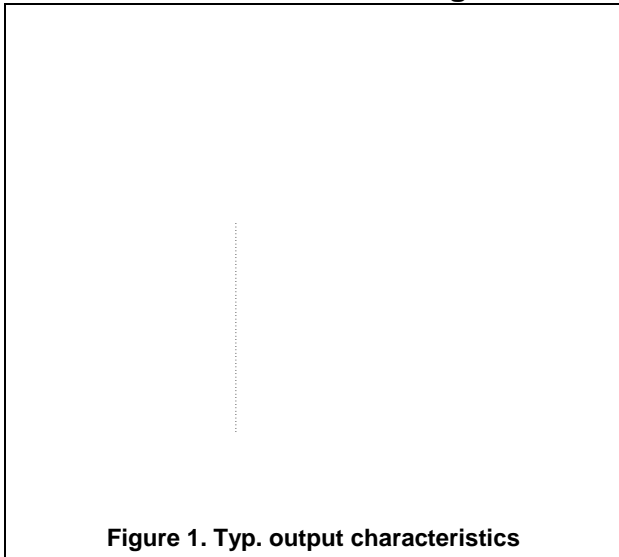
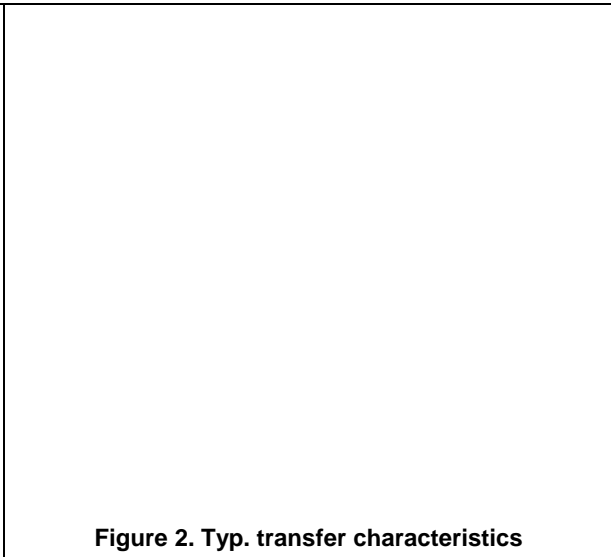
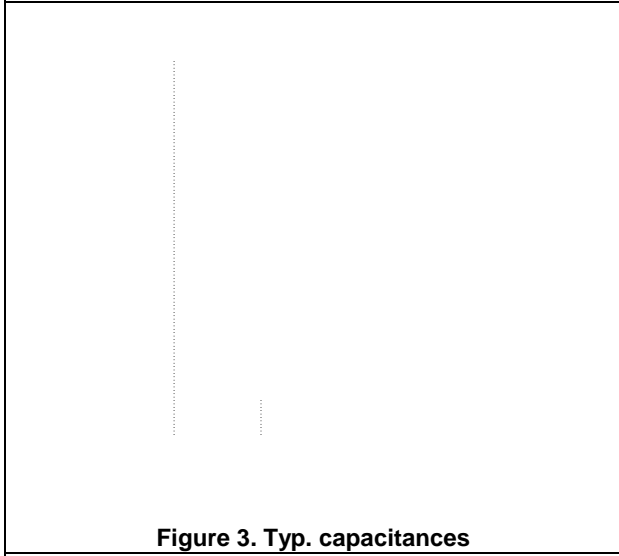
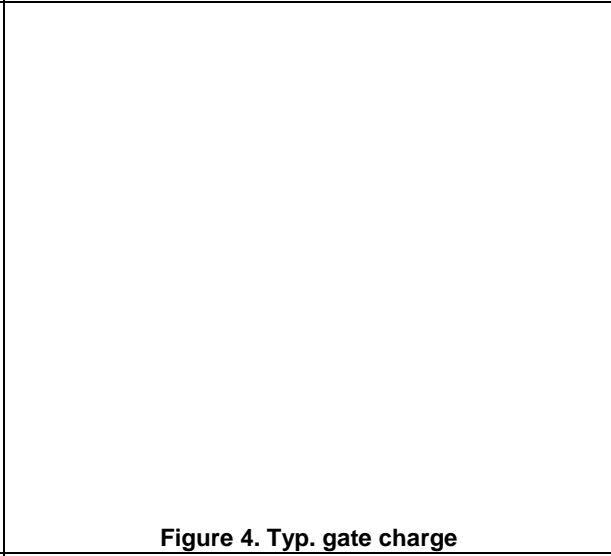
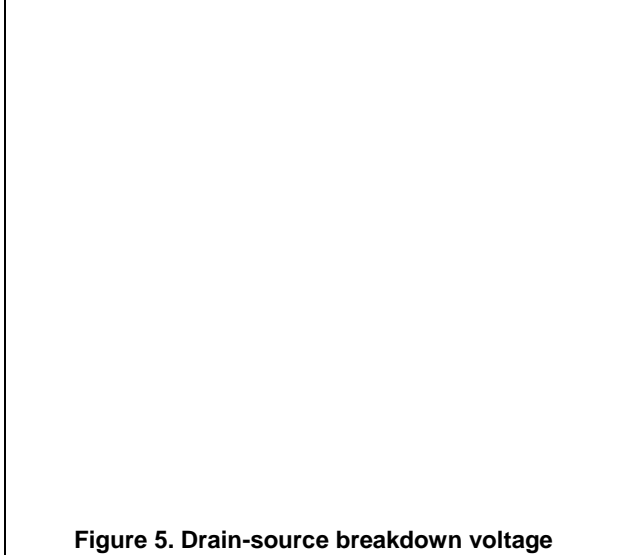

**Gate Charge Characteristics**

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Total gate charge	$Q_g$		18		nC	$V_{GS}=10\text{ V}$ , $V_{DS}=520\text{ V}$ , $I_D=10\text{ A}$
Gate-source charge	$Q_{gs}$		5.9		nC	
Gate-drain charge	$Q_{gd}$		6		nC	
Gate plateau voltage	$V_{plateau}$		5.6		V	

**Body Diode Characteristics**

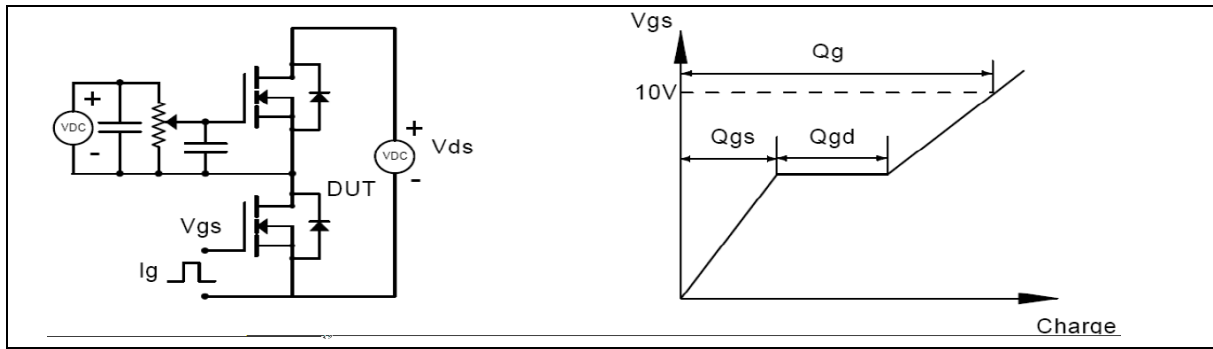
Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Diode forward voltage	$V_{SD}$			1.4	V	$I_s$

### Electrical Characteristics Diagrams

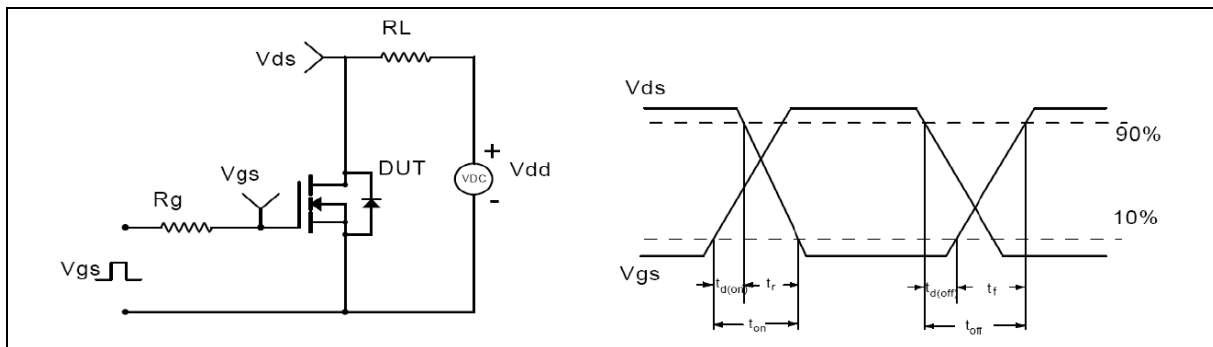
 <p><b>Figure 1. Typ. output characteristics</b></p>	 <p><b>Figure 2. Typ. transfer characteristics</b></p>
 <p><b>Figure 3. Typ. capacitances</b></p>	 <p><b>Figure 4. Typ. gate charge</b></p>
 <p><b>Figure 5. Drain-source breakdown voltage</b></p>	 <p><b>Figure 6. Drain-source on-state resistance</b>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

Enhancement Mode N-

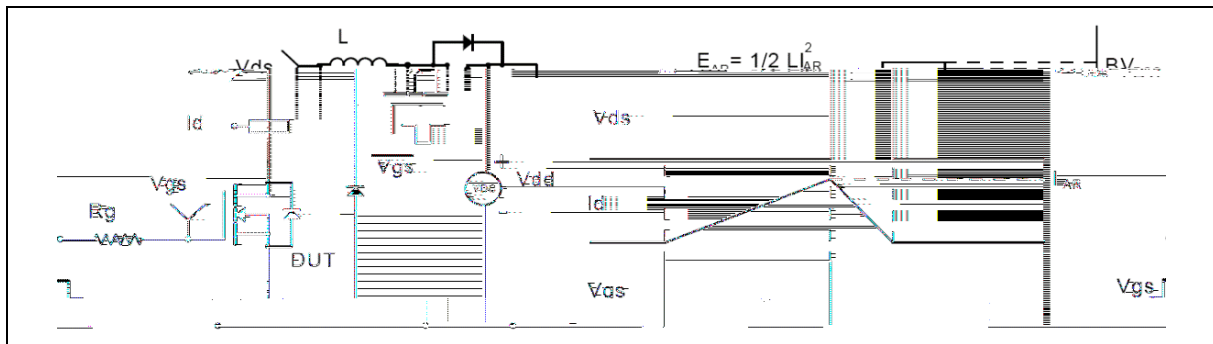
**Test circuits and waveforms**



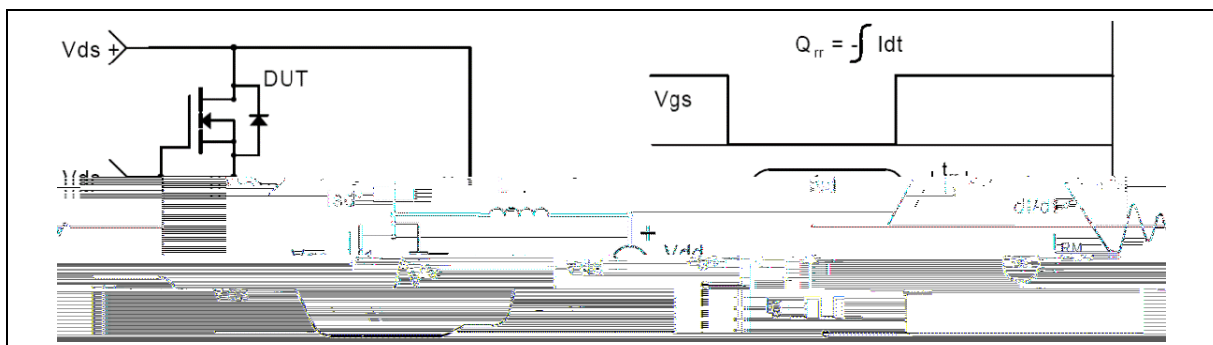
**Figure 1. Gate charge test circuit & waveform**



**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
OSG65R290FF	TO220F	yes	yes	yes