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® Z series is integrated with fast recovery diode (FRD) to minimize reverse recovery time. It is suitable for resonant switching topologies to reach higher efficiency, higher reliability and smaller form factor.

Features

- Low $R_{DS(ON)}$ & FOM
- Extremely low switching loss
- Excellent stability and uniformity
- Ultra-fast and robust body diode

Applications

- PC power
- Telecom power
- Server power
- EV Charger
- Motor driver

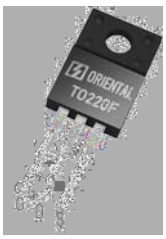
Key Performance Parameters

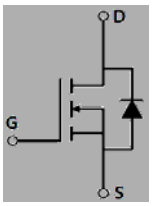
Parameter	Value	Unit
$V_{DS,\ min}$ @ $T_{j(max)}$	600	V
$I_{D,\ pulse}$	141	A
$R_{DS(ON),\ max}$ @ V_{GS}=10V	74	mΩ
Q_g	44.8	nC

Marking Information

Product Name	Package	Marking
OSG55R074FZF	TO220F	OSG55R074FZ

Package & Pin Information





Absolute Maximum Ratings at T_j=25°C unless otherwise noted

Parameter	Symbol	Value	Unit
Drain-source voltage	V_{DS}	550	V
Gate-source voltage	V_{GS}	±30	V
Continuous drain current[1], T_C=25 °C	I_D	47	A
Continuous drain current[1], T_C=100 °C		30	
Pulsed drain current[2], T_C=25 °C	$I_{D,\ pulse}$	141	A
Continuous diode forward current[1], T_C=25 °C	I_S	47	A
Diode pulsed current[2], T_C=25 °C	$I_{S,\ pulse}$	141	A
Power dissipation[3], T_C=25 °C	P_D	35	W
Single pulsed avalanche energy[5]	E_{AS}	1000	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	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	$R_{\theta JC}$	3.6	°C/W
Thermal resistance, junction-ambient[4]	$R_{\theta JA}$	62.5	°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}	550			V	V_{GS}=0 V, I_D=1 mA
		600				V_{GS}=0 V, I_D=1 mA, T_j=150 °C
Gate threshold voltage	$V_{GS(th)}$	3.5		4.5	V	V_{DS}=V_{GS}, I_D=1 mA
Drain-source on-state resistance	$R_{DS(ON)}$		0.066	0.074	Ω	V_{GS}=10 V, I_D=23.5 A
			0.16			V_{GS}=10 V, I_D=23.5 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	μA	V_{DS}=600 V, V_{GS}=0 V
Gate resistance	R_G		8		Ω	f=1 MHz Open drain

Dynamic Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Input capacitance	C_{iss}		2933		pF	V_{GS}=0 V, V_{DS}=50 V, f=100 KHz
Output capacitance	C_{oss}		350.1		pF	
Reverse transfer capacitance	C_{rss}		7.04		pF	
Turn-on delay time	$t_{d(on)}$		92.3		ns	V_{GS}=10 V, V_{DS}=400 V, R_G=2 Ω, I_D=25 A
Rise time	t_r		98.1		ns	
Turn-off delay time	$t_{d(off)}$		75.5		ns	
Fall time	t_f		63.9		ns	

Gate Charge Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Total gate charge	Q_g		44.8		nC	V_{GS}=10 V, V_{DS}=400 V, I_D=25 A
Gate-source charge	Q_{gs}		18.2		nC	
Gate-drain charge	Q_{gd}		13.8		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=47 A, V_{GS}=0 V
Reverse recovery time	t_{rr}		167		ns	I_S=25 A, di/dt=100 A/μs
Reverse recovery charge	Q_{rr}		1.1		uC	
Peak reverse recovery current	I_{rrm}		12.7		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 $R_{\theta JA}$ 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}=100 V, V_{GS}=10 V, L=60 mH, starting T_j=25 °C.

Electrical Characteristics Diagrams

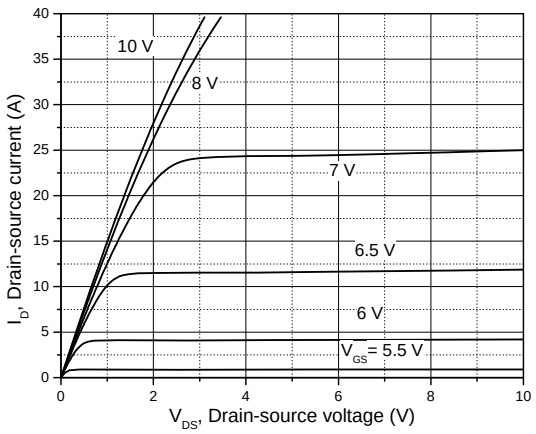


Figure 1. Typ. output characteristics

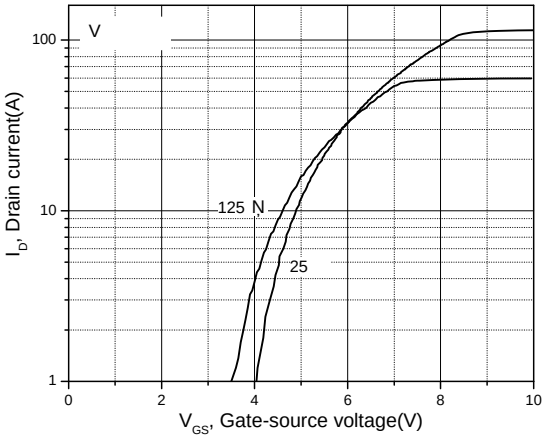


Figure 2. Typ. transfer characteristics

Figure 3. Typ. capacitances

Figure 4. Typ. gate charge

Figure 5. Drain-source breakdown voltage

Figure 6. Drain-source on-state resistance

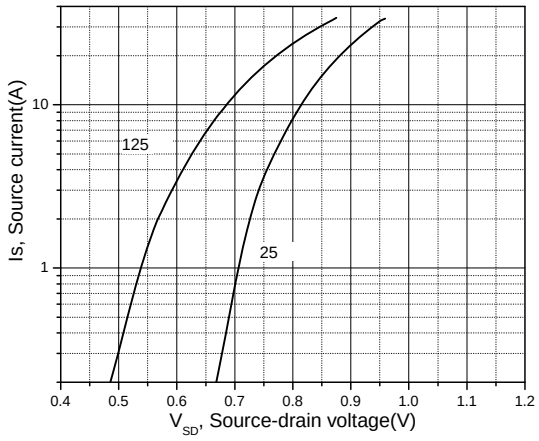


Figure 7. Forward characteristic of body diode

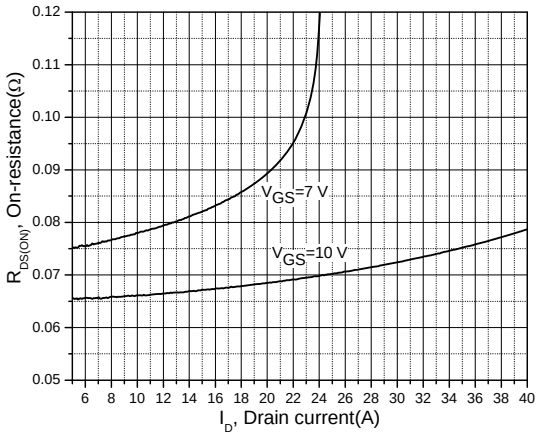


Figure 8. Drain-source on-state resistance

Figure 9. Drain current

Figure 10. Safe operation area T_C=25 ÁC

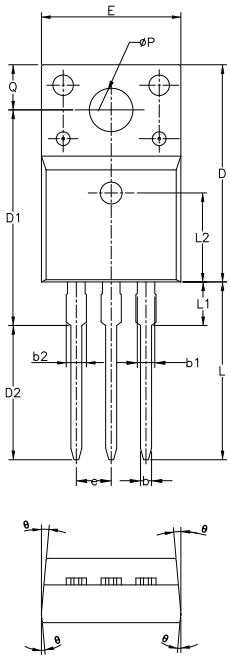
Test circuits and waveforms

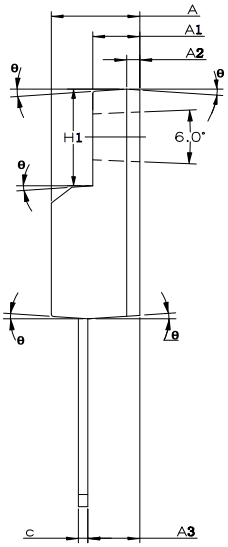
Package Information

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
ΦP	3.03	3.18	3.38
ΦP3	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

Version 1: TO220F-C outline dimension

Package Information





Symbol	mm		
	Min	Nom	Max
A	4.50	4.70	4.83
A1	2.34	2.54	2.74
A2		0.70 REF	
A3	2.56	2.76	2.93
b	0.70	-	0.90
b1	1.18	-	1.38
b2	-	-	1.47
c	0.45	0.50	0.60
D	15.67	15.87	16.07
D1	15.55	15.75	15.95
D2	9.60	9.80	10.00
E	9.96	10.16	10.36
e		2.54 BSC	
H1	6.48	6.68	6.88
L	12.68	12.98	13.28
L1	-	-	3.50
L2		6.50 REF	
ΦP	3.08	3.18	3.28
Q	3.20	-	3.40
θ	1º	3º	5º

Version 2: TO220F-J 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
TO220F-J	50	20	1000	5	5000

Product Information

Product	Package	Pb Free	RoHS	Halogen Free
OSG55R074FZF	TO220F	yes	yes	yes

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