

General Description

The GreenMOS[®] SuperSi series is based on Oriental Semiconductor's unique device design to achieve extremely fast switching characteristics. It is the perfect replacement for the SiC device in high frequency operations with better ruggedness and cost. It is targeted to meet the most aggressive efficiency standards of power supply systems by pushing both performance and power density to extreme limits.

Features

- Low $R_{DS(ON)}$ & FOM
- Extremely low reverse recovery charges
- Extremely low switching loss
- Excellent stability and uniformity




Applications

- EV motor driving system
- PV converter

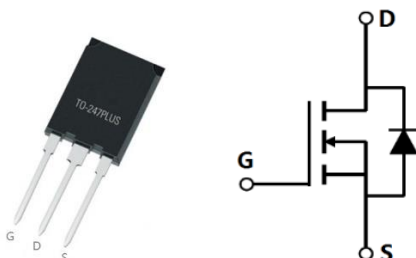
Key Performance Parameters

Parameter	Value	Unit
V_{DS}	650	V
I_D , pulse	300	A
$R_{DS(ON)}$, typ @ $V_{GS}=10V$	22	m Ω
Q_g	351	nC

Marking Information

Product Name	Package	Marking
OSS100N65H5MF	TO247-PLUS	OSS100N65H5M

Package & Pin Information



Absolute Maximum Ratings at $T_j=25^{\circ}\text{C}$ 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⁾ , $T_C=25^{\circ}\text{C}$	I_D	100	A
Continuous drain current ¹⁾ , $T_C=100^{\circ}\text{C}$		63	
Pulsed drain current ²⁾ , $T_C=25^{\circ}\text{C}$	$I_{D, \text{pulse}}$	300	A
Power dissipation ³⁾ , $T_C=25^{\circ}\text{C}$	P_D	510	W
Single pulsed avalanche energy ⁵⁾	E_{AS}	2109	mJ
MOSFET dv/dt ruggedness, $V_{DS}=0 \dots 480 \text{ V}$	dv/dt	50	V/ns
Reverse diode dv/dt, $V_{DS}=0 \dots 480 \text{ V}$, $I_{SD} \leq I_D$	dv/dt	50	V/ns
Operation and storage temperature	T_{stg}, T_j	-55 to 150	$^{\circ}\text{C}$

Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal resistance, junction-case	$R_{\theta JC}$	0.25	$^{\circ}\text{C/W}$
Thermal resistance, junction-ambient ⁴⁾	$R_{\theta JA}$	62	$^{\circ}\text{C/W}$

Electrical Characteristics at $T_j=25^{\circ}\text{C}$ unless otherwise specified

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Drain-source breakdown voltage	BV_{DSS}	650			V	$V_{GS}=0 \text{ V}$, $I_D=2 \text{ mA}$
Gate threshold voltage	$V_{GS(th)}$	3.0		5.0	V	$V_{DS}=V_{GS}$, $I_D=2 \text{ mA}$
Drain-source on-state resistance	$R_{DS(on)}$		22	25	m Ω	$V_{GS}=18 \text{ V}$, $I_D=50 \text{ A}$
			51			$V_{GS}=18 \text{ V}$, $I_D=50 \text{ A}$, $T_j=150^{\circ}\text{C}$
Gate-source leakage current	I_{GSS}			100	nA	$V_{GS}=30 \text{ V}$
				-100		$V_{GS}=-30 \text{ V}$
Drain-source leakage current	I_{DSS}			10	μA	$V_{DS}=650 \text{ V}$, $V_{GS}=0 \text{ V}$
Gate resistance	R_G		1.4		Ω	$f=1 \text{ MHz}$, Open drain

Dynamic Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Input capacitance	C_{iss}		10100		pF	$V_{GS}=0\text{ V}$, $V_{DS}=50\text{ V}$, $f=100\text{ kHz}$
Output capacitance	C_{oss}		619		pF	
Reverse transfer capacitance	C_{rss}		17		pF	
Effective output capacitance, energy related	$C_{o(er)}$		383		pF	$V_{GS}=0\text{ V}$, $V_{DS}=0\text{ V}-400\text{ V}$
Effective output capacitance, time related	$C_{o(tr)}$		1810		pF	
Turn-on delay time	$t_{d(on)}$		24		ns	$V_{GS}=18\text{ V}$, $V_{DS}=400\text{ V}$, $R_G=2\ \Omega$, $I_D=40\text{ A}$
Rise time	t_r		23		ns	
Turn-off delay time	$t_{d(off)}$		64		ns	
Fall time	t_f		18		ns	

Gate Charge Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Total gate charge	Q_g		351		nC	$V_{GS}=18\text{ V}$, $V_{DS}=400\text{ V}$, $I_D=40\text{ A}$
Gate-source charge	Q_{gs}		105		nC	
Gate-drain charge	Q_{gd}		98		nC	

Body Diode Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Diode forward voltage	V_{SD}			3.0	V	$I_S=100\text{ A}$, $V_{GS}=0\text{ V}$
Reverse recovery time	t_{rr}		56		ns	$V_R=400\text{ V}$, $I_S=40\text{ A}$, $di/dt=1000\text{ A}/\mu\text{s}$
Reverse recovery charge	Q_{rr}		1.17		uC	
Peak reverse recovery current	I_{rrm}		38.2		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) $V_{DD}=100\text{ V}$, $V_{GS}=10\text{ V}$, $L=75\text{ mH}$, starting $T_J=25\text{ }^\circ\text{C}$.

Electrical Characteristics Diagrams

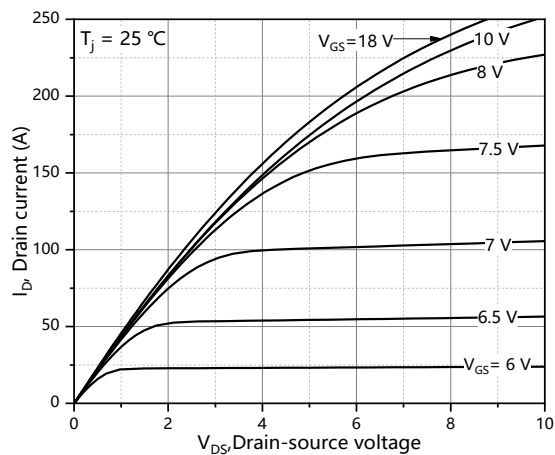


Figure 1. Typ. output characteristics

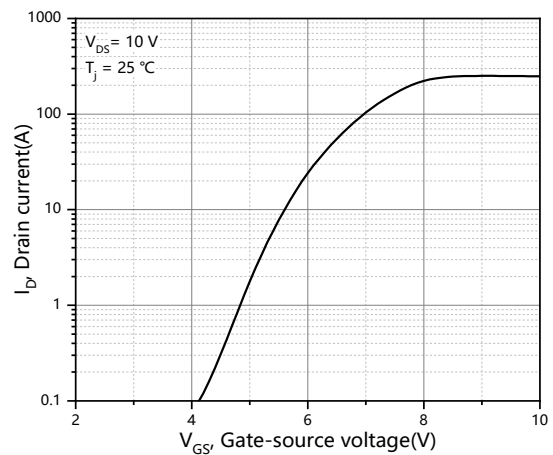


Figure 2. Typ. transfer characteristics

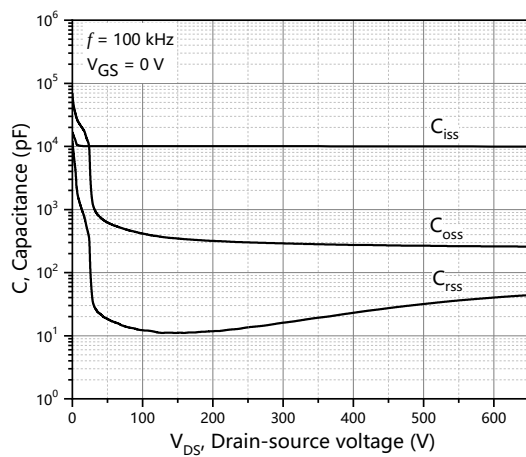


Figure 3. Typ. capacitances

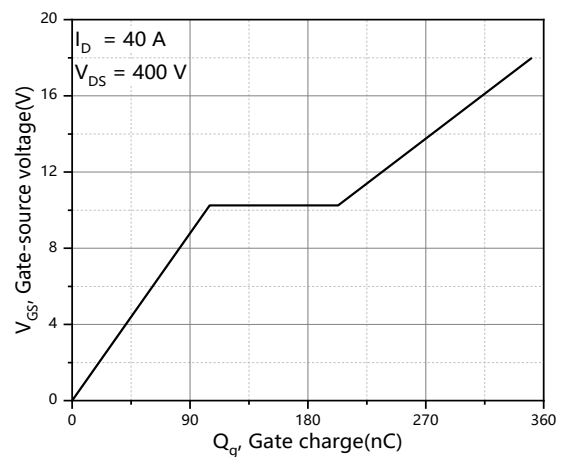


Figure 4. Typ. gate charge

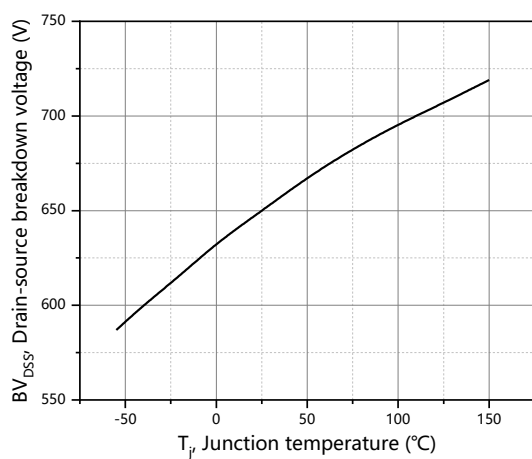


Figure 5. Drain-source breakdown voltage

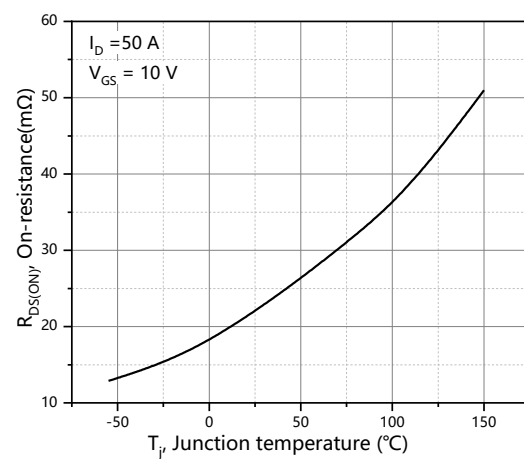


Figure 6. Drain-source on-state resistance

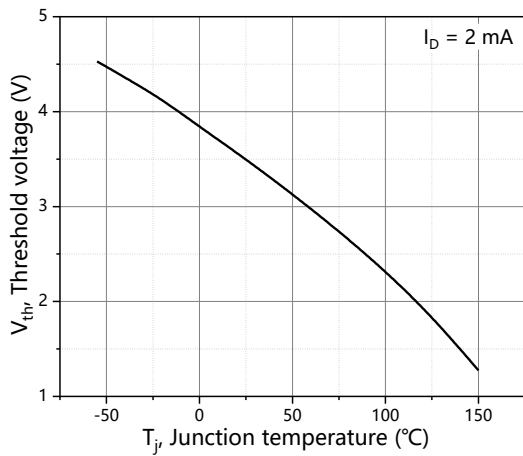


Figure 7. Threshold voltage

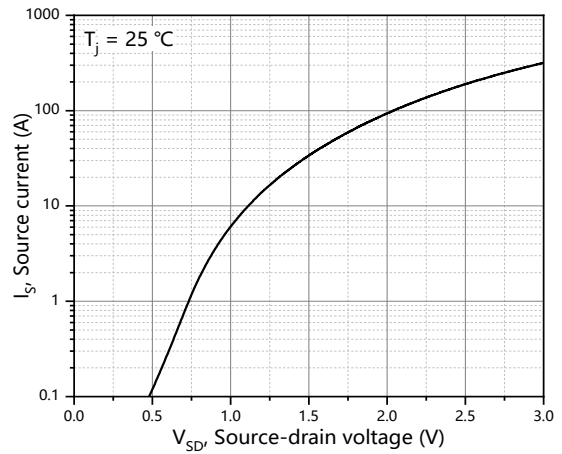


Figure 8. Forward characteristic of body diode

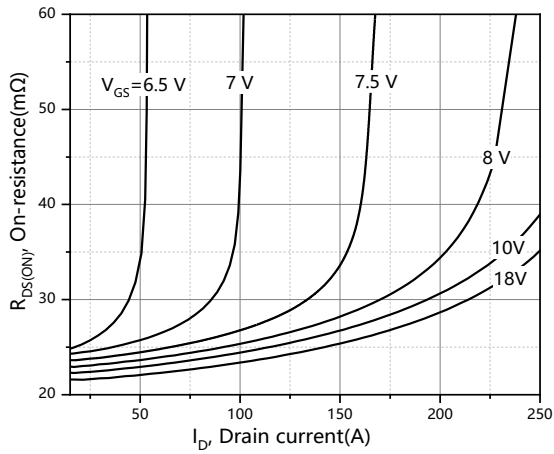


Figure 9. Drain-source on-state resistance

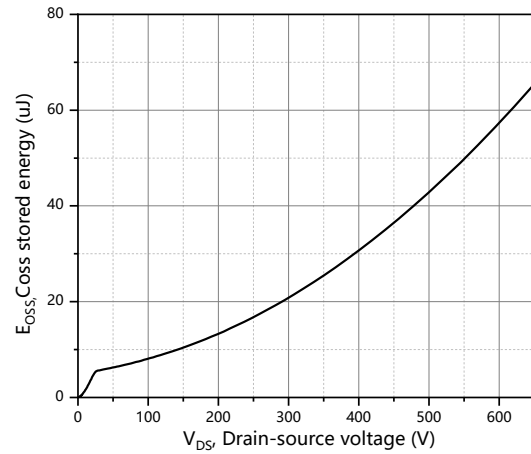


Figure 10. Typ. Coss stored energy

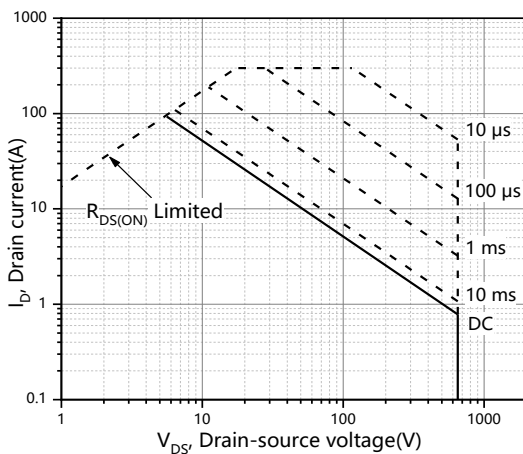


Figure 11. Safe operation area T_c=25 °C

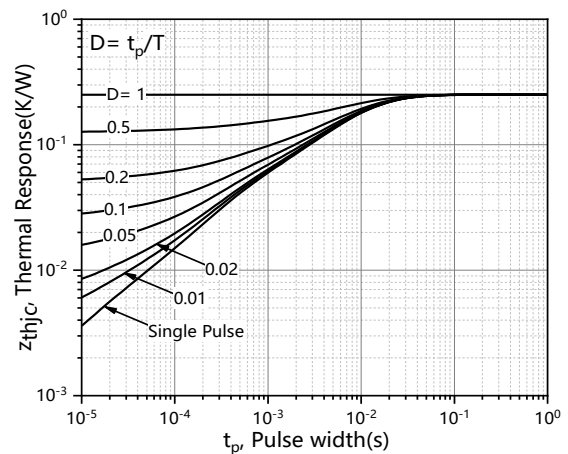


Figure 12. Max. transient thermal impedance

Test circuits and waveforms



Figure 1. Gate charge test circuit & waveform



Figure 2. Switching time test circuit & waveforms

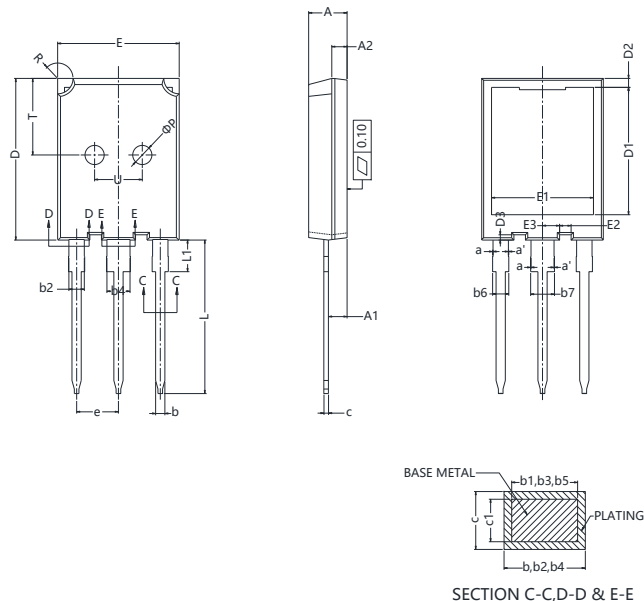


Figure 3. Unclamped inductive switching (UIS) test circuit & waveforms



Figure 4. Diode reverse recovery test circuit & waveforms

Package Information



Symbol	mm		
	Min	Nom	Max
A	4.90	5.00	5.10
A1	2.31	2.41	2.51
A2	1.90	2.00	2.10
a	0.00		0.15
a'	0.00		0.15
b	1.16		1.26
b1	1.15	1.20	1.22
b2	1.96		2.06
b3	1.95	2.00	2.02
b4	2.96		3.06
b5	2.96	3.00	3.02
b6			2.25
b7			3.25
c	0.59		0.66
c1	0.59	0.60	0.66
D	20.90	21.00	21.10
D1	16.25	16.55	16.85
D2	1.05	1.17	1.35
D3	0.58		0.78
E	15.70	15.80	15.90
E1	13.10	13.30	13.50
E2	1.40	1.50	1.60
E3	2.12	2.22	2.32
e	5.436 BSC		
L	19.80	19.95	20.10
L1			4.30
P	2.40	2.50	2.60
R	1.90		2.10
T	9.80		10.20
U	6.00		6.40

Version 1: TO247-PLUS-J package outline dimension

Ordering Information

Package Type	Units/ Tube	Tubes/ Inner Box	Units/ Inner Box	Inner Boxes/ Carton Box	Units/ Carton Box
TO247-PLUS-J	30	15	450	4	1800

Product Information

Product	Package	Pb Free	RoHS	Halogen Free
OSS100N65H5MF	TO247-PLUS	yes	yes	yes

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