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® 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.

Features

GreenMOS®

RoHS compliant

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

Applications

- PC power
- LED lighting
- Telecom power
- Server power
- EV Charger
- Solar/UPS

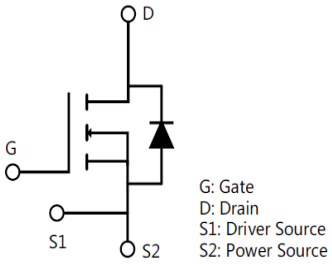
Key Performance Parameters

Parameter	Value	Unit
$V_{DS,\ min}$ @ $T_{j(max)}$	700	V
$I_{D,\ pulse}$	60	A
$R_{DS(ON)\ ,\ max}$ @ V_{GS}=10V	200	mΩ
Q_g	24	nC

Marking Information

Product Name	Package	Marking
OSG65R200JT3F	PDFN 8×8	OSG65R200JT3

Package & Pin Information



Absolute Maximum Ratings at T_j=25°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 °C	I_D	20	A
Continuous drain current[1], T_C=100 °C		12.6	
Pulsed drain current[2], T_C=25 °C	$I_{D,\ pulse}$	60	A
Continuous diode forward current[1], T_C=25 °C	I_S	20	A
Diode pulsed current[2], T_C=25 °C	$I_{S,\ pulse}$	60	A
Power dissipation[3], T_C=25 °C	P_D	186	W
Single pulsed avalanche energy[5]	E_{AS}	250	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	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	$R_{\theta JC}$	0.67	°C/W
Thermal resistance, junction-ambient[4]	$R_{\theta JA}$	62	°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}	650			V	V_{GS}=0 V, I_D=250 μA
		700				V_{GS}=0 V, I_D=250 μA, T_j=150 °C
Gate threshold voltage	$V_{GS(th)}$	3.5		4.5	V	V_{DS}=V_{GS}, I_D=250 μA
Drain-source on-state resistance	$R_{DS(ON)}$		0.16	0.20	Ω	V_{GS}=10 V, I_D=10 A
			0.42			V_{GS}=10 V, I_D=10 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	μA	V_{DS}=650 V, V_{GS}=0 V
Gate resistance	R_G		22		Ω	f = 1 MHz, Open drain

Dynamic Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Input capacitance	C_{iss}		842		pF	V_{GS}=0 V, V_{DS}=50 V, f=100 kHz
Output capacitance	C_{oss}		58		pF	
Reverse transfer capacitance	C_{rss}		2.5		pF	
Effective output capacitance, energy related	$C_{o(er)}$		40		pF	V_{GS} =0 V, V_{DS} =0 V-400 V
Effective output capacitance, time related	$C_{o(tr)}$		226		pF	
Turn-on delay time	$t_{d(on)}$		30.2		ns	V_{GS}=10 V, V_{DS}=400 V, R_G=2 Ω, I_D=20 A
Rise time	t_r		72.8		ns	
Turn-off delay time	$t_{d(off)}$		65.2		ns	
Fall time	t_f		34		ns	

Gate Charge Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Total gate charge	Q_g		24		nC	V_{GS}=10 V, V_{DS}=400 V, I_D=20 A
Gate-source charge	Q_{gs}		6		nC	
Gate-drain charge	Q_{gd}		12		nC	
Gate plateau voltage	$V_{plateau}$		7		V	

Body Diode Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Diode forward voltage	V_{SD}			1.3	V	I_S=20 A, V_{GS}=0 V
Reverse recovery time	t_{rr}		350		ns	V_R=400 V, I_S=20 A, di/dt=100 A/μs
Reverse recovery charge	Q_{rr}		4.8		μC	
Peak reverse recovery current	I_{rrm}		25.3		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 square 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=80 mH, starting T_j=25 °C.

Electrical Characteristics Diagrams

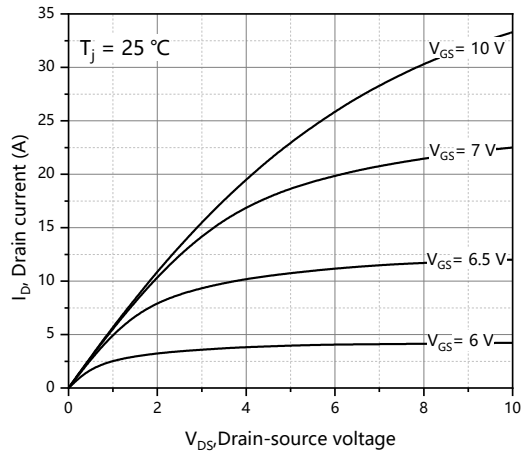


Figure 1. Typ. output characteristics

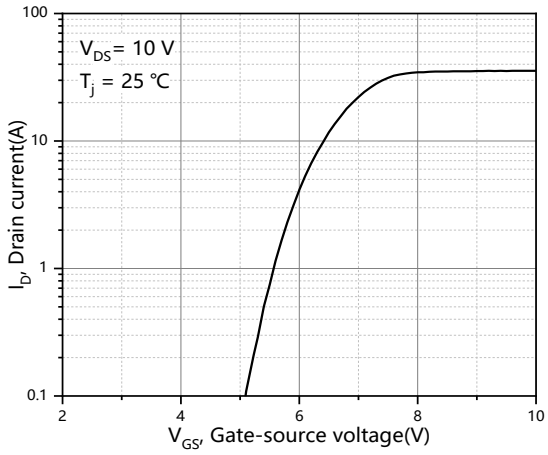


Figure 2. Typ. transfer characteristics

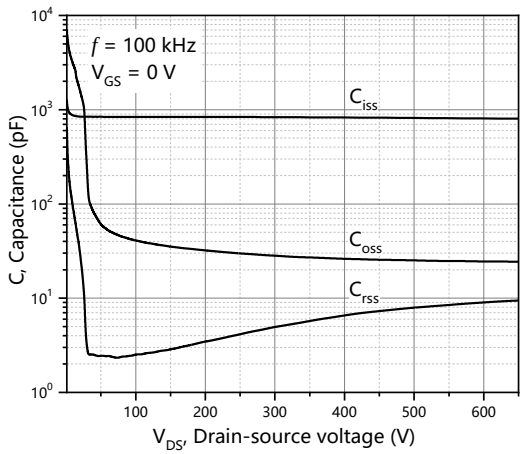


Figure 3. Typ. capacitances

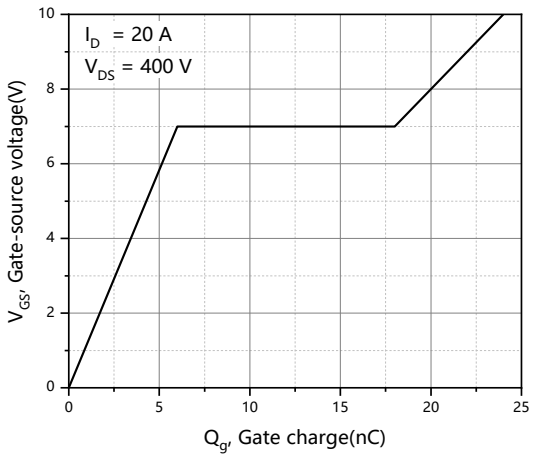


Figure 4. Typ. gate charge

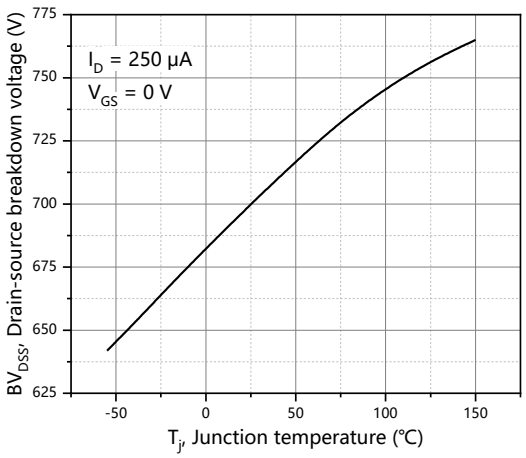


Figure 5. Drain-source breakdown voltage

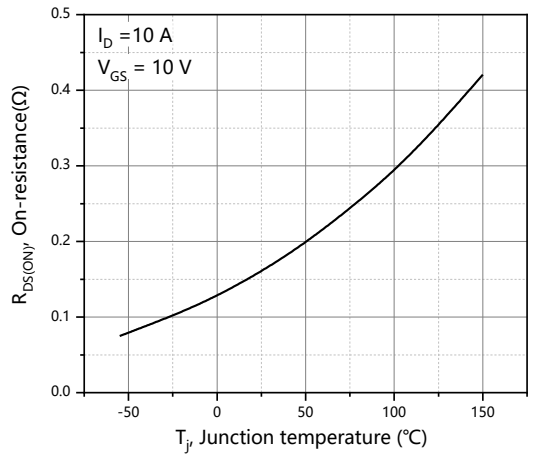


Figure 6. Drain-source on-state resistance

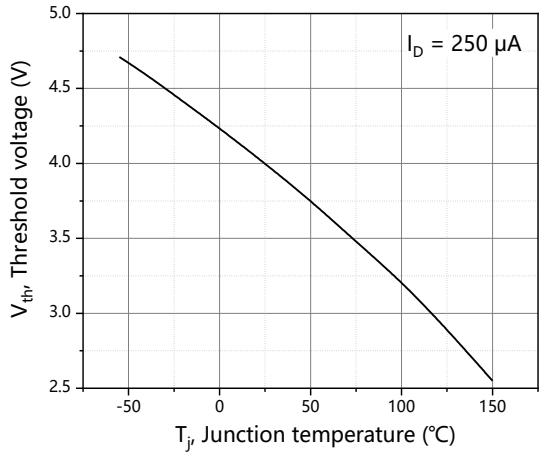


Figure 7. Threshold voltage

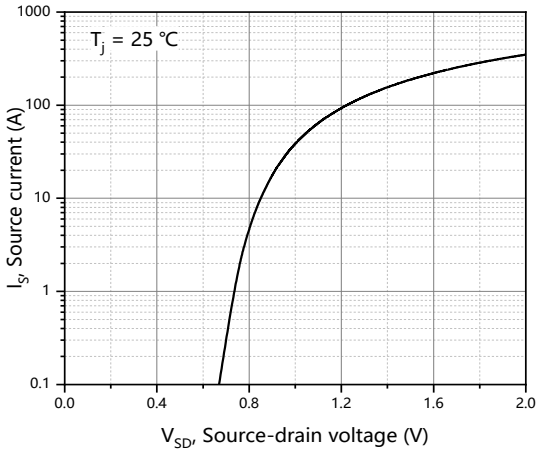


Figure 8. Forward characteristic of body diode

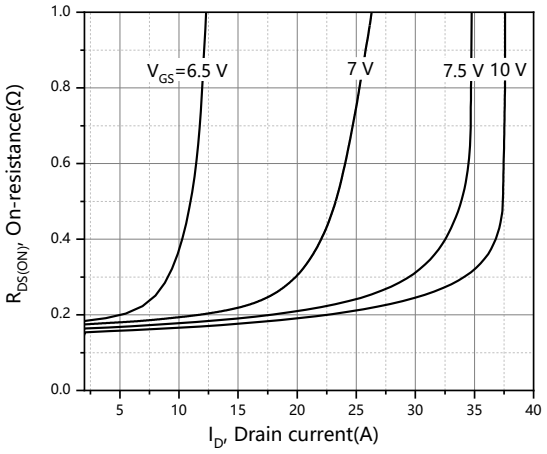


Figure 9. Drain-source on-state resistance

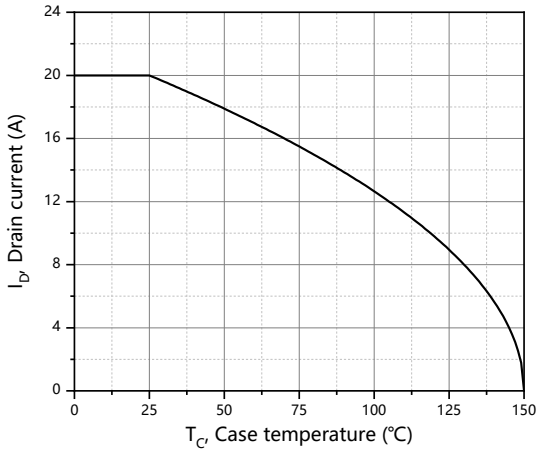


Figure 10. Drain current

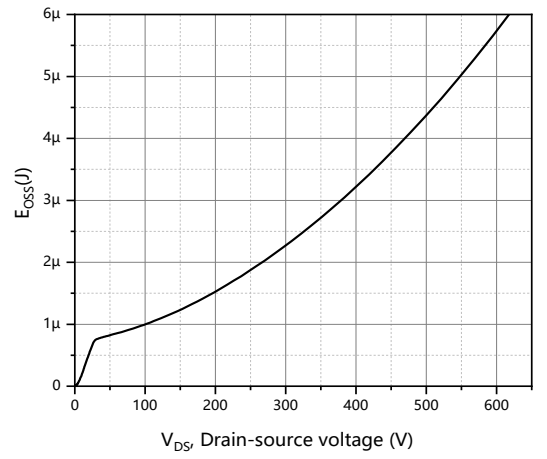


Figure 11. Typ. Coss stored energy

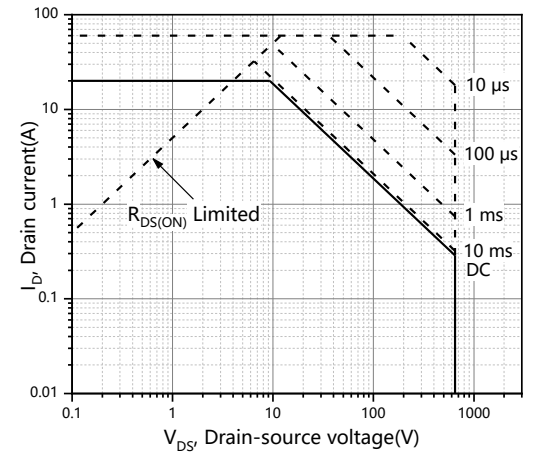


Figure 12. Safe operation area for T_C=25℃

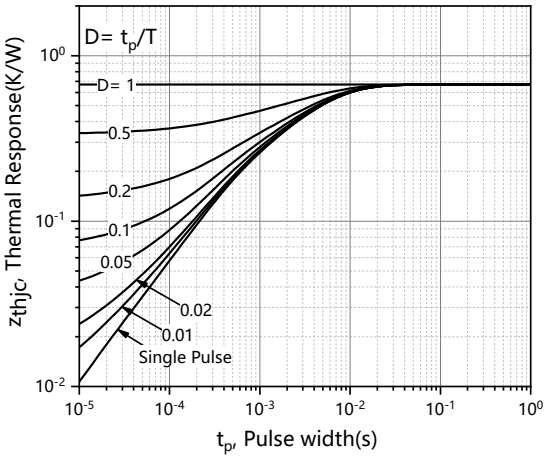


Figure 13. Max transient thermal impedance

Test circuits and waveforms

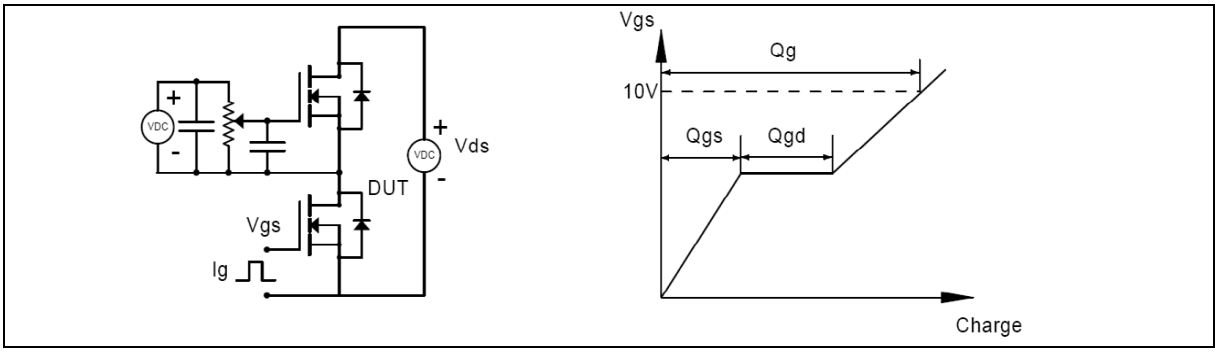


Figure 1. Gate charge test circuit & waveform

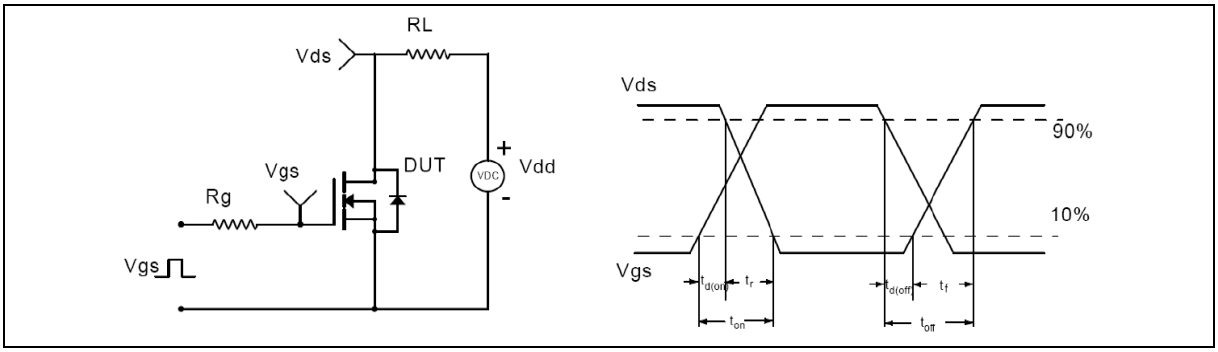


Figure 2. Switching time test circuit & waveforms

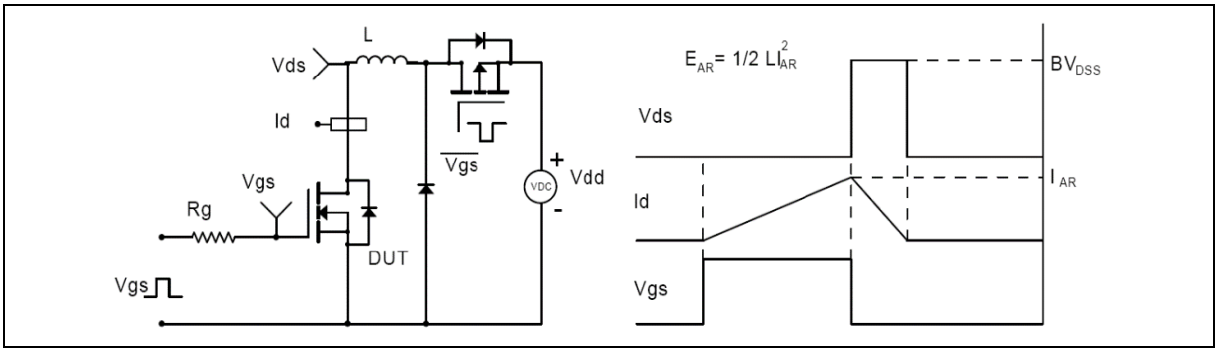


Figure 3. Unclamped inductive switching (UIS) test circuit & waveforms

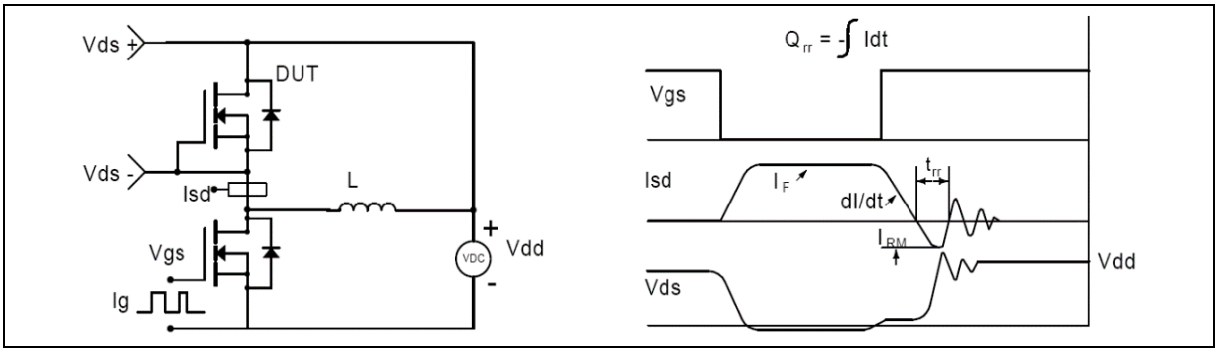
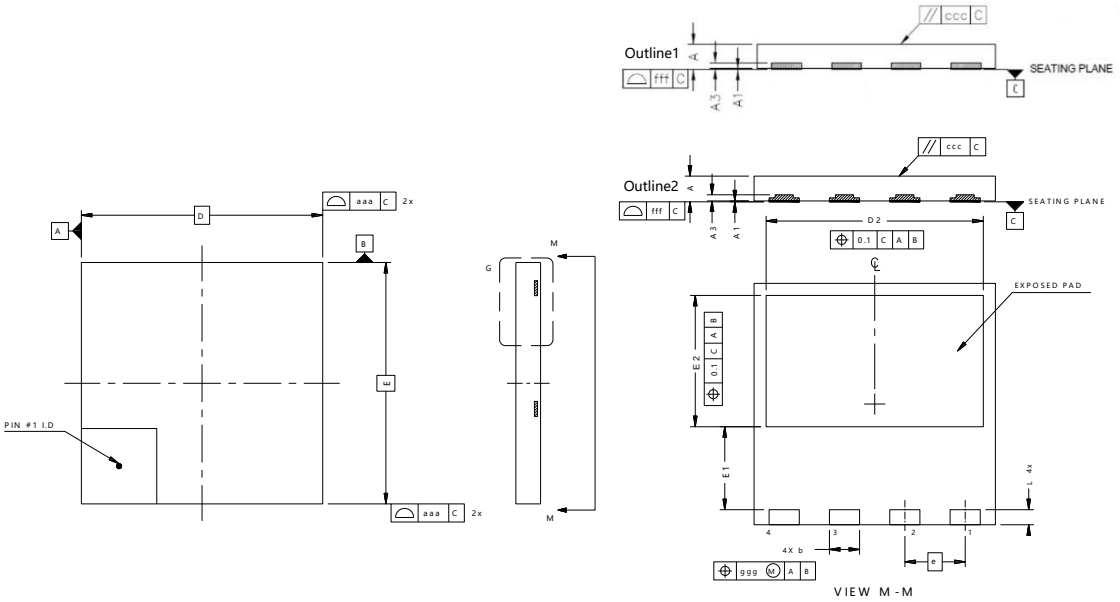


Figure 4. Diode reverse recovery test circuit & waveforms

Package Information



Symbol	mm	
	Min	Max
A	0.75	0.95
A1	0.00	0.05
A3	0.10	0.30
b	0.90	1.10
D	7.90	8.10
E	7.90	8.10
D2	7.10	7.30
E1	2.65	2.85
E2	4.25	4.45
e	2.0 BSC	
L	0.40	0.60
aaa	0.1	
ggg	0.05	
ccc	0.05	
fff	0.05	

Version 1: PDFN8×8-S package outline dimension

Ordering Information

Package Type	Units/ Reel	Reels/ Inner Box	Units/ Inner Box	Inner Boxes/ Carton Box	Units/ Carton Box
PDFN8×8-S	3000	1	3000	10	30000

Product Information

Product	Package	Pb Free	RoHS	Halogen Free
OSG65R200JT3F	PDFN8×8	yes	yes	yes

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