General Description

The GreenMOS® 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

- Switch-Mode and Resonant-Mode Power Supplies
- DC-DC Converters
- PFC Circuits

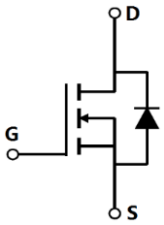
Key Performance Parameters

Parameter	Value	Unit
V_{DS}	300	V
$I_{D,\ pulse}$	156	A
$R_{DS(ON),\ max}$ @ V_{GS}=10V	25	mΩ
Q_g	54	nC

Marking Information

Product Name	Package	Marking
OSG30R025PF	TO220	OSG30R025P

Package & Pin Information



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

Parameter	Symbol	Value	Unit
Drain-source voltage	V_{DS}	300	V
Gate-source voltage	V_{GS}	±20	V
Continuous drain current[1], T_C=25 °C	I_D	78	A
Continuous drain current[1], T_C=100 °C		49	
Pulsed drain current[2], T_C=25 °C	$I_{D,\ pulse}$	156	A
Continuous diode forward current[1], T_C=25 °C	I_S	78	A
Diode pulsed current[2], T_C=25 °C	$I_{S,\ pulse}$	156	A
Power dissipation[3], T_C=25 °C	P_D	357	W
Single pulsed avalanche energy[4]	E_{AS}	800	mJ
Reverse diode dv/dt	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	$R_{\theta JC}$	0.35	°C/W
Thermal resistance, junction-ambient	$R_{\theta JA}$	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}	300			V	V_{GS}=0 V, I_D=1 mA
Gate threshold voltage	$V_{GS(th)}$	3		5	V	V_{DS}=V_{GS}, I_D=1 mA
Drain-source on-state resistance	$R_{DS(ON)}$		18.6	25	mΩ	V_{GS}=10 V, I_D=39 A
			43.3			V_{GS}=10 V, I_D=39 A, T_j=150 °C
Transconductance	g_{fs}	28	47		S	V_{DS} = 10 V, I_D =39 A
Gate-source leakage current	I_{GSS}			100	nA	V_{GS}=20 V
				-100		V_{GS}=-20 V
Drain-source leakage current	I_{DSS}			10	μA	V_{DS}=300 V, V_{GS}=0 V
Gate resistance	R_G		4.8		Ω	f=1 MHz, Open drain

Dynamic Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Input capacitance	C_{iss}		3135		pF	V_{GS}=0 V, V_{DS}=50 V, f=100 kHz
Output capacitance	C_{oss}		234		pF	
Reverse transfer capacitance	C_{rss}		9.2		pF	
Effective output capacitance, energy related	$C_{o(er)}$		206		pF	V_{GS}=0 V, V_{DS}=0 V-240 V
Effective output capacitance, time related	$C_{o(tr)}$		917		pF	
Turn-on delay time	$t_{d(on)}$		21.4		ns	V_{GS}=10 V, V_{DS}=150 V, R_G=2 Ω, I_D=39 A
Rise time	t_r		8.4		ns	
Turn-off delay time	$t_{d(off)}$		43.4		ns	
Fall time	t_f		3.6		ns	

Gate Charge Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Total gate charge	Q_g		54		nC	V_{GS}=10 V, V_{DS}=150 V, I_D=39 A
Gate-source charge	Q_{gs}		22		nC	
Gate-drain charge	Q_{gd}		20		nC	
Gate plateau voltage	$V_{plateau}$		7.6		V	

Body Diode Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Diode forward voltage	V_{SD}			1.3	V	I_S=78 A, V_{GS}=0 V
Reverse recovery time	t_{rr}		136		ns	V_R=150 V, I_S=39 A, di/dt=100 A/μs
Reverse recovery charge	Q_{rr}		0.53		μC	
Peak reverse recovery current	I_{rrm}		6.6		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) V_{DD}=100 V, V_{GS}=10 V, L=80 mH, starting T_j=25 °C.

Electrical Characteristics Diagrams

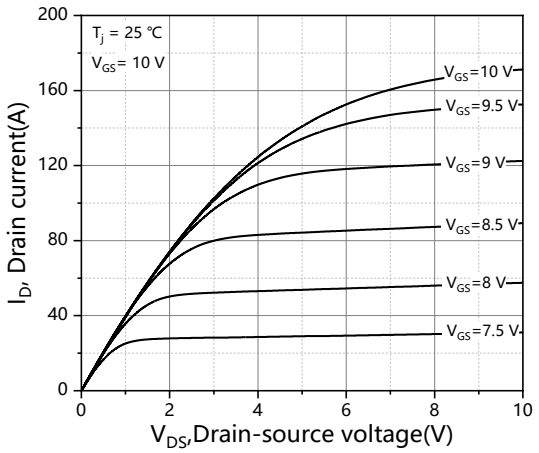


Figure 1. Typ. output characteristics T_j=25℃

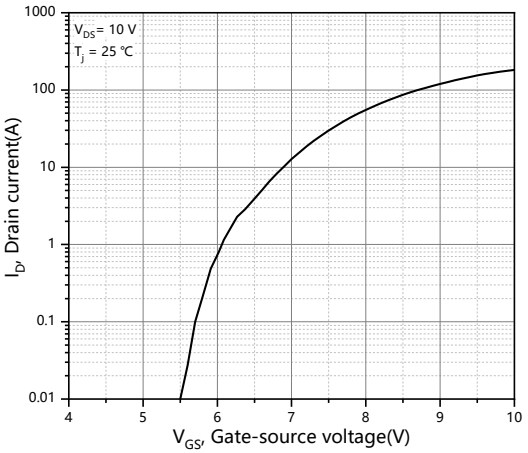


Figure 2. Typ. transfer characteristics

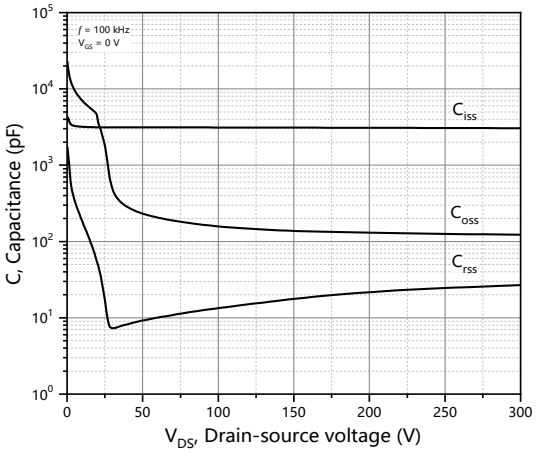


Figure 3. Typ. capacitances

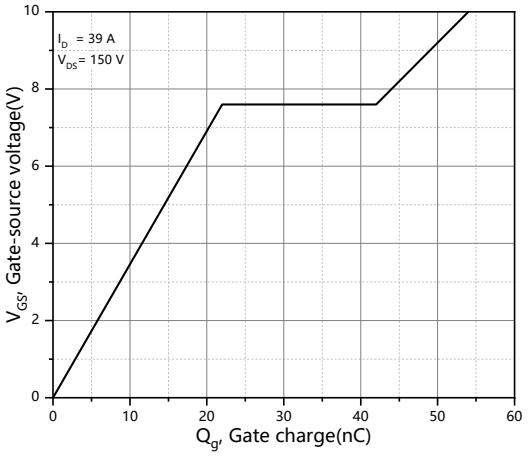


Figure 4. Typ. gate charge

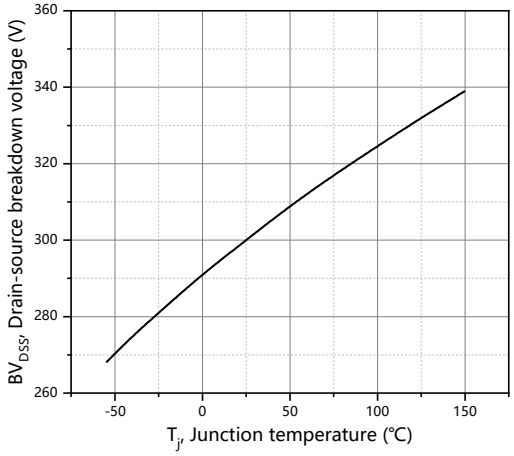


Figure 5. Drain-source breakdown voltage

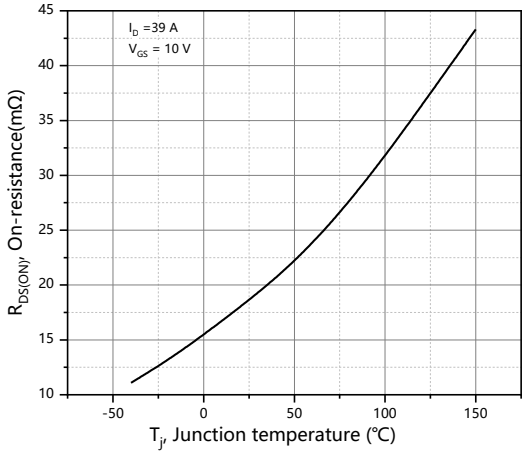


Figure 6. Drain-source on-state resistance

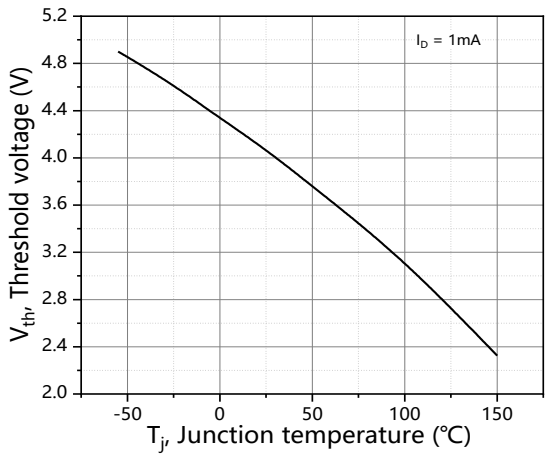


Figure 7. Threshold voltage

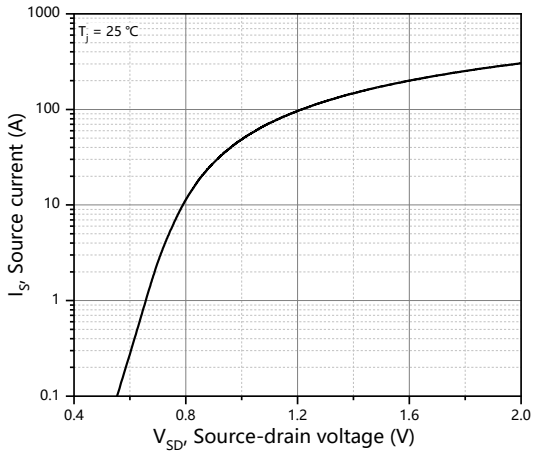


Figure 8. Forward characteristic of body diode

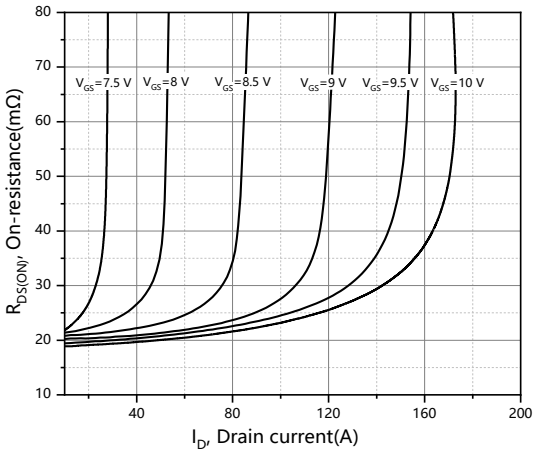


Figure 9. Drain-source on-state resistance

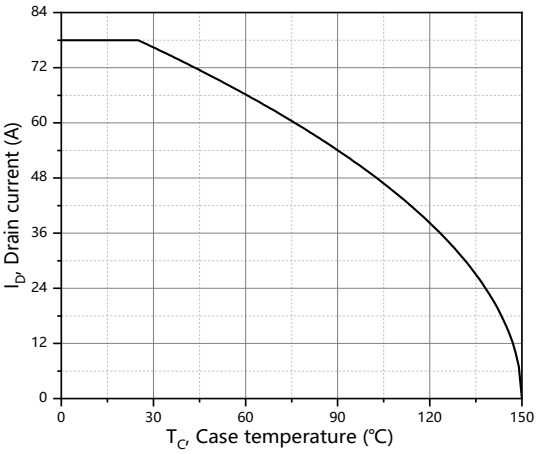


Figure 10. Drain current

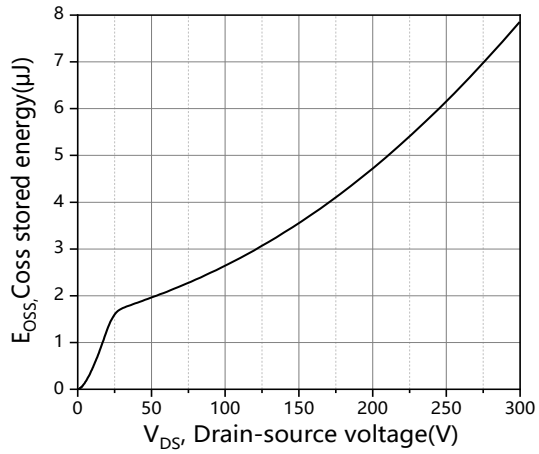


Figure 11. Typ. Coss stored energy

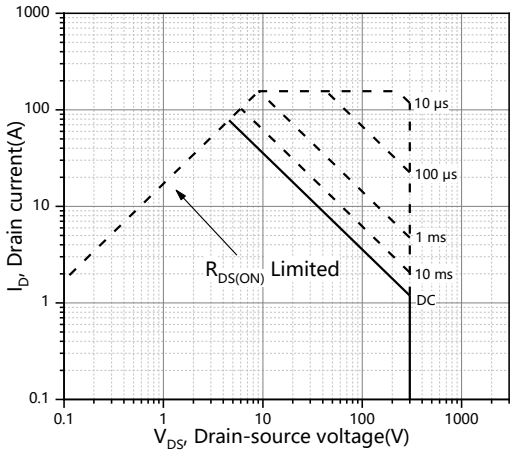


Figure 12. Safe operation area Tc=25℃

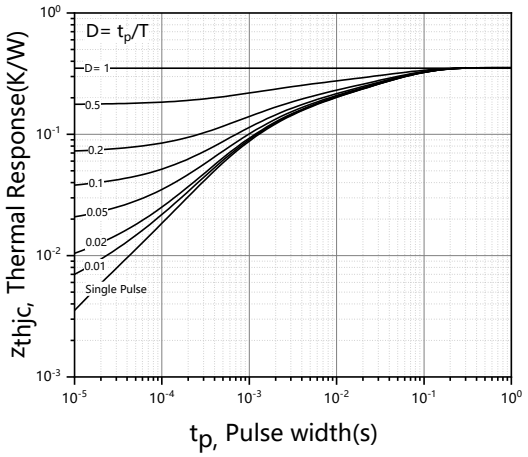


Figure 13. Max. transient thermal impedance

Test circuits and waveforms

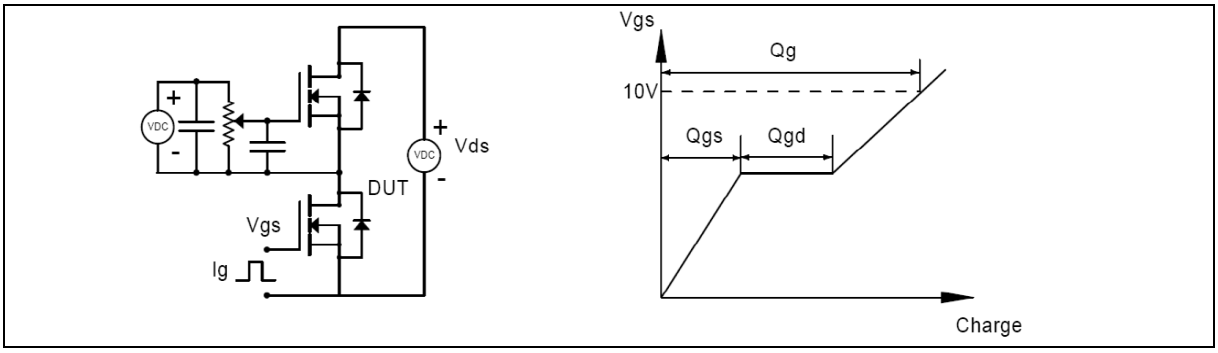


Figure 1. Gate charge test circuit & waveform

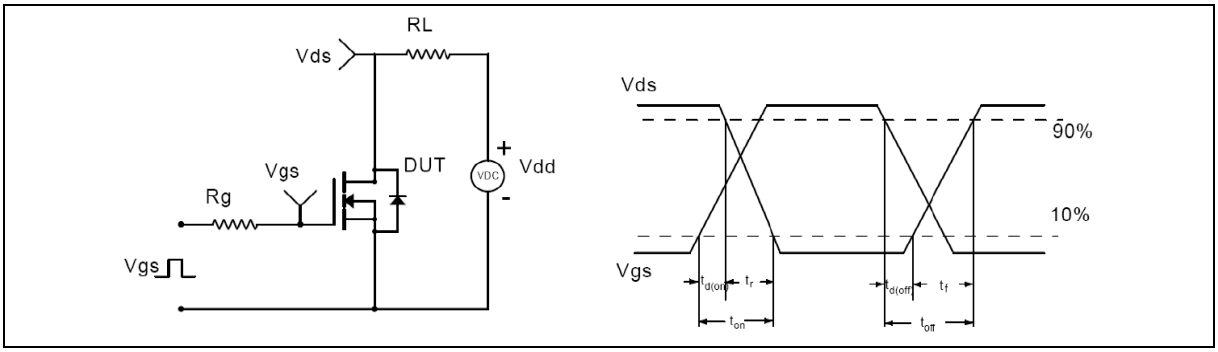


Figure 2. Switching time test circuit & waveforms

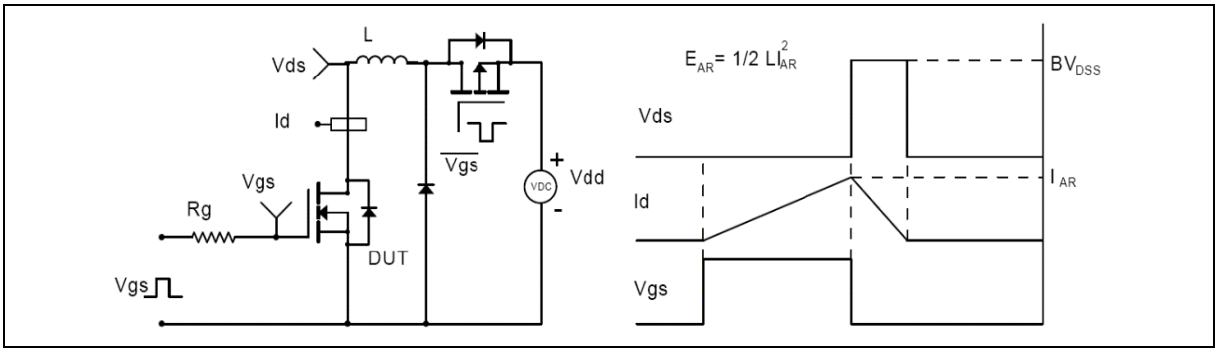


Figure 3. Unclamped inductive switching (UIS) test circuit & waveforms

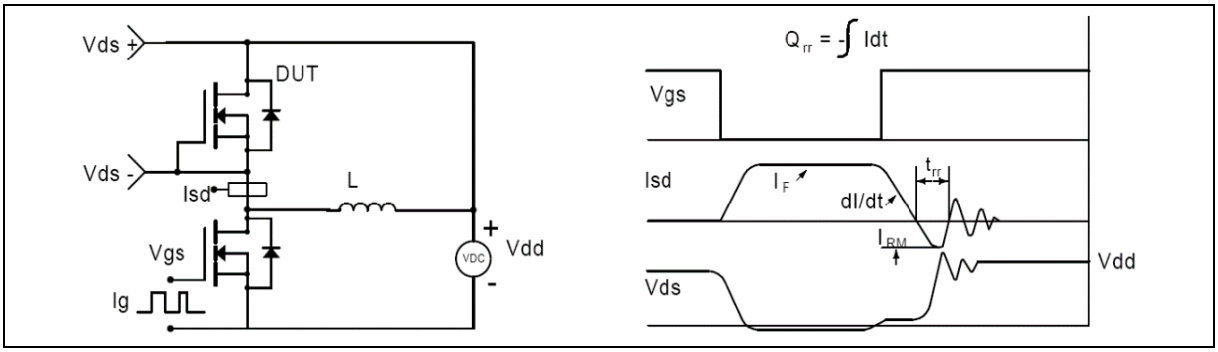
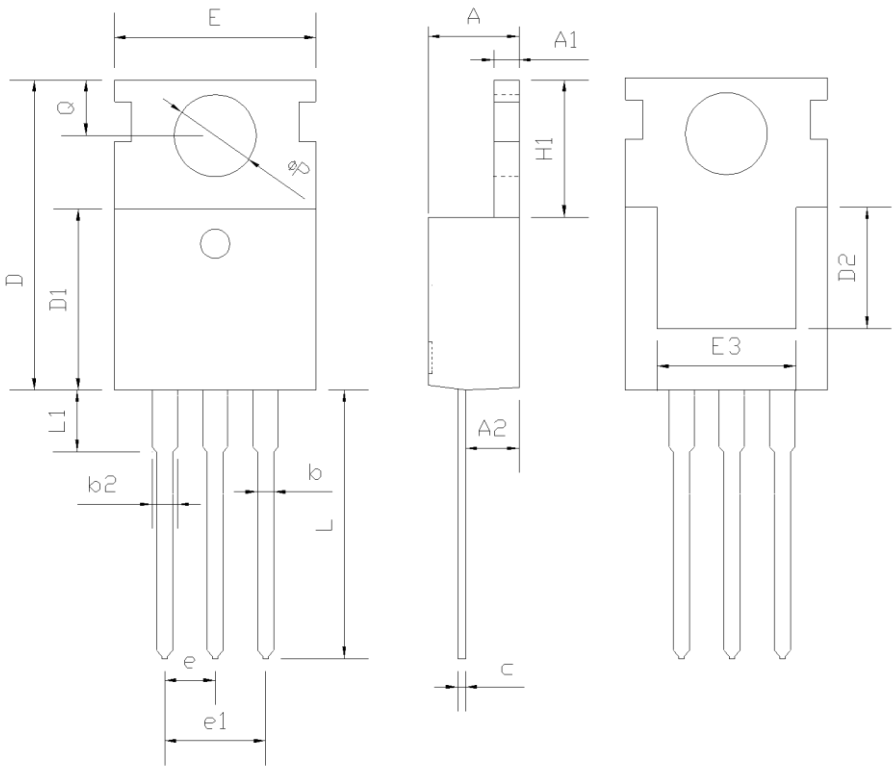


Figure 4. Diode reverse recovery test circuit & waveforms

Package Information



Symbol	mm		
	Min	Nom	Max
A	4.37	4.57	4.77
A1	1.25	1.30	1.45
A2	2.20	2.40	2.60
b	0.70	0.80	0.95
b2	1.17	1.27	1.47
c	0.40	0.50	0.65
D	15.10	15.60	16.10
D1	8.80	9.10	9.40
D2	5.50	-	-
E	9.70	10.00	10.30
E3	7.00	-	-
e	2.54 BSC		
e1	5.08 BSC		
H1	6.25	6.50	6.85
L	12.75	13.50	13.80
L1	-	3.10	3.40
ΦP	3.40	3.60	3.80
Q	2.60	2.80	3.00

Version：TO220-P package outline dimension

Ordering Information

Package Type	Units/ Tube	Tubes/ Inner Box	Units/ Inner Box	Inner Boxes/ Carton Box	Units/ Carton Box
TO220-P	50	20	1000	6	6000

Product Information

Product	Package	Pb Free	RoHS	Halogen Free
OSG30R025PF	TO220	yes	yes	yes

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Revision History

Version	Revision History	Date
V1.0	Initial release	2025-08-01

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