

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

- 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

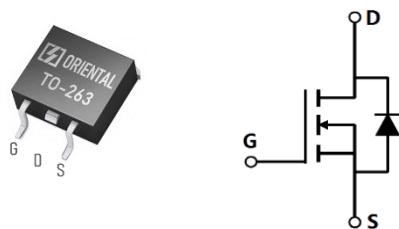
Key Performance Parameters

Parameter	Value	Unit
V_{DS} , @ $T_j(max)$	950	V
I_D , pulse	36	A
$R_{DS(ON)}$, max @ $V_{GS}=10V$	340	$m\Omega$
Q_g	54	nC

Marking Information

Product Name	Package	Marking
OSG90R340KF	TO263	OSG90R340K

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}	900	V
Gate-source voltage	V_{GS}	± 30	V
Continuous drain current ¹⁾ , $T_C=25\text{ }^\circ\text{C}$	I_D	12	A
Continuous drain current ¹⁾ , $T_C=100\text{ }^\circ\text{C}$		7.6	
Pulsed drain current ²⁾ , $T_C=25\text{ }^\circ\text{C}$	$I_{D,\text{pulse}}$	36	A
Continuous diode forward current ¹⁾ , $T_C=25\text{ }^\circ\text{C}$	I_S	12	A
Diode pulsed current ²⁾ , $T_C=25\text{ }^\circ\text{C}$	$I_{S,\text{pulse}}$	36	A
Power dissipation ³⁾ , $T_C=25\text{ }^\circ\text{C}$	P_D	219	W
Single pulsed avalanche energy ⁵⁾	E_{AS}	360	mJ
MOSFET dv/dt ruggedness, $V_{DS}=0\text{...}480\text{ V}$	dv/dt	50	V/ns
Reverse diode dv/dt, $V_{DS}=0\text{...}480\text{ V}$, $I_{SD}\leq I_D$	dv/dt	15	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	$R_{\theta JC}$	0.57	$^\circ\text{C/W}$
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}	900			V	$V_{GS}=0\text{ V}$, $I_D=250\text{ }\mu\text{A}$
Gate threshold voltage	$V_{GS(\text{th})}$	2.9		3.9	V	$V_{DS}=V_{GS}$, $I_D=250\text{ }\mu\text{A}$
Drain-source on-state resistance	$R_{DS(\text{ON})}$		0.28	0.34	Ω	$V_{GS}=10\text{ V}$, $I_D=6\text{ A}$
			0.98			$V_{GS}=10\text{ V}$, $I_D=6\text{ A}$, $T_j=150\text{ }^\circ\text{C}$
Gate-source leakage current	I_{GS}			100	nA	$V_{GS}=30\text{ V}$
				-100		$V_{GS}=-30\text{ V}$
Drain-source leakage current	I_{DSS}			1	μA	$V_{DS}=900\text{ V}$, $V_{GS}=0\text{ V}$
Gate resistance	R_G		16.6		Ω	$f=1\text{ MHz}$, Open drain

Dynamic Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Input capacitance	C _{iss}		2786		pF	V _{GS} =0 V, V _{DS} =50 V, f=100 kHz
Output capacitance	C _{oss}		94		pF	
Reverse transfer capacitance	C _{rss}		3.9		pF	
Effective output capacitance, energy related	C _{o(er)}		58		pF	V _{GS} = 0 V, V _{DS} = 0V-400 V
Effective output capacitance, time related	C _{o(tr)}		276		pF	
Turn-on delay time	t _{d(on)}		50		ns	V _{GS} =10 V, V _{DS} =400 V, R _G =2 Ω, I _D =10 A
Rise time	t _r		32		ns	
Turn-off delay time	t _{d(off)}		121		ns	
Fall time	t _f		27.6		ns	

Gate Charge Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Total gate charge	Q _g		53.8		nC	V _{GS} =10 V, V _{DS} =400 V, I _D =10 A
Gate-source charge	Q _{gs}		15.6		nC	
Gate-drain charge	Q _{gd}		14.5		nC	
Gate plateau voltage	V _{plateau}		5.3		V	

Body Diode Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Diode forward voltage	V _{SD}			1.3	V	I _S =12 A, V _{GS} =0 V
Reverse recovery time	t _{rr}		300		ns	
Reverse recovery charge	Q _{rr}		4.1		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_{θJA} is measured with the device mounted on 1 in² 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=75 mH, starting T_j=25 °C.

Electrical Characteristics Diagrams

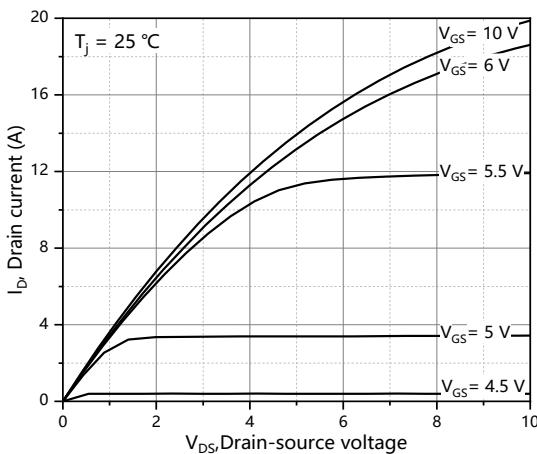


Figure 1. Typ. output characteristics

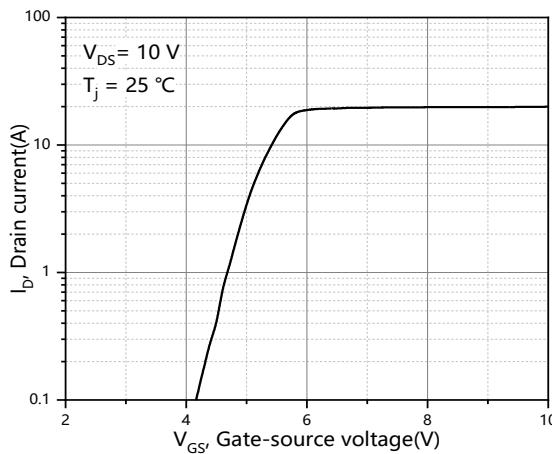


Figure 2. Typ. transfer characteristics

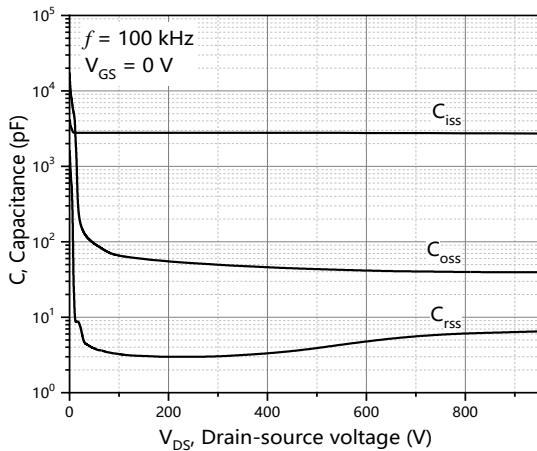


Figure 3. Typ. capacitances

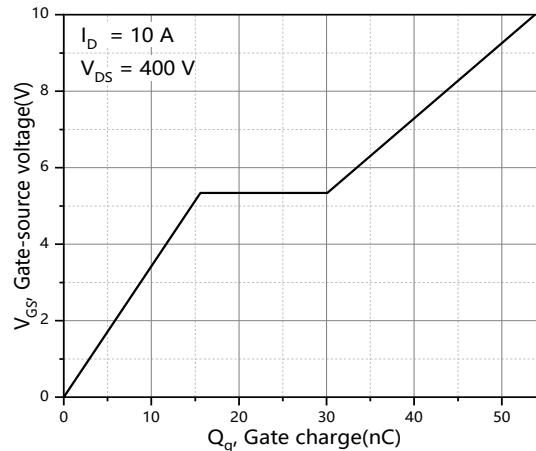


Figure 4. Typ. gate charge

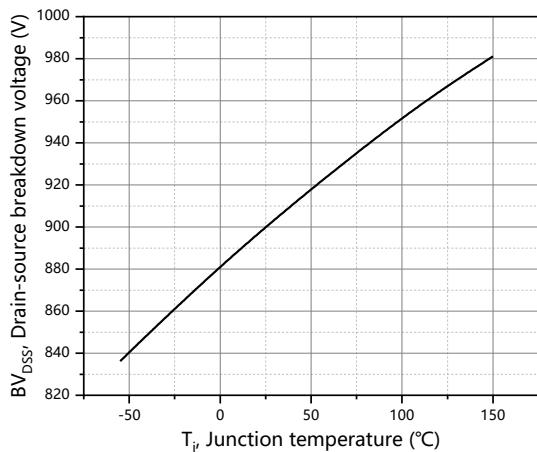


Figure 5. Drain-source breakdown voltage

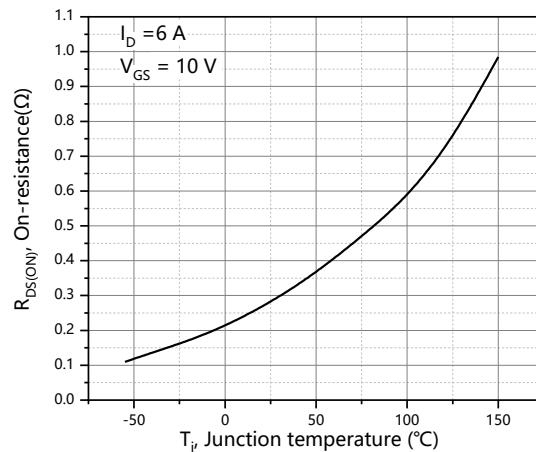
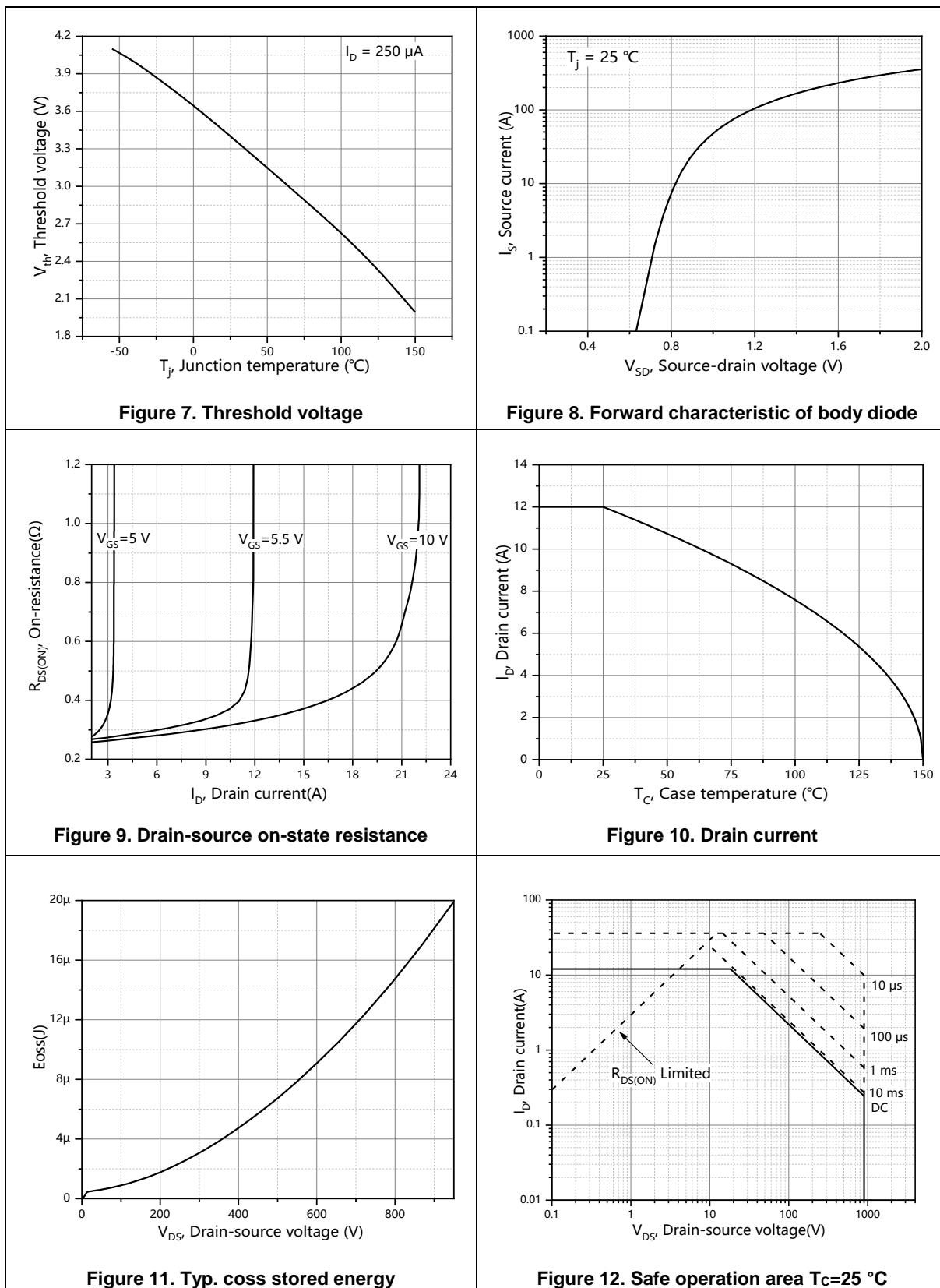


Figure 6. Drain-source on-state resistance



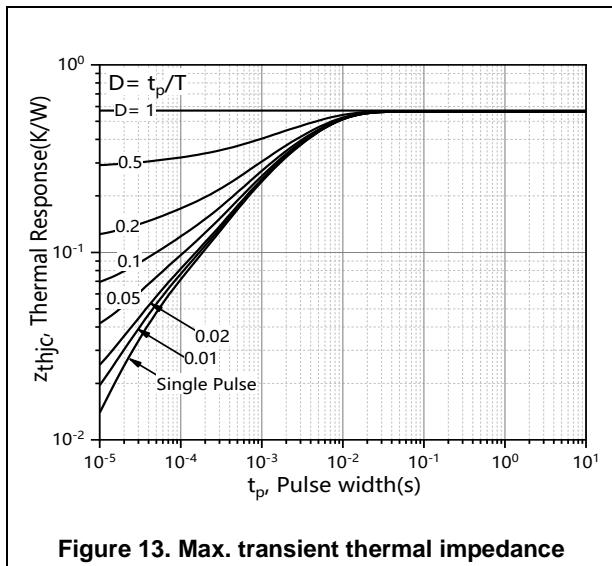


Figure 13. Max. transient thermal impedance

Test circuits and waveforms

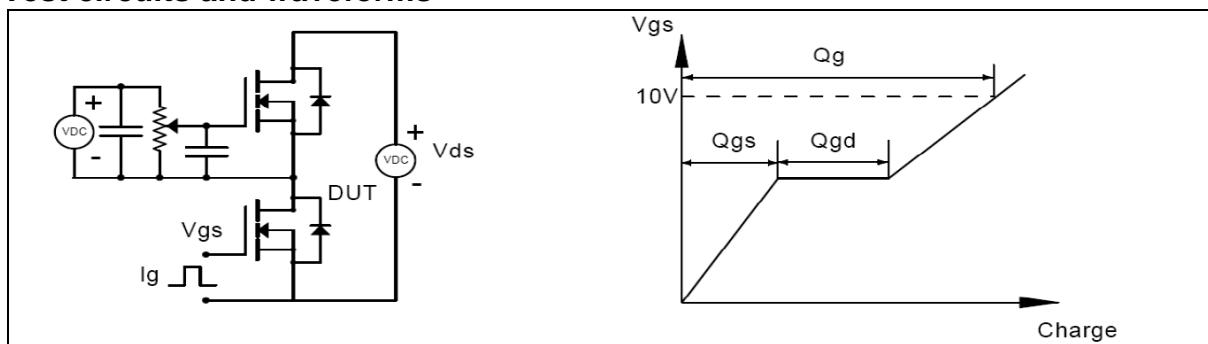


Figure 1. Gate charge test circuit & waveform

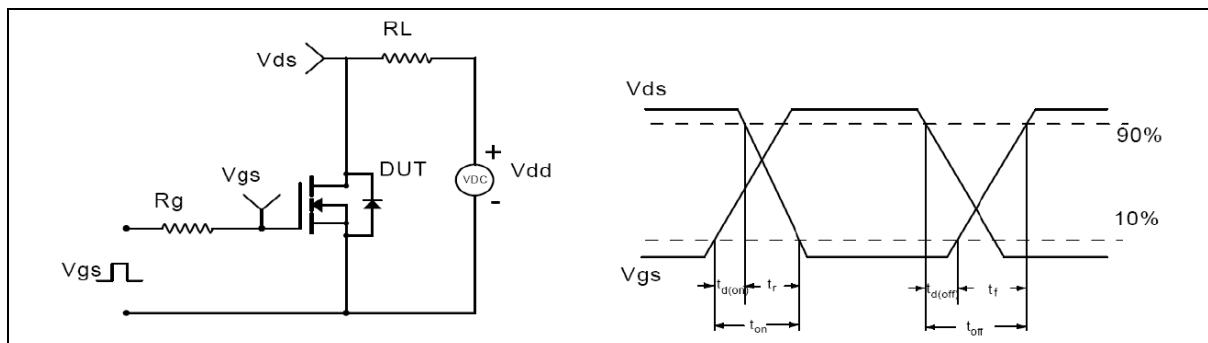


Figure 2. Switching time test circuit & waveforms

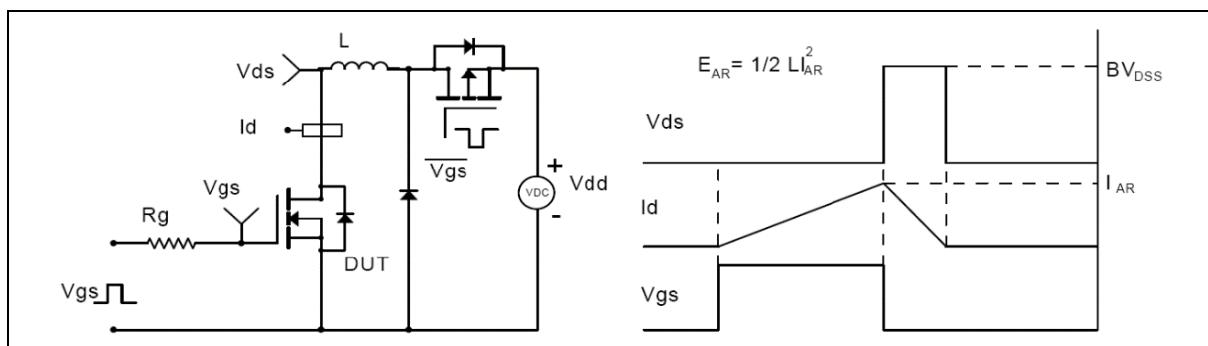


Figure 3. Unclamped inductive switching (UIS) test circuit & waveforms

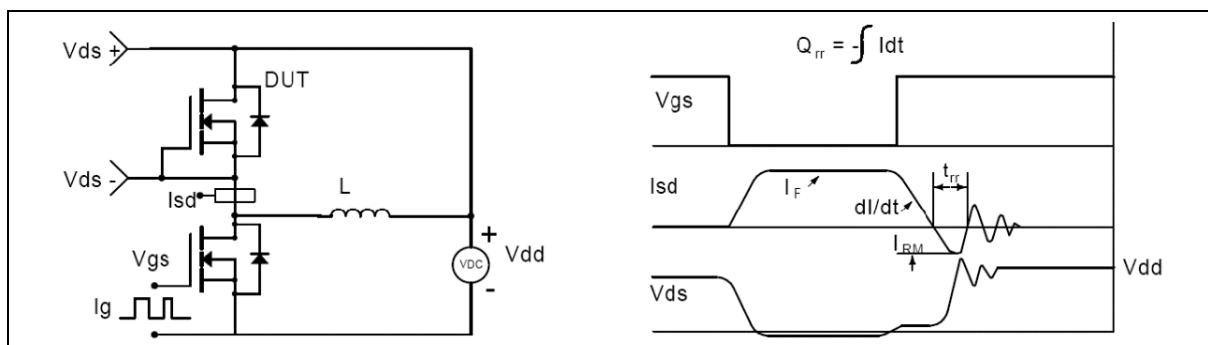
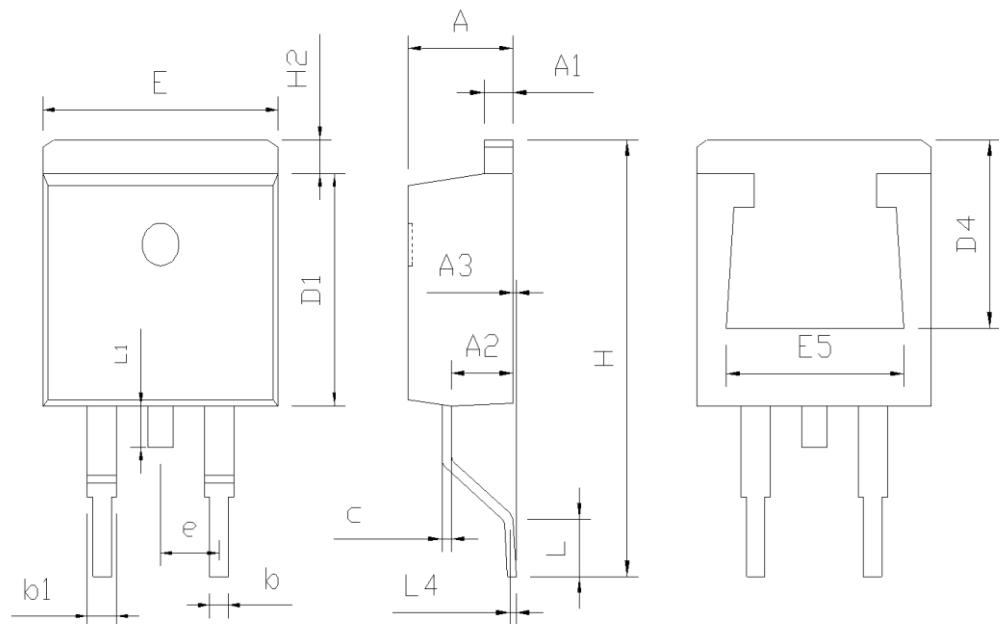


Figure 4. Diode reverse recovery test circuit & waveforms

Package Information



Symbol	mm		
	Min	Nom	Max
A	4.37	4.57	4.77
A1	1.22	1.27	1.42
A2	2.49	2.69	2.89
A3	0.00	0.13	0.25
b	0.70	0.81	0.96
b1	1.17	1.27	1.47
c	0.30	0.38	0.53
D1	8.50	8.70	8.90
D4	6.60	-	-
E	9.86	10.16	10.36
E5	7.06	-	-
e	2.54 BSC		
H	14.70	15.10	15.50
H2	1.07	1.27	1.47
L	2.00	2.30	2.60
L1	1.40	1.55	1.70
L4	0.25 BSC		
θ	0°	5°	9°

Version 1: TO263-P package outline dimension

Ordering Information

Package Type	Units/ Tube	Tubes / Inner Box	Units/ Inner Box	Inner Box/ Carton Box	Units/ Carton Box
TO263-P	50	20	800	5	4000

Product Information

Product	Package	Pb Free	RoHS	Halogen Free
OSG90R340KF	TO263	yes	yes	yes

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