KODENSHI AUK

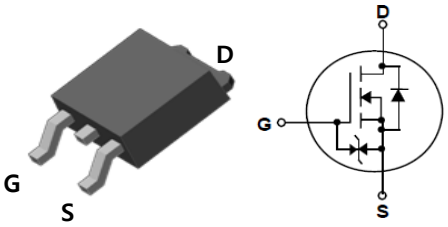
SJMN290R60ZD

Super Junction MOSFET

600V N-Channel Super Junction MOSFET

Features

- Very Low FOM ($R_{DS(on)}$ X Q_g)
- Extremely low switching loss
- Excellent stability and uniformity
- 100% avalanche tested
- Built-in ESD Diode

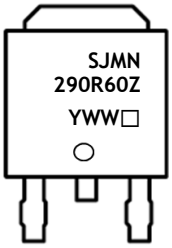


TO-252

Ordering Information

Part Number	Marking	Package
SJMN290R60ZD	SJMN290R60Z	TO-252

Marking Information



Column 1, 2 = Device Code
Column 3 = Production Information
-. YWW = Date Code (year, week)
□ = Factory Management Code

Absolute maximum ratings (T_C=25°C unless otherwise noted)

Characteristic	Symbol		Rating	Unit
Drain-source voltage	V_{DSS}		600	V
Gate-source voltage	V_{GSS}		±20	V
Drain current (DC)	I_D	T_c=25°C	12.9	A
		T_c=100°C	8.1	A
Drain current (Pulsed) (Note 1)	I_{DM}		39	A
Single pulsed avalanche energy (Note 2)	E_{AS}		175	mJ
Repetitive avalanche current	I_{AR}		2	A
Power dissipation	P_D		106	W
Diode dv/dt ruggedness, V_{DS}=0...400V, I_{DS}≤I_D	dv/dt		50	V/ns
MOSFET dv/dt ruggedness, V_{DS}=0...400V	dv/dt		15	V/ns
Gate to source ESD (Human Body Model)	$V_{ESD(G-S)}$		2000	V
Junction temperature	T_J		150	°C
Storage temperature range	T_{stg}		-55~150	°C

Thermal Characteristics

Characteristic	Symbol	Rating	Unit
Thermal resistance, junction to case	$R_{th(j-c)}$	Max. 1.18	°C/W
Thermal resistance, junction to ambient	$R_{th(j-a)}$	Max. 62.5	

Electrical Characteristics (T_C=25°C unless otherwise noted)

Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Drain-source breakdown voltage	BV_{DSS}	I_D=250uA, V_{GS}=0	600	-	-	V
Gate threshold voltage	$V_{GS(th)}$	I_D=250uA, V_{DS}=V_{GS}	2	-	4	V
Drain-source cut-off current	I_{DSS}	V_{DS}=600V, V_{GS}=0V	-	-	1	uA
		V_{DS}=600V, T_c=150°C	-	-	100	uA
Gate leakage current	I_{GSS}	V_{DS}=0V, V_{GS}=±20V	-	-	±1	uA
Drain-source on-resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=4.5A	-	0.25	0.29	Ω
Internal gate resistance	R_g	Open drain, f=1MHz	-	2	-	Ω
Input capacitance	C_{iss}	V_{DS}=400V, V_{GS}=0V, f=1.0MHz	-	1232	-	pF
Output capacitance	C_{oss}		-	32	-	
Reverse transfer capacitance	C_{rss}		-	0.3	-	
Turn-on delay time (Note 3,4)	$t_{d(on)}$	V_{DD}=300V, I_D=5.7A, R_G=25Ω	-	27	-	ns
Rise time (Note 3,4)	t_r		-	41	-	
Turn-off delay time (Note 3,4)	$t_{d(off)}$		-	96	-	
Fall time (Note 3,4)	t_f		-	24	-	
Total gate charge (Note 3,4)	Q_g	V_{DS}=480V, V_{GS}=10V, I_D=5.7A	-	32	-	nC
Gate-source charge (Note 3,4)	Q_{gs}		-	5.5	-	
Gate-drain charge (Note 3,4)	Q_{gd}		-	11	-	

Source-Drain Diode Ratings and Characteristics (T_C=25°C unless otherwise noted)

Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Source current (DC)	I_S	Integral reverse diode in the MOSFET	-	-	12.9	A
Source current (Pulsed)	I_{SM}		-	-	39	A
Forward voltage	V_{SD}	V_{GS}=0V, I_S=5.7A	-	-	1.3	V
Reverse recovery time (Note 3,4)	t_{rr}	I_S=5.7A, V_{GS}=0V dI_F/dt=100A/us	-	276	-	ns
Reverse recovery charge (Note 3,4)	Q_{rr}		-	2.9	-	uC

Note:
1. Repeated rating: Pulse width limited by safe operating area
2. I_{AS}=2A, V_{DD}=50V, R_G=25Ω, Starting T_J=25°C
3. Pulse test: Pulse width≤300us, Duty cycle≤2%
4. Essentially independent of operating temperature typical characteristics

Typical Characteristics Curve

Fig. 1 I_D - V_{DS}

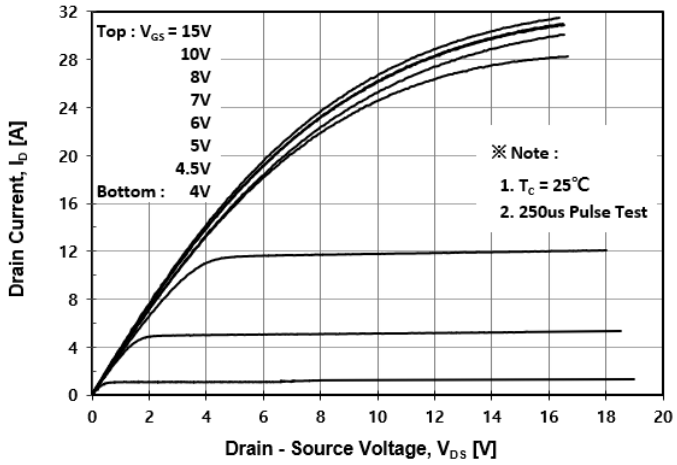


Fig. 2 I_D - V_{GS}

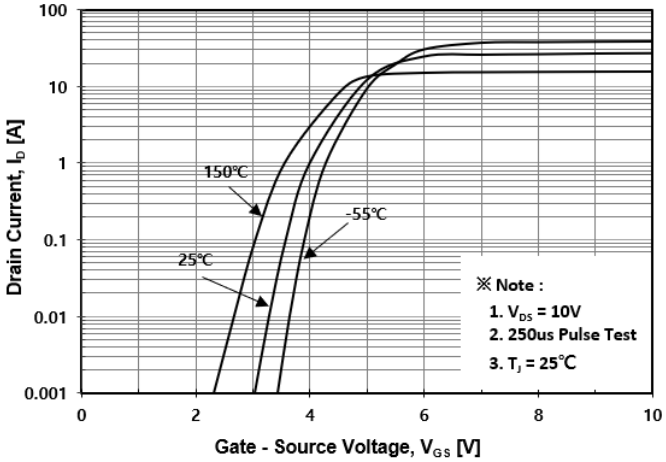


Fig. 3 $R_{DS(ON)}$ - I_D

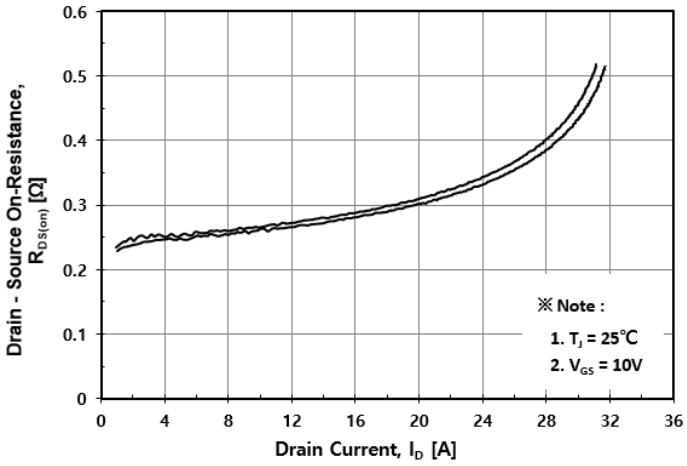


Fig. 4 I_S - V_{SD}

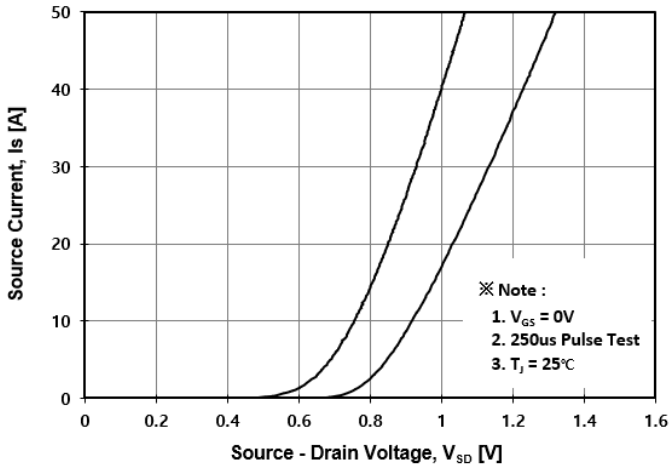


Fig. 5 Capacitance - V_{DS}

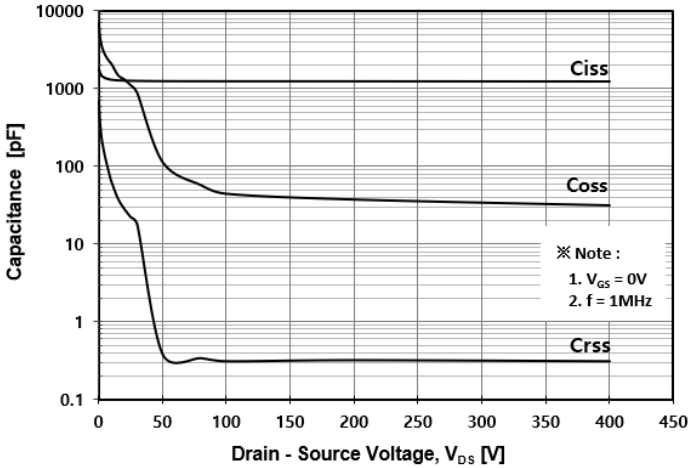
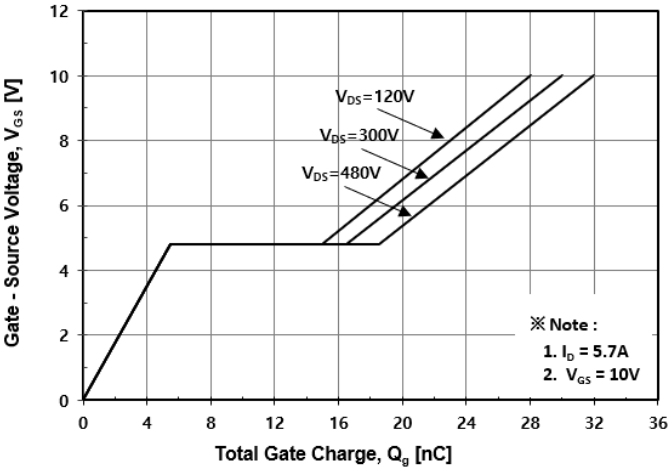


Fig. 6 V_{GS} - Q_G



Typical Characteristics Curve (Continue)

Fig. 7 BV_{DSS} - T_J

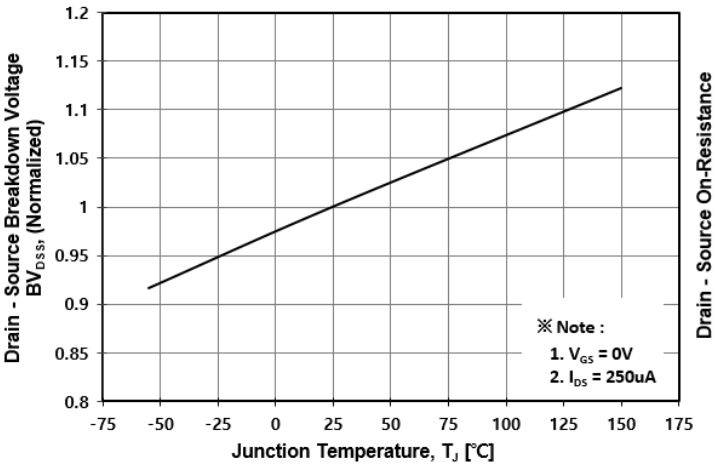


Fig. 8 $R_{DS(ON)}$ - T_J

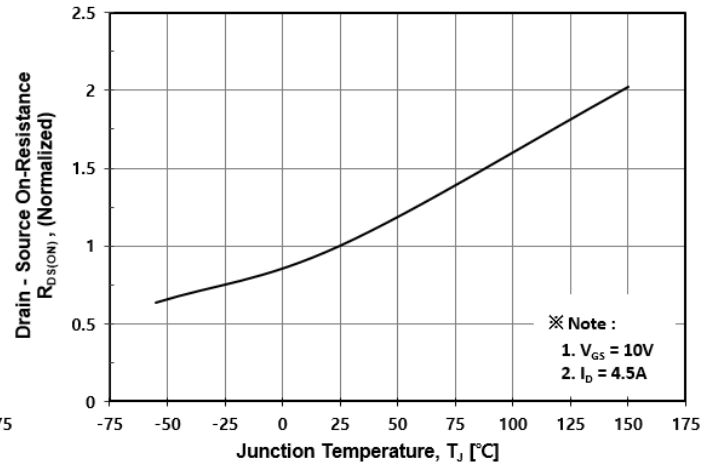


Fig. 9 Safe Operating Area

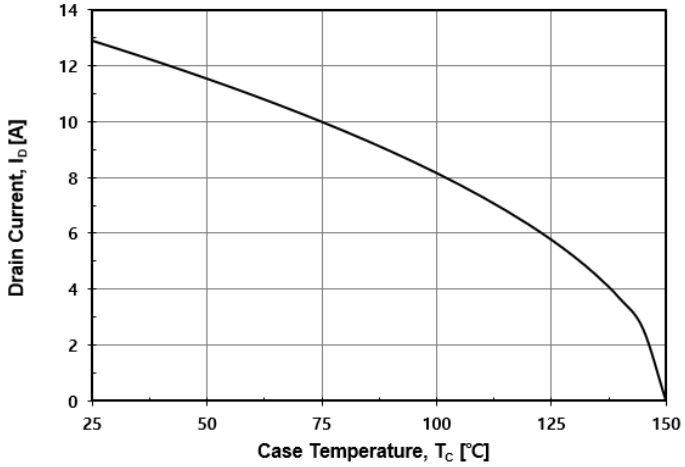


Fig. 10 I_D - T_C

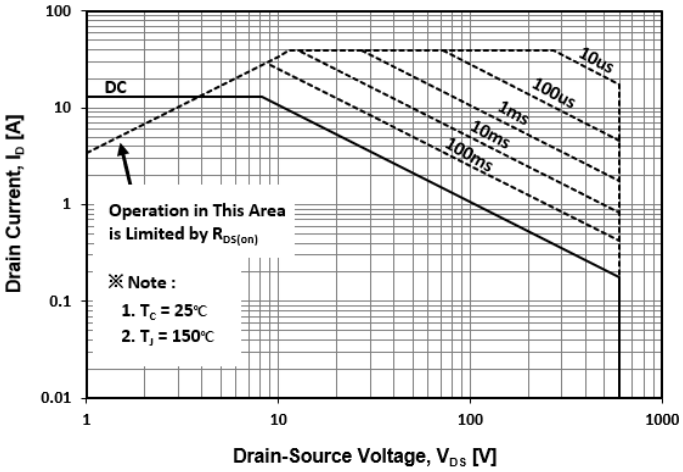


Fig. 11 Transient Thermal Impedance

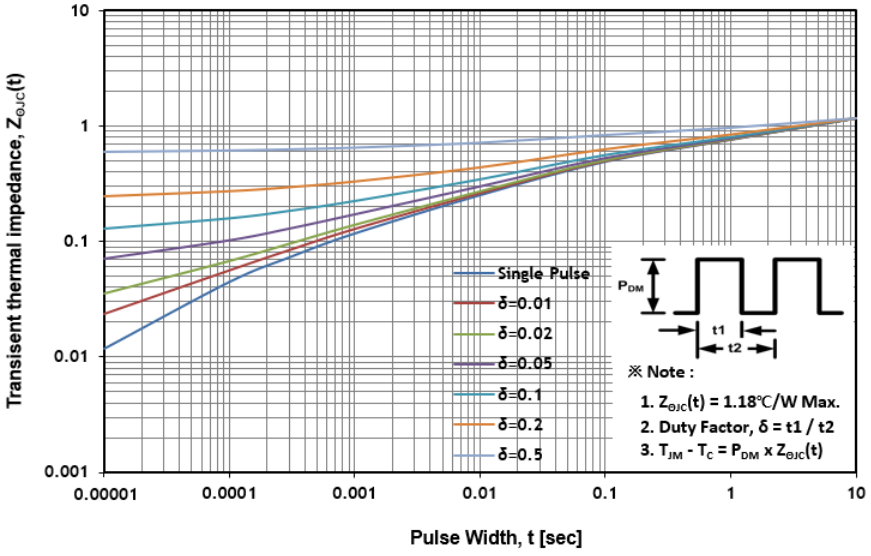


Fig. 12 Gate Charge Test Circuit & Waveform

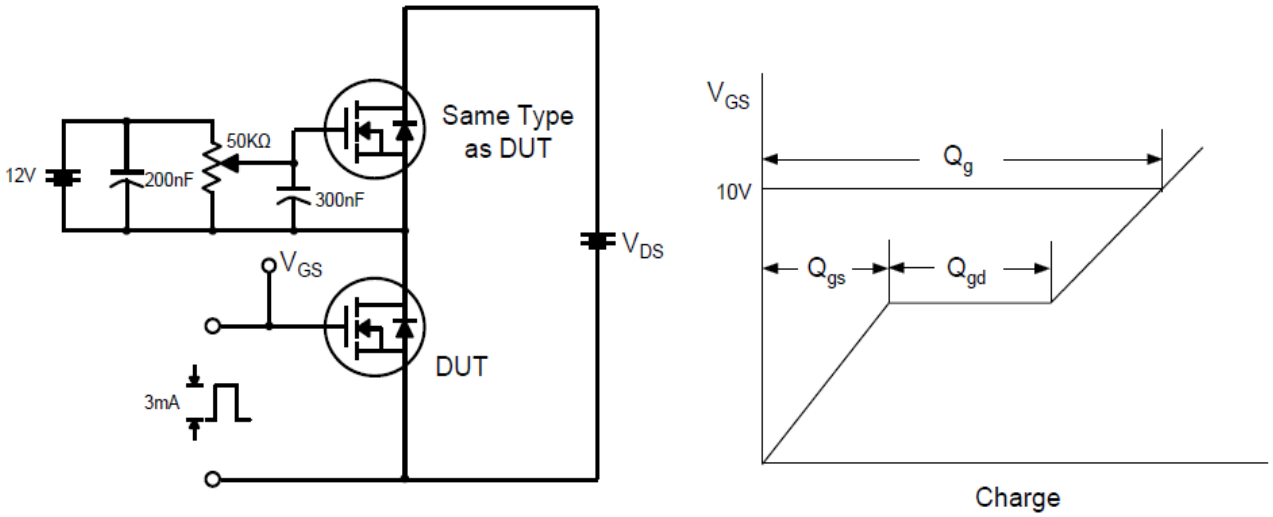


Fig. 13 Resistive Switching Test Circuit & Waveform

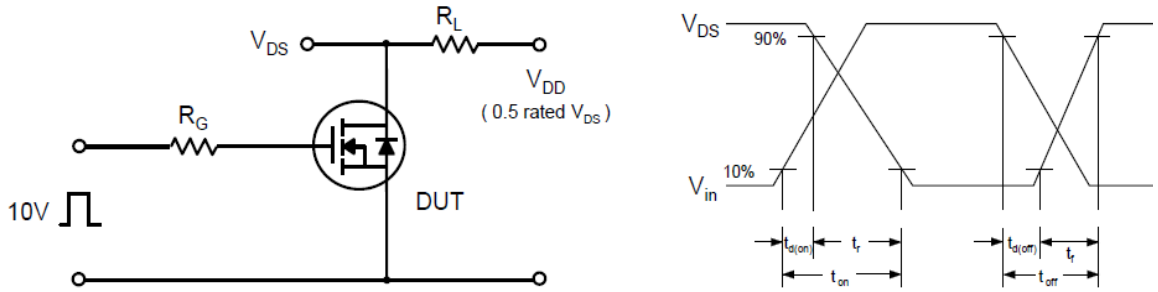


Fig. 14 E_{AS} Test Circuit & Waveform

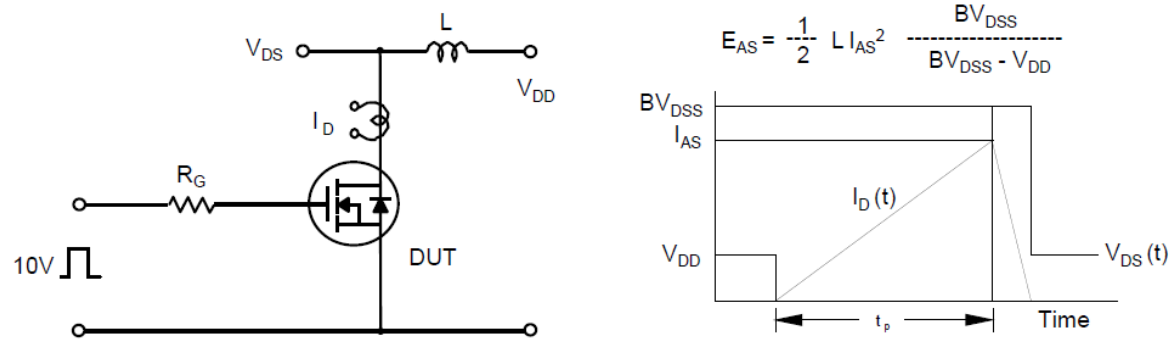
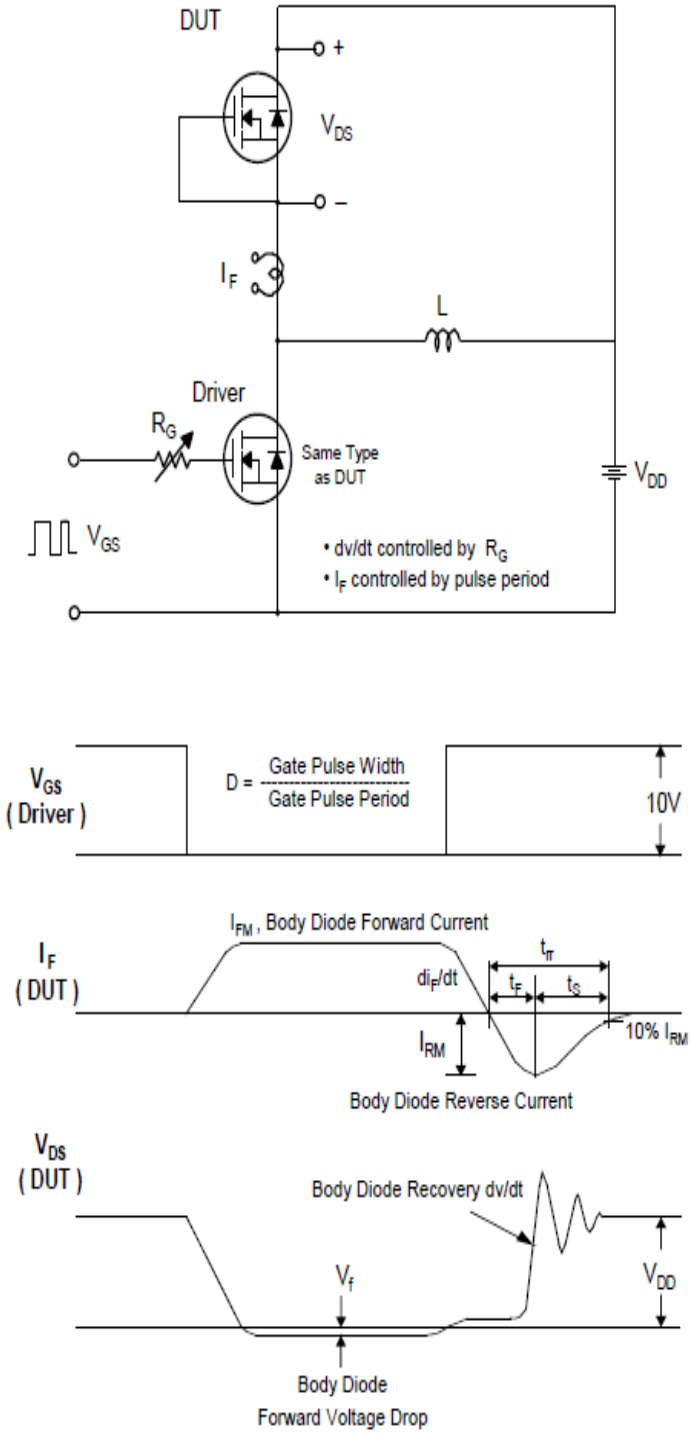
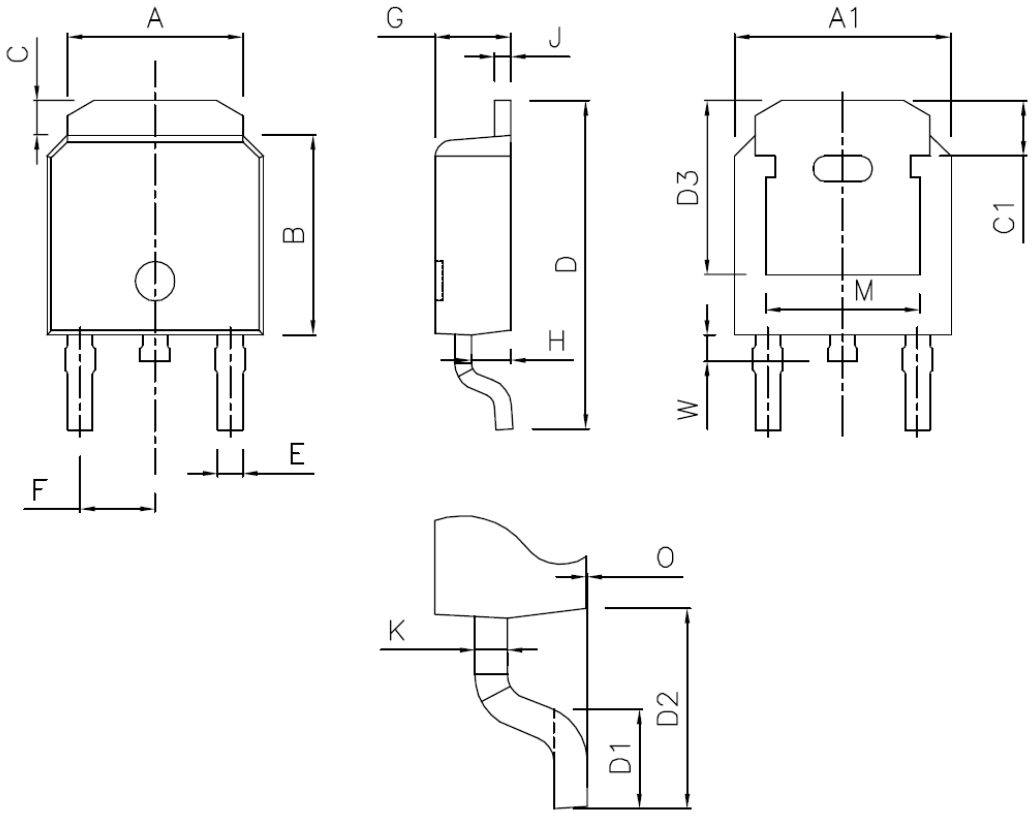


Fig. 15 Diode Reverse Recovery Time Test Circuit & Waveform



Package Outline Dimensions



SYMBOL	MILLIMETERS		
	MIN	NOR	MAX
A	5.03	5.34	5.64
A1	6.30	6.60	6.90
B	5.70	6.00	6.30
C	0.75	1.05	1.35
C1	1.021	1.321	1.621
D	9.65	9.95	10.25
D1	1.30	1.50	1.70
D2	2.70	2.90	3.10
D3	5.00	5.30	5.60
E	0.61	0.76	0.91
F	2.13	2.28	2.43
G	2.00	2.30	2.60
H	0.76	1.06	1.36
J	0.36	0.51	0.66
K	0.37	0.52	0.67
M	4.55	4.85	5.15
O	0.00	0.07	0.17
W	0.60	0.90	1.20

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