KODENSHI AUK

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SMK0170I

Advanced N-Ch Power MOSFET

SWITCHING REGULATOR APPLICATIONS

Features

- High Voltage : BV_{DSS}=700V(Min.)
- Low C_{rss} : C_{rss}=2.6pF(Typ.)
- Low gate charge : Qg=4.1nC(Typ.)
- Low $R_{DS(ON)}$: $R_{DS(ON)}$=15Ω(Max.)

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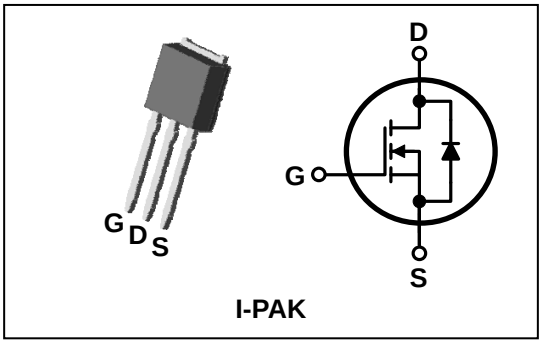
PIN Connection

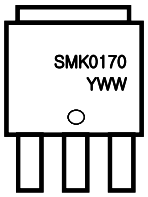


I-PAK

Ordering Information

Type No.	Marking	Package Code
SMK0170I	SMK0170	I-PAK

Marking Diagram



Column 1 : Device Code

Column 2 : Production Information
e.g.) YWW
-. Y : Year Code
-. WW : Week Code

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

Characteristic	Symbol		Rating	Unit
Drain-source voltage	V_{DSS}		700	V
Gate-source voltage	V_{GSS}		±30	V
Drain current (DC) *	I_D	(T_C=25℃)	1.0	A
		(T_C=100℃)	0.63	
Drain current (Pulsed) *	I_{DP}		4.0	A
Total Power dissipation	P_D		28	W
Avalanche current (Single) ②	I_{AS}		1.0	A
Single pulsed avalanche energy ②	E_{AS}		17	mJ
Avalanche current (Repetitive) ①	I_{AR}		1.0	A
Repetitive avalanche energy ①	E_{AR}		0.5	mJ
Junction temperature	T_J		150	°C
Storage temperature range	T_{stg}		-55~150	

* Limited by maximum junction temperature

Characteristic		Symbol	Typ.	Max.	Unit
Thermal resistance*	Junction-case	$R_{th(J-C)}$	-	4.46	℃/W
	Junction-ambient	$R_{th(J-A)}$	-	62.5	

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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=250μA, V_{GS}=0	700	-	-	V
Gate threshold voltage	$V_{GS(th)}$	I_D=250μA, V_{DS}=V_{GS}	2.0	-	4.0	V
Drain-source cut-off current	I_{DSS}	V_{DS}=700V, V_{GS}=0V	-	-	1	μA
Gate leakage current	I_{GSS}	V_{DS}=0V, V_{GS}=±30V	-	-	±100	nA
Drain-source on-resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=0.5A	-	12.5	15.0	Ω
Forward transfer conductance ④	g_{fs}	V_{DS}=10V, I_D=0.5A	-	0.5	-	S
Input capacitance	Ciss	V_{GS}=0V, V_{DS}=25V, f=1MHz	-	124	155	pF
Output capacitance	Coss		-	17.7	22.1	
Reverse transfer capacitance	Crss		-	2.6	3.3	
Turn-on delay time	$t_{d(on)}$	V_{DD}=300V, I_D=1.0A R_G=25Ω ③④	-	7	-	ns
Rise time	t_r		-	21	-	
Turn-off delay time	$t_{d(off)}$		-	13	-	
Fall time	t_f		-	27	-	
Total gate charge	Q_g	V_{DD}=560V, V_{GS}=10V I_D=1.0A ③④	-	4.1	5.1	nC
Gate-source charge	Q_{gs}		-	1.8	-	
Gate-drain charge	Q_{gd}		-	0.9	-	

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

Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Source current	I_S	Integral reverse diode in the MOSFET	-	-	1.0	A
Source current (Pulsed) ①	I_{SM}		-	-	4.0	
Forward voltage ④	V_{SD}	V_{GS}=0V, I_S=1.0A	-	-	1.4	V
Reverse recovery time	t_{rr}	I_S=1.0A, V_{GS}=0V dI_S/dt=100A/us	-	190	-	ns
Reverse recovery charge	Q_{rr}		-	0.53	-	uC

Note ;

① Repetitive Rating : Pulse Width Limited by Maximum Junction Temperature

② L=50mH, I_{AS}=0.8A, V_{DD}=50V, R_G=25Ω

③ Pulse Test : Pulse Width < 300us, Duty cycle≤ 2%

④ Essentially independent of operating temperature

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Electrical Characteristic Curves

Fig. 1 I_D - V_{DS}

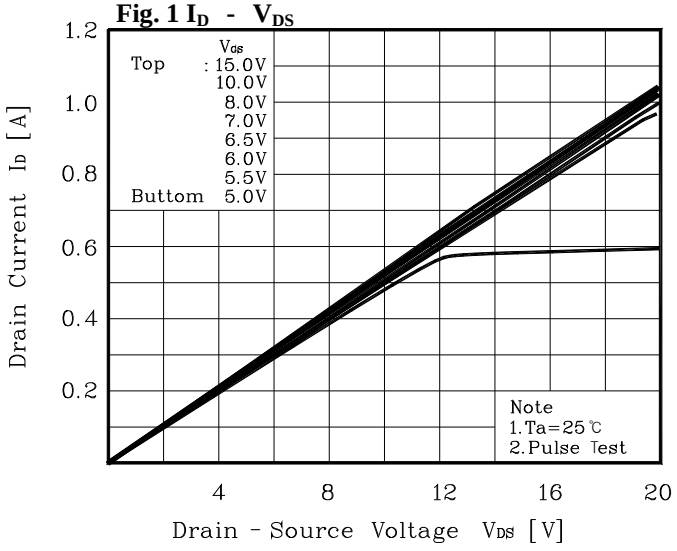

Fig. 2 I_D - V_{GS}

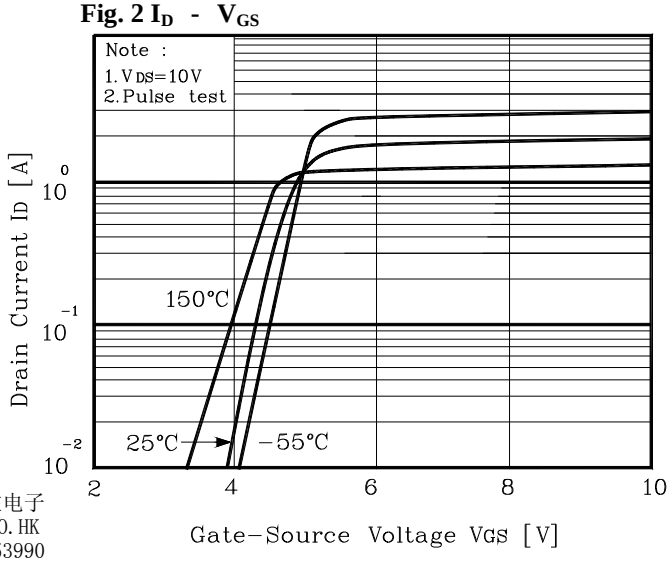

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Fig. 3 $R_{DS(on)}$ - I_D

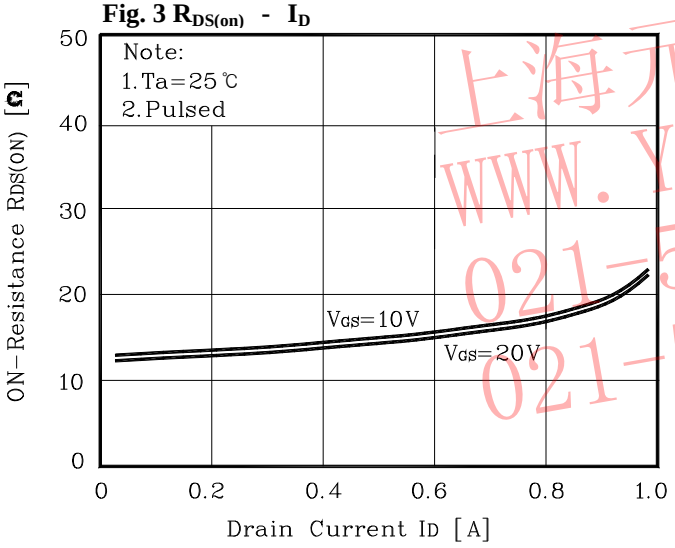

Fig. 4 I_S - V_{SD}

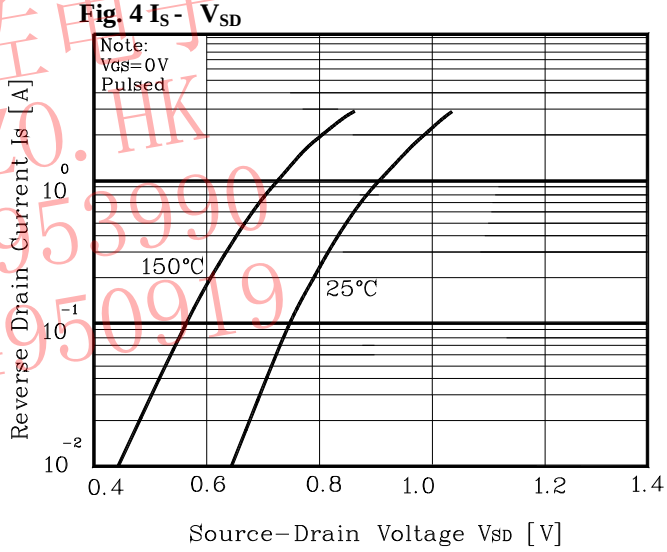

Fig. 5 Capacitance - V_{DS}

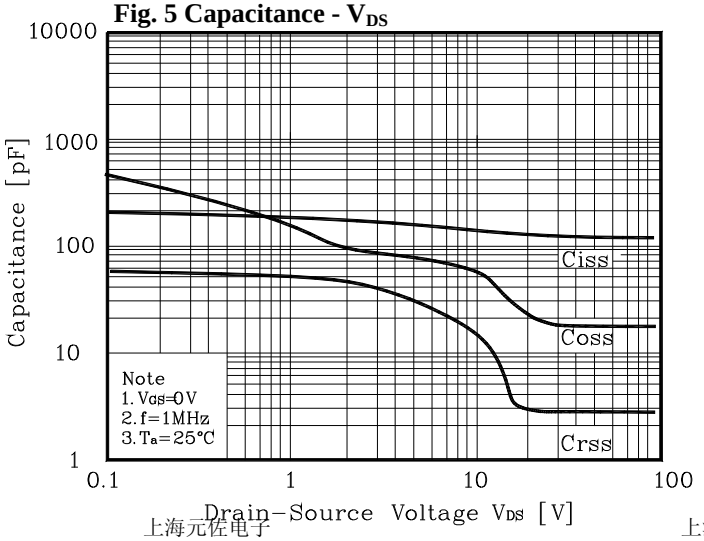

Fig. 6 V_{GS} - Q_G

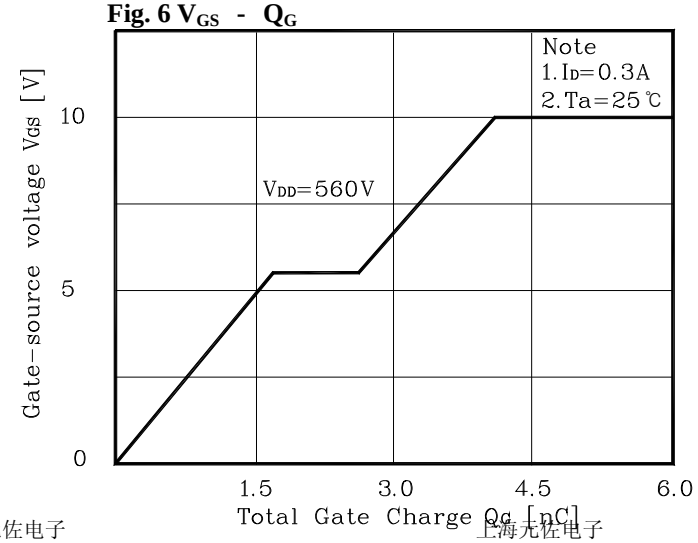

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Fig. 7 V_{DSS} - T_J

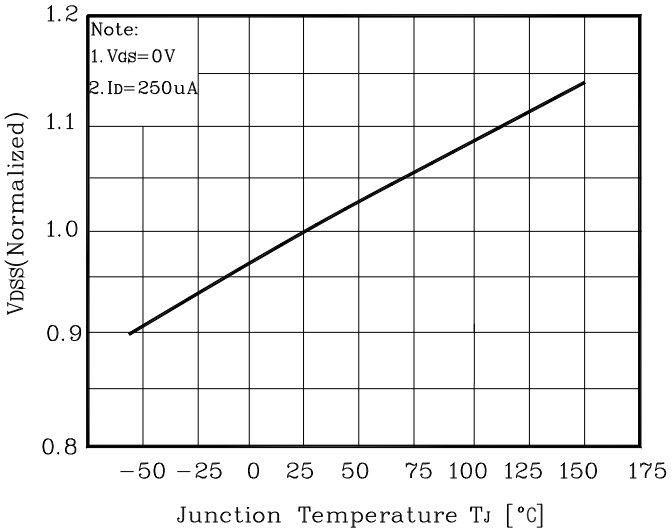


Fig. 8 $R_{DS(on)}$ - T_J

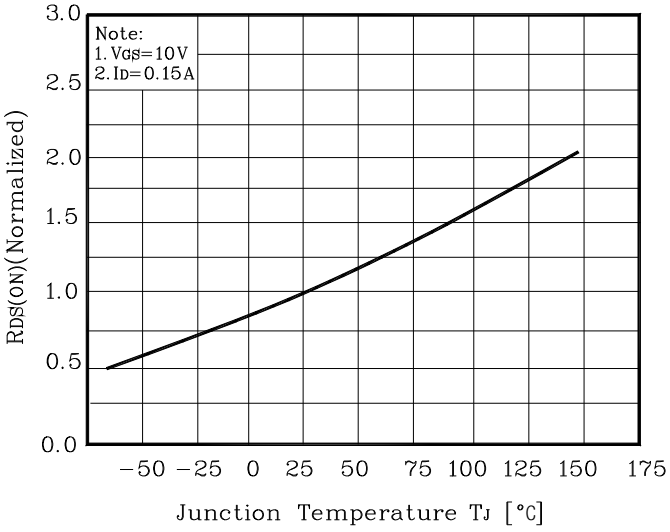


Fig. 9 I_D - T_a

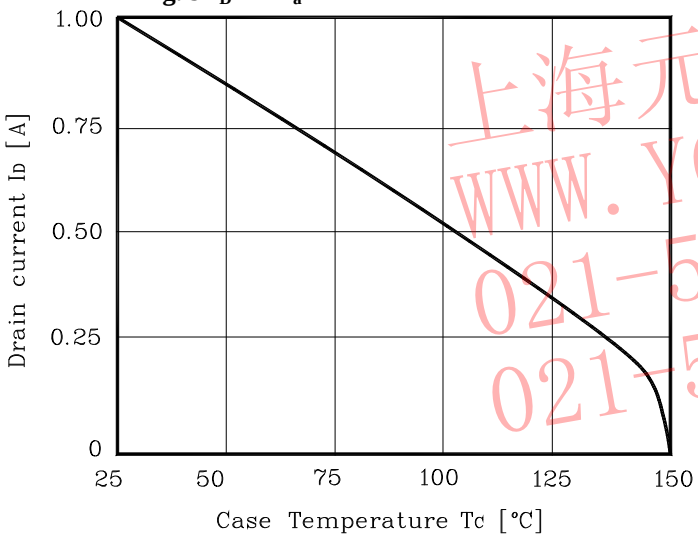


Fig. 10 Safe Operating Area

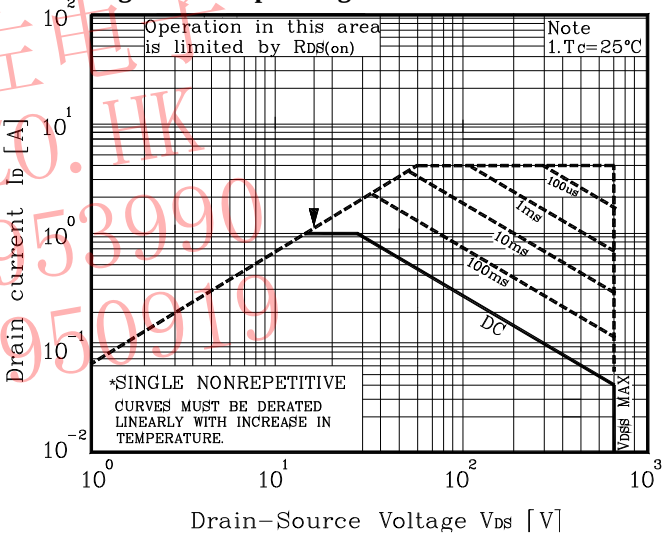


Fig. 11 Gate Charge Test Circuit & Waveform

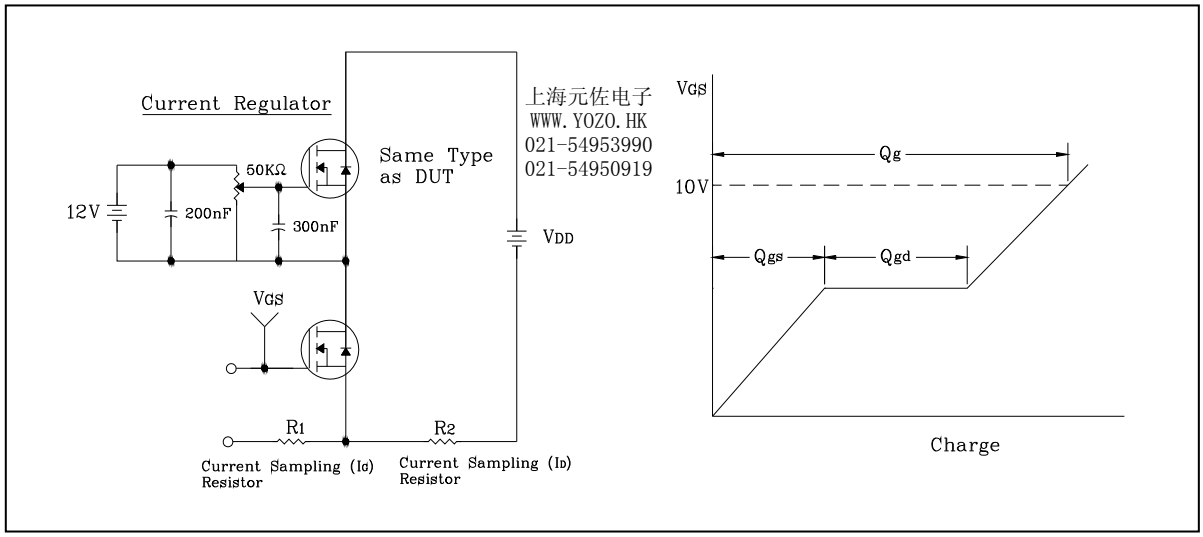


Fig. 12 Resistive Switching Test Circuit & Waveform

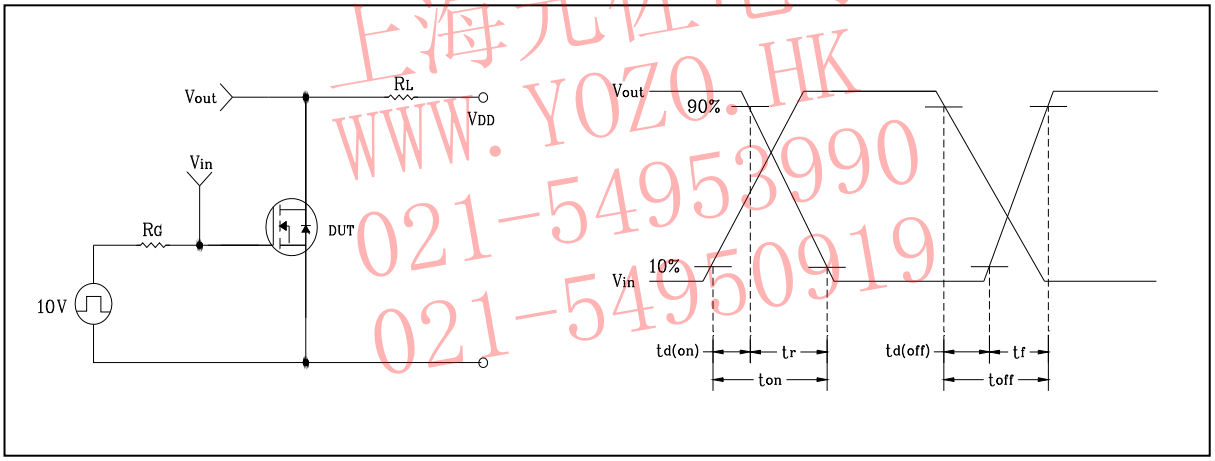


Fig. 13 E_{AS} Test Circuit & Waveform

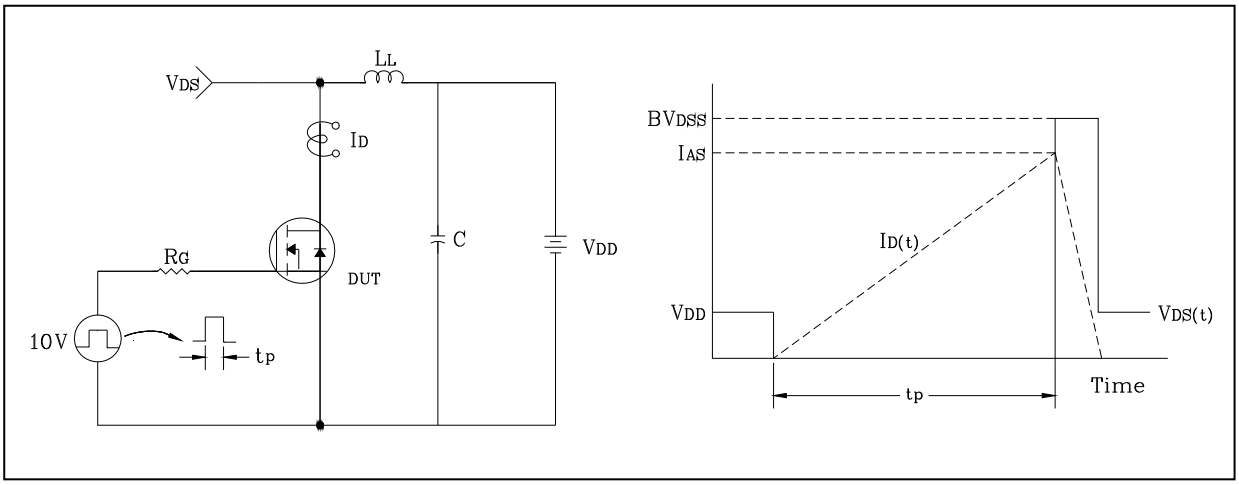
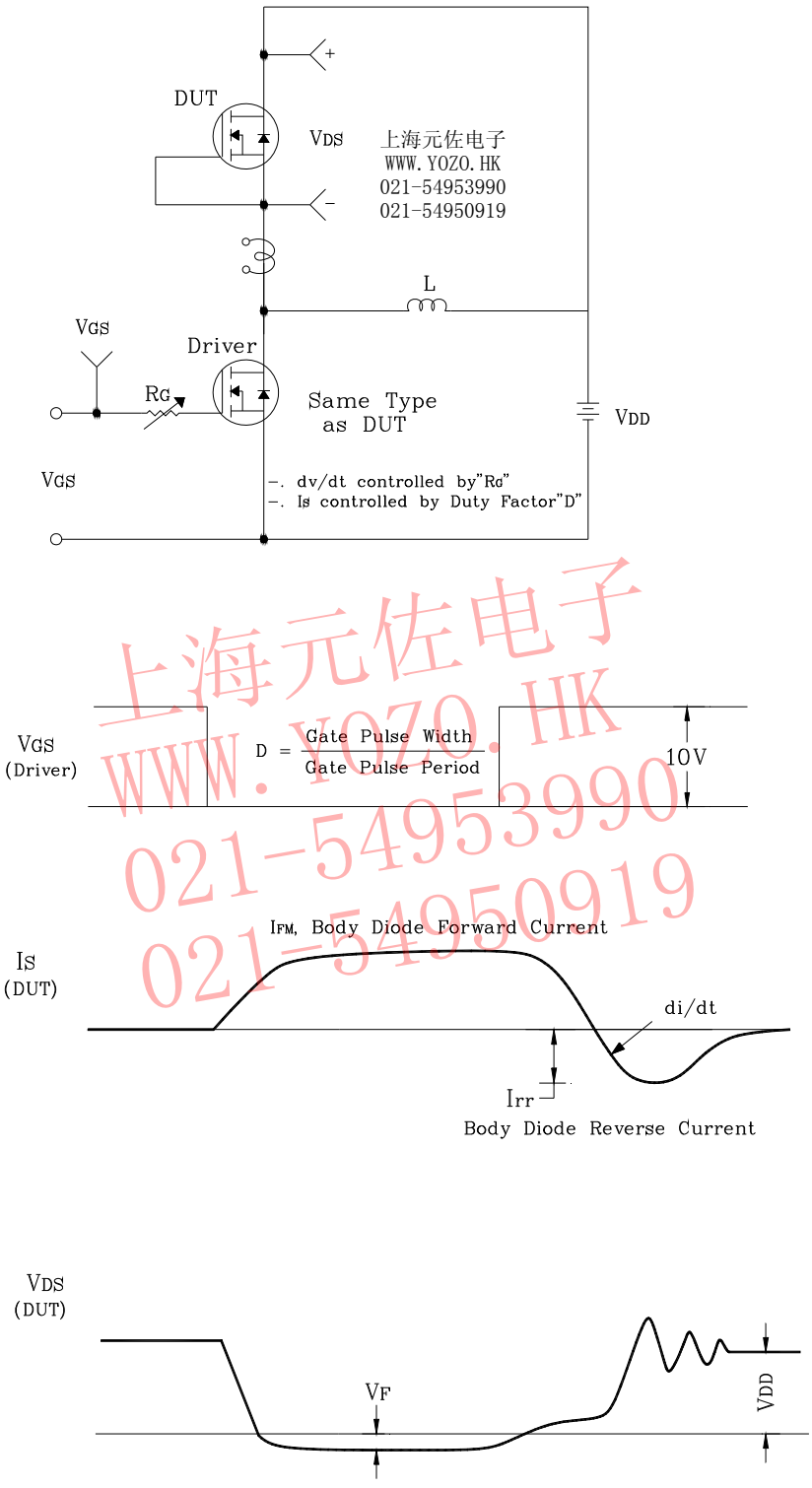


Fig. 14 Diode Reverse Recovery Time Test Circuit & Waveform



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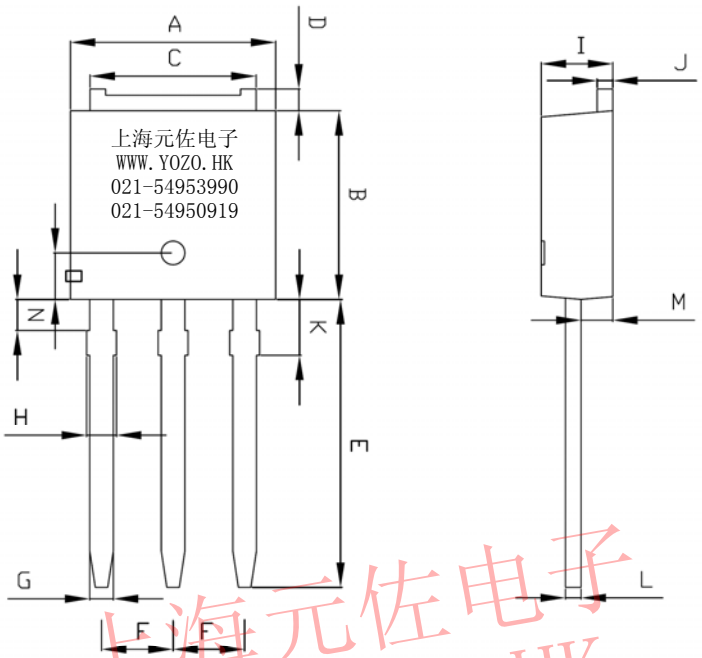
Outline Dimension

unit : mm



SYMBOL	MILLIMETERS			NOTE
	MINIMUM	NOMINAL	MAXIMUM	
A	6.40	6.60	6.80	
B	5.90	6.10	6.30	
C	5.04	5.34	5.64	
D	0.50	0.70	0.90	
E	9.00	9.30	9.60	
F	2.10	2.30	2.50	
G	0.66	0.76	0.86	
H	0.96 MAX			
I	2.20	2.30	2.40	
J	0.40	0.50	0.60	
K	1.60	1.80	2.00	
L	0.40	0.50	0.60	
M	0.72	1.02	1.32	
N	0.90	1.00	1.10	
O	1.50			

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