



SWITCHING REGULATOR APPLICATIONS

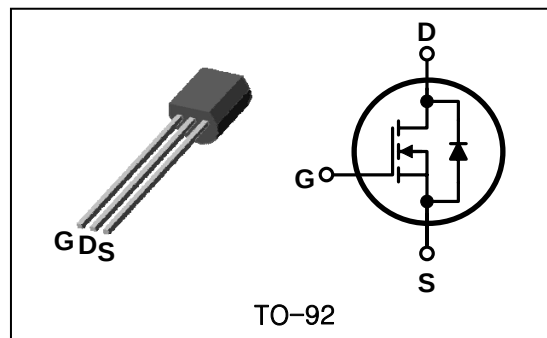
Features

- High Voltage : $BV_{DSS}=700V(\text{Min.})$
- Low C_{RSS} : $C_{RSS}=2.6pF(\text{Typ.})$
- Low gate charge : $Q_g=4.1nC(\text{Typ.})$
- Low $R_{DS(on)}$: $R_{DS(on)}=15\Omega(\text{Max.})$

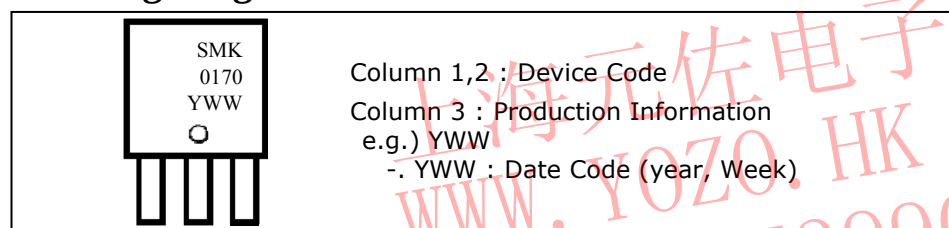
Ordering Information

Type No.	Marking	Package Code
SMK0170	SMK0170	TO-92

PIN Connection



Marking Diagram



Absolute maximum ratings ($T_c=25^\circ\text{C}$ 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℃)	0.3	A
		(T _c =100℃)	0.18	A
Drain current (Pulsed) *	I _{DM}		1.2	A
Power dissipation **	P _D		625	W
Avalanche current (Single) ②	I _{AS}		0.3	A
Single pulsed avalanche energy ②	E _{AS}		17	mJ
Avalanche current (Repetitive) ①	I _{AR}		0.3	A
Repetitive avalanche energy ①	E _{AR}		0.5	mJ
Junction temperature	T _J		150	℃
Storage temperature range	T _{sta}		-55~150	

* Limited by maximum junction temperature

** Device mounted on a glass-epoxy board

Characteristic	Symbol	Typ.	Max.	Unit
Thermal resistance	$R_{th(J-A)}$	-	200	$^\circ\text{C/W}$

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	700	-	-	V
Gate threshold voltage	V _{GS(th)}	I _D =250uA, V _{DS} =V _{GS}	2.0	-	4.0	V
Drain-source cut-off current	I _{DSS}	V _{DS} =700V, V _{GS} =0V	-	-	1	uA
Gate leakage current	I _{GSS}	V _{DS} =0V, V _{GS} =±30V	-	-	±100	nA
Drain-source on-resistance ④	R _{DS(ON)}	V _{GS} =10V, I _D =150mA	-	12.5	15.0	Ω
Forward transfer conductance ④	g _{fs}	V _{DS} =10V, I _D =150mA	-	2.1	-	S
Input capacitance	C _{iss}	V _{GS} =0V, V _{DS} =25V, f=1MHz	-	124	155	pF
Output capacitance	C _{oss}		-	17.7	22.1	
Reverse transfer capacitance	C _{rss}		-	2.6	3.3	
Turn-on delay time	t _{d(on)}	V _{DD} =300V, I _D =0.3A 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 _{DS} =560V, V _{GS} =10V I _D =0.3A 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 (DC)	I _S	Integral reverse diode in the MOSFET	-	-	0.3	A
Source current (Pulsed) ①	I _{SM}		-	-	1.2	
Forward voltage ④	V _{SD}	V _{GS} =0V, I _S =0.3A	-	-	1.4	V
Reverse recovery time	t _{rr}	I _S =0.3A, V _{GS} =0V dI _F /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, Starting T_J=25°C
- ③ Pulse Test : Pulse width≤300us, Duty cycle≤2%
- ④ Essentially independent of operating temperature

Electrical Characteristic Curves

Fig. 1 $I_D - V_{DS}$

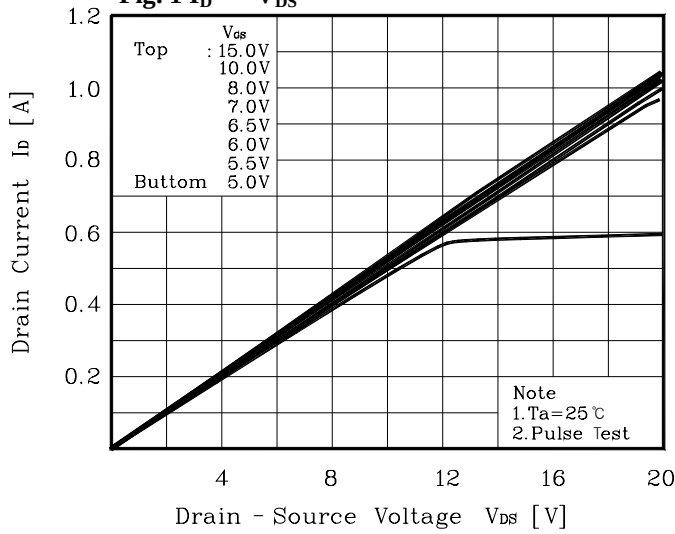


Fig. 2 $I_D - V_{GS}$

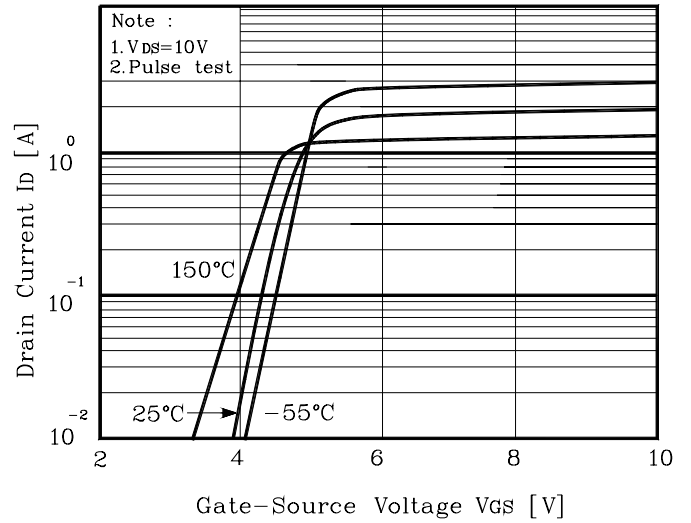


Fig. 3 $R_{DS(on)} - I_D$

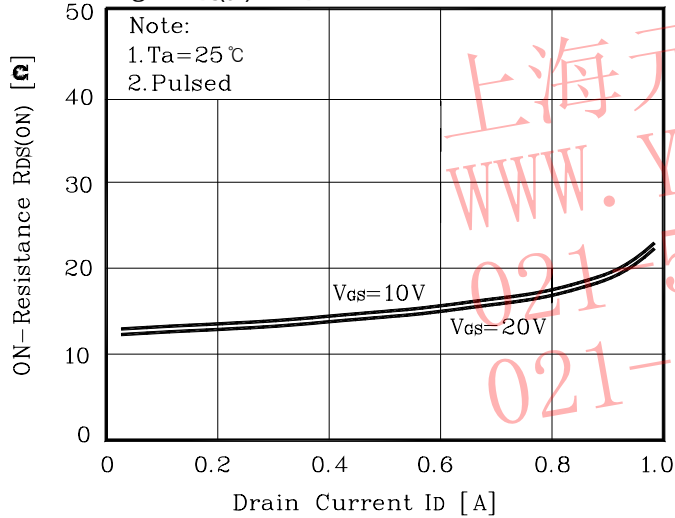


Fig. 4 $I_S - V_{SD}$

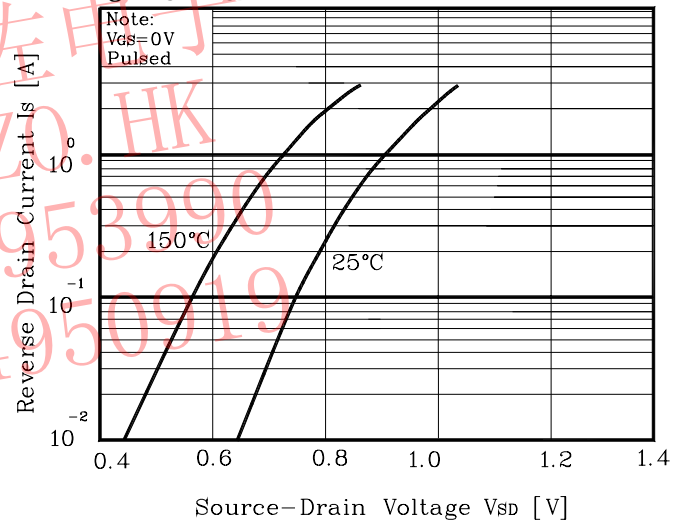


Fig. 5 Capacitance - V_{DS}

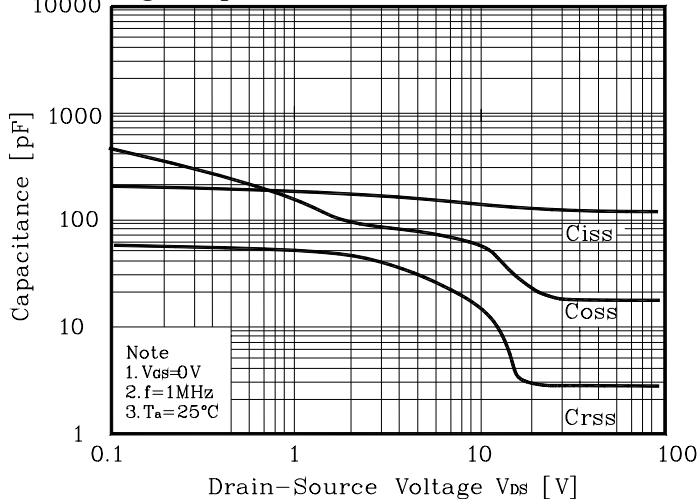


Fig. 6 $V_{GS} - Q_G$

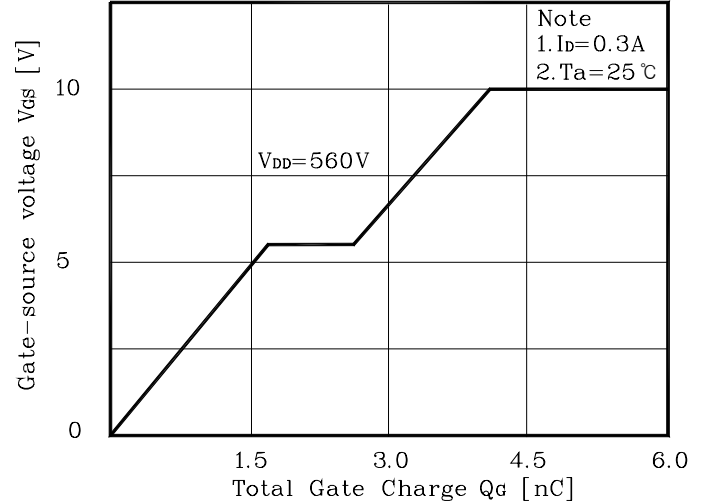


Fig. 7 $V_{DS} - T_J$

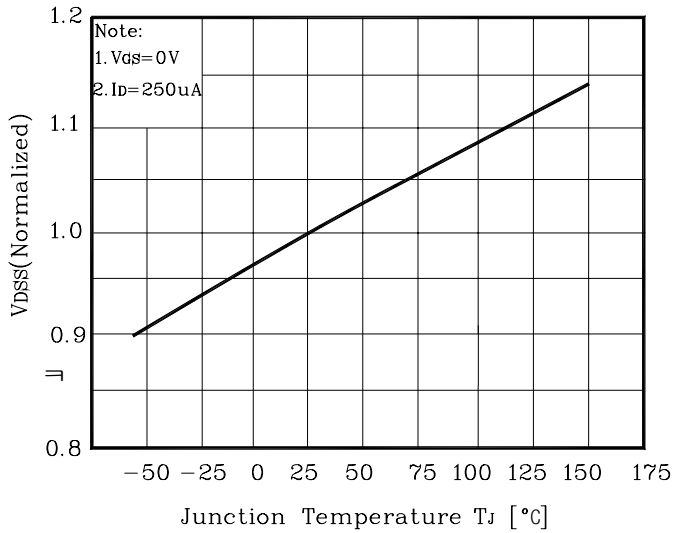


Fig. 8 $R_{DS(on)} - T_J$

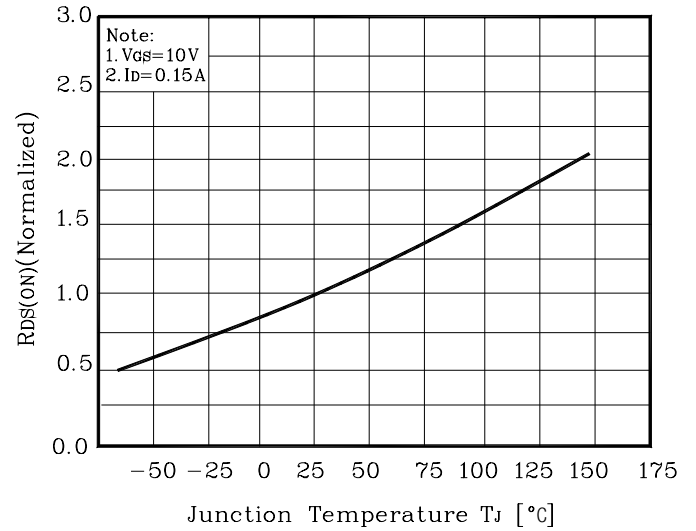


Fig. 9 $I_D - T_a$

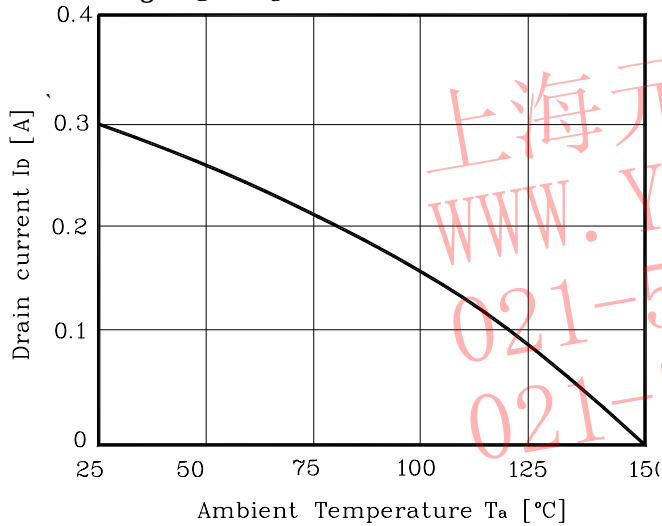


Fig. 10 Safe Operating Area

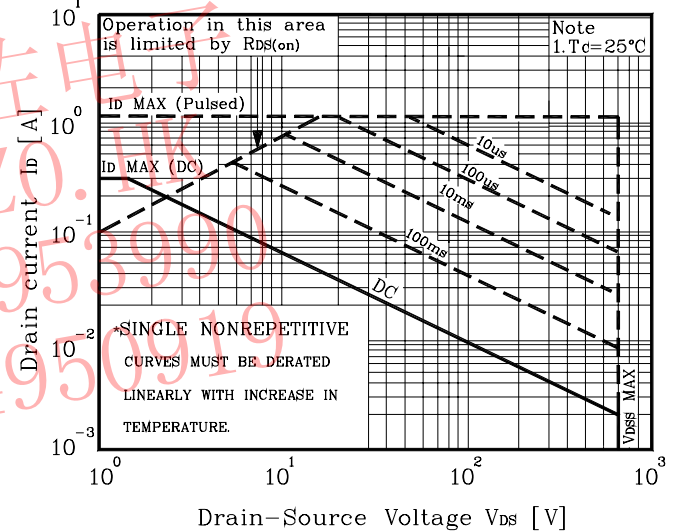


Fig. 11 Gate Charge Test Circuit & Waveform

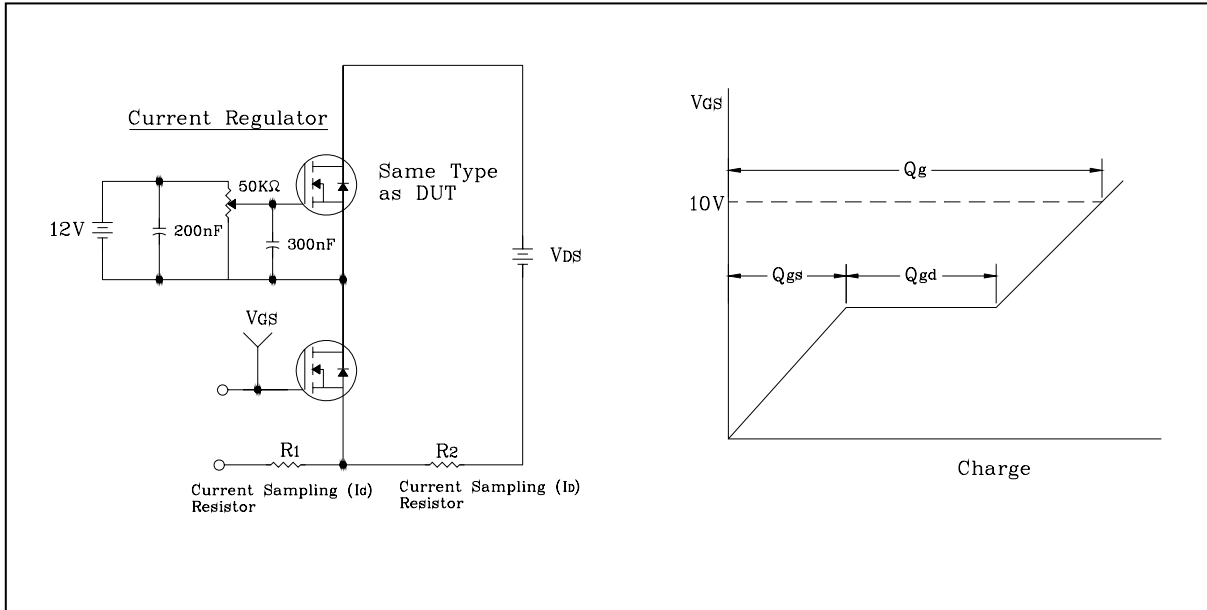


Fig. 12 Resistive Switching Test Circuit & Waveform

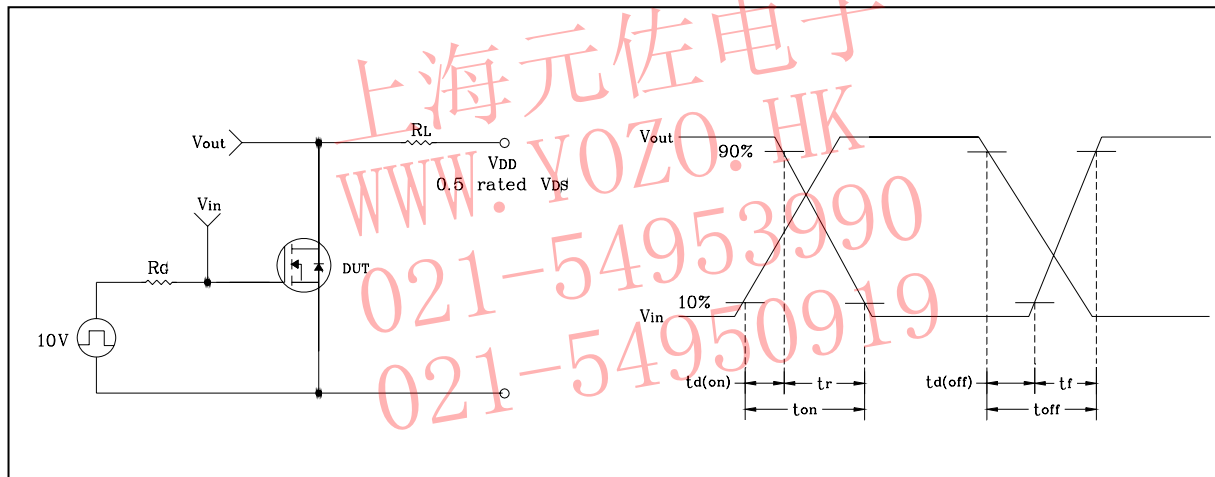


Fig. 13 EAS Test Circuit & Waveform

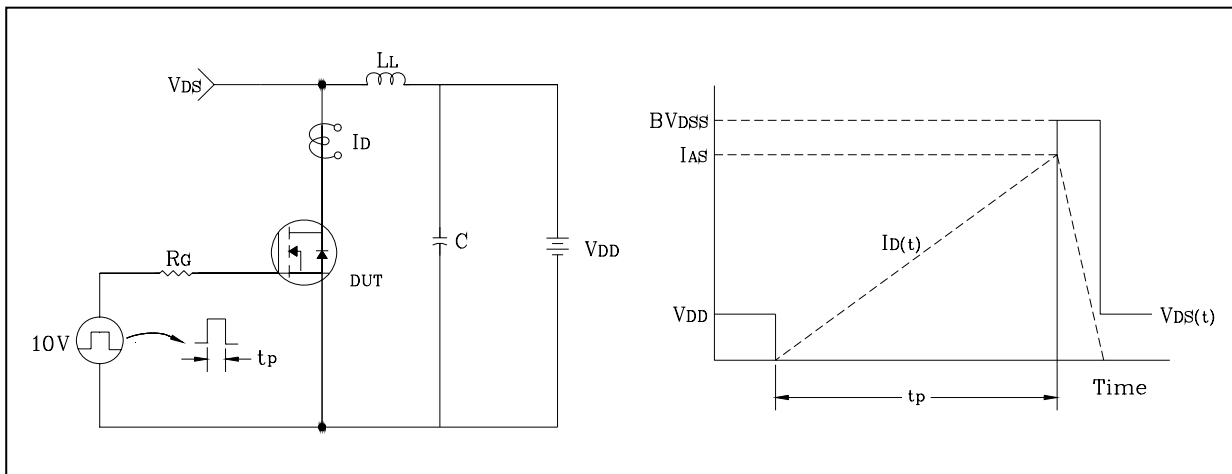
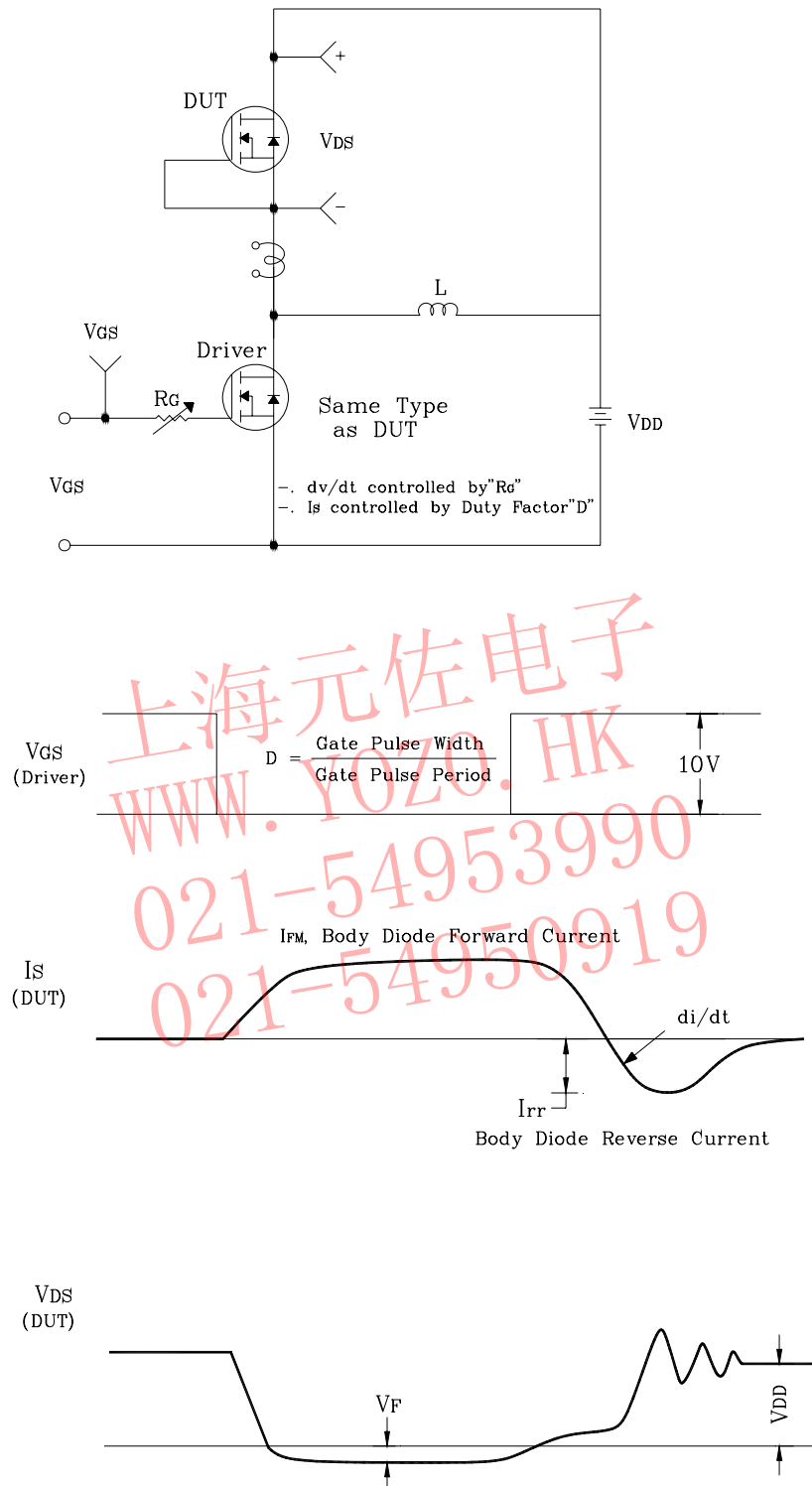
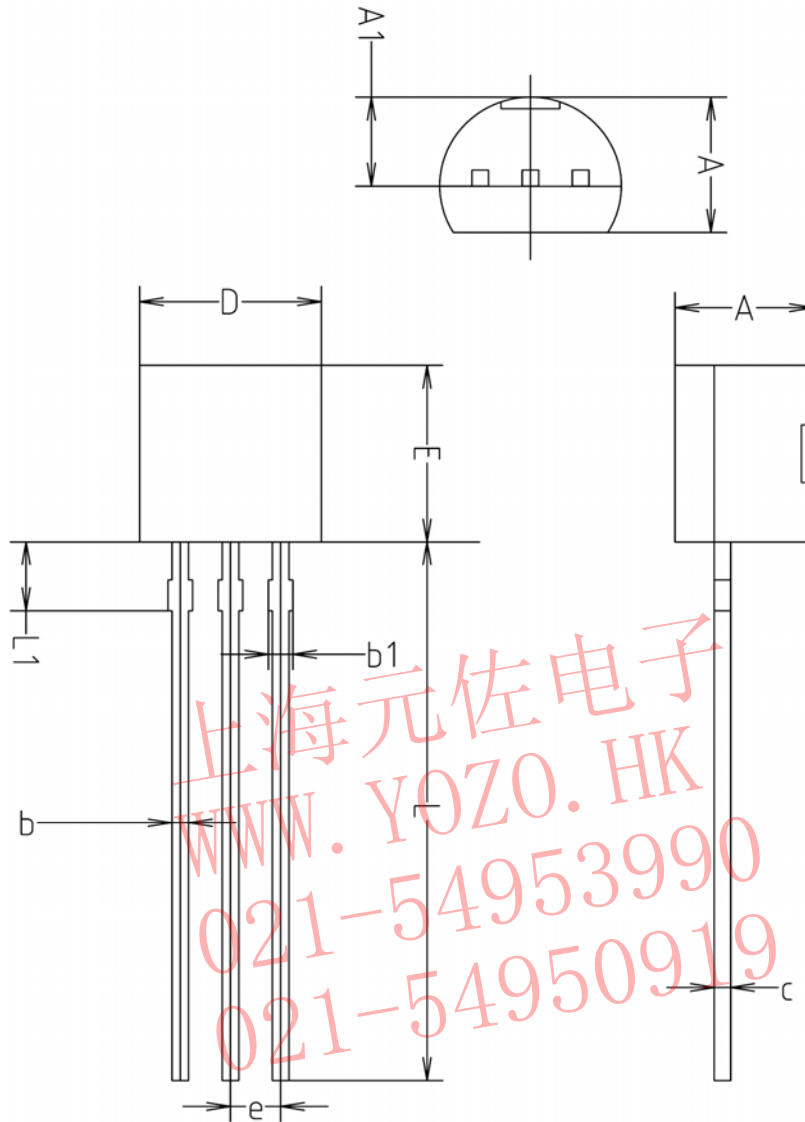


Fig. 14 Diode Reverse Recovery Time Test Circuit & Waveform



Outline Dimension

unit: mm



SYMBOL	MILLIMETERS(mm)		
	MINIMUM	NOMINAL	MAXIMUM
A	3.40	3.50	3.66
A1	2.46	2.51	2.59
b	0.39	0.44	0.53
b1	0.39	—	0.63
c	0.35	0.42	0.47
D	4.48	4.60	4.70
E	4.48	4.60	4.70
e	1.17	1.27	1.37
L	13.70	14.00	14.77
L1	1.55	1.70	2.15