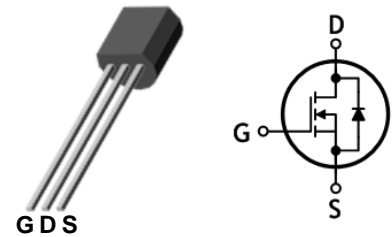


SWITCHING REGULATOR APPLICATION

Features

- High voltage: $BV_{DSS}=700V$ (Min.)
- Low gate charge: $Q_g=4nC$ (Typ.)
- Low drain-source On resistance: $R_{DS(on)}=12.5\Omega$ (Max.)
- Low C_{rss} : $C_{rss}=2.5pF$ (Typ.)
- RoHS compliant device

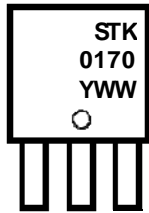


Ordering Information

Part Number	Marking	Package
STK0170	STK0170	TO-92

TO-92

Marking Information



Column 1, 2: Device Code
 Column 3: Production Information
 e.g.) YWW
 - . YWW: Date Code (year, week)

Absolute maximum ratings ($T_a=25^\circ C$ 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	0.3	A
Drain current (Pulsed) *	I_{DP}	1.2	A
Avalanche current	I_{AS}	0.3	A
Single pulsed avalanche energy ^(Note 2)	E_{AS}	25	mJ
Repetitive avalanche current ^(Note 1)	I_{AR}	0.3	A
Repetitive avalanche energy ^(Note 1)	E_{AR}	0.5	mJ
Power dissipation	P_D	625	mW
Junction temperature	T_J	150	$^\circ C$
Storage temperature range	T_{stg}	-55~150	$^\circ C$

* Limited only maximum junction temperature

Thermal Characteristics

Characteristic	Symbol	Rating	Unit
Thermal resistance, junction to ambient	$R_{th(j-a)}$	Max. 200	°C/W

Electrical Characteristics ($T_a=25^\circ\text{C}$ unless otherwise noted)

Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Drain-source breakdown voltage	BV_{DSS}	$I_D=250\mu\text{A}$, $V_{GS}=0$	700	-	-	V
Gate threshold voltage	$V_{GS(th)}$	$I_D=250\mu\text{A}$, $V_{DS}=V_{GS}$	2.5	2	4.5	V
Drain-source cut-off current	I_{DSS}	$V_{DS}=700\text{V}$, $V_{GS}=0\text{V}$	-	-	1	μA
Gate leakage current	I_{GSS}	$V_{DS}=0\text{V}$, $V_{GS}=\pm 30\text{V}$	-	-	± 100	nA
Drain-source on-resistance	$R_{DS(on)}$	$V_{GS}=10\text{V}$, $I_D=150\text{mA}$	-	12.5	15	Ω
Input capacitance	C_{iss}	$V_{DS}=25\text{V}$, $V_{GS}=0\text{V}$, $f=1\text{MHz}$		163	211	pF
Output capacitance	C_{oss}			19	25	
Reverse transfer capacitance	C_{rss}			2.5	3.5	
Turn-on delay time ^(Note 3,4)	$t_{d(on)}$	$V_{DD}=300\text{V}$, $I_D=0.8\text{A}$ $R_G=25\Omega$		12	30	ns
Rise time ^(Note 3,4)	t_r			50	150	
Turn-off delay time ^(Note 3,4)	$t_{d(off)}$			20	50	
Fall time ^(Note 3,4)	t_f			30	80	
Total gate charge ^(Note 3,4)	Q_g	$V_{DS}=560\text{V}$, $V_{GS}=10\text{V}$ $I_D=0.8\text{A}$		4	6	nC
Gate-source charge ^(Note 3,4)	Q_{gs}			1.2	3	
Gate-drain charge ^(Note 3,4)	Q_{gd}			1.5	4.5	

Source-Drain Diode Ratings and Characteristics ($T_a=25^\circ\text{C}$ 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)	I_{SM}		-	-	1.2	A
Forward voltage	V_{SD}	$V_{GS}=0\text{V}$, $I_S=0.3\text{A}$	-	-	1.4	V
Reverse recovery time ^(Note 3,4)	t_{rr}	$I_S=0.8\text{A}$, $V_{GS}=0\text{V}$ $dI_F/dt=100\text{A}/\mu\text{s}$	-	200	-	ns
Reverse recovery charge ^(Note 3,4)	Q_{rr}		-	0.31	-	μC

Note:

1. Repeated rating: Pulse width limited by safe operating area
2. $L=94.7\text{mH}$, $I_{AS}=0.7\text{A}$, $V_{DD}=50\text{V}$, $R_G=25\Omega$, Starting $T_J=25^\circ\text{C}$
3. Pulse test: Pulse width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$
4. Essentially independent of operating temperature typical characteristics

Electrical Characteristic Curves

Fig. 1 $I_D - V_{DS}$

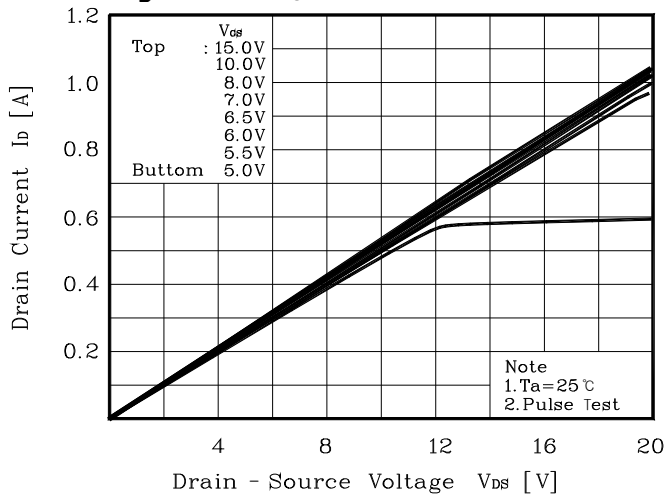


Fig. 2 $I_D - V_{GS}$

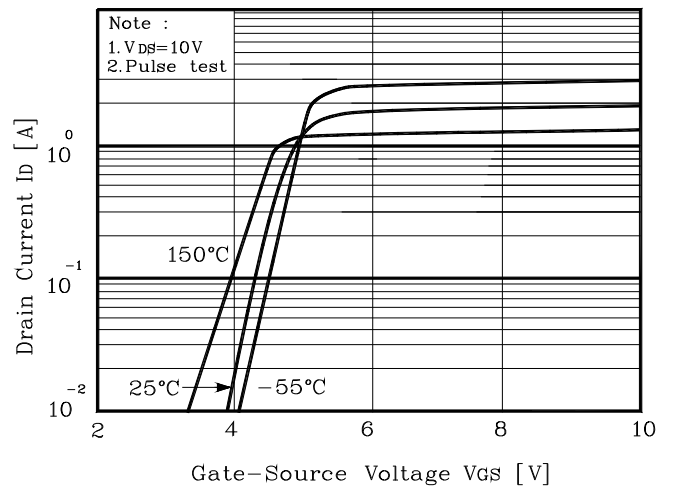


Fig. 3 $R_{DS(on)} - I_D$

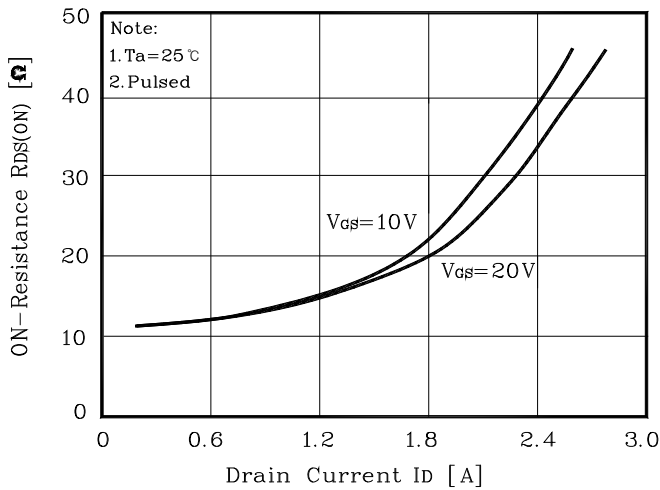


Fig. 4 $I_S - V_{SD}$

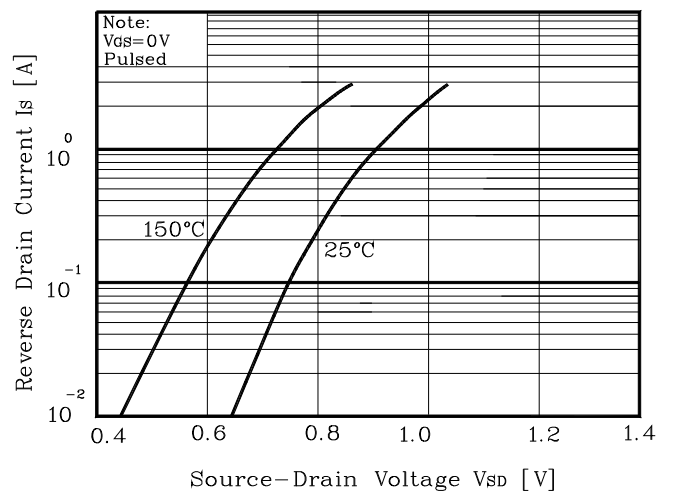


Fig. 5 Capacitance - V_{DS}

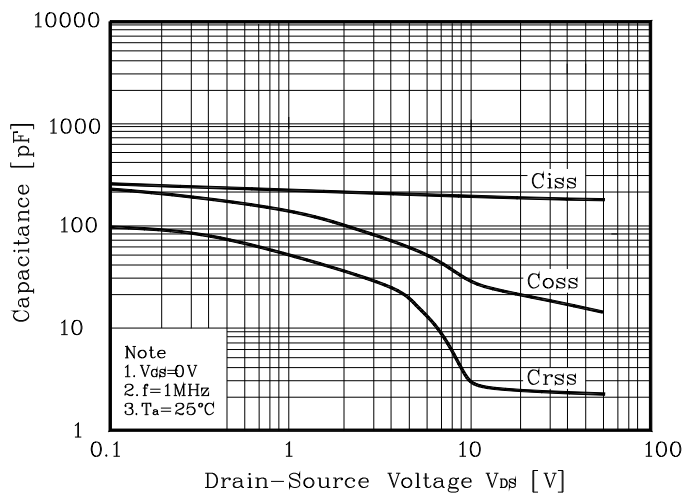
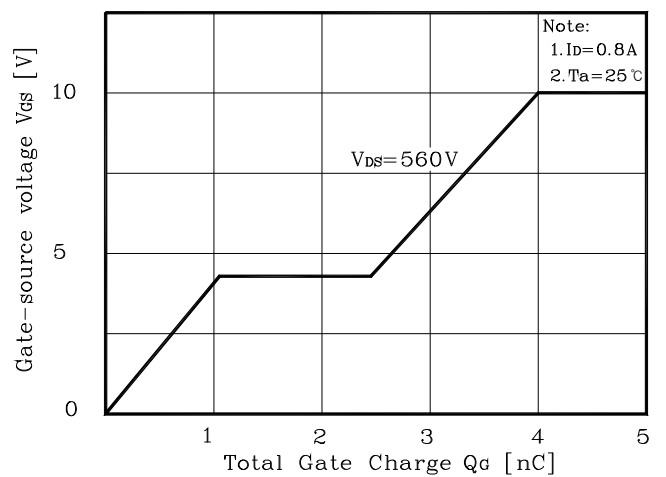


Fig. 6 $V_{GS} - Q_G$



Electrical Characteristic Curves (Continue)

Fig. 7 $V_{DSS} - T_J$

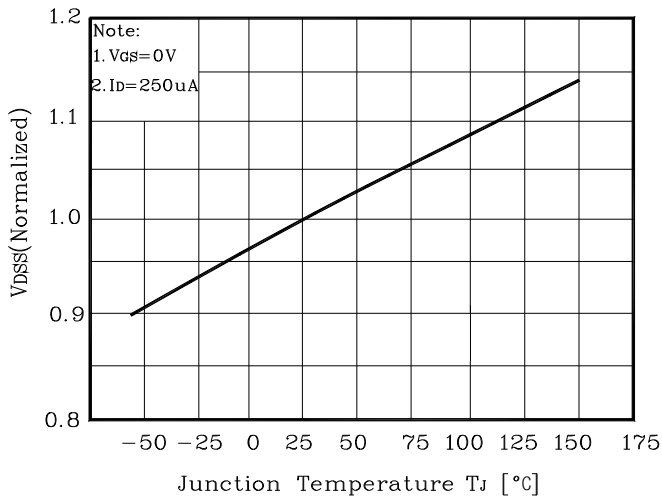


Fig. 8 $R_{DS(on)} - T_J$

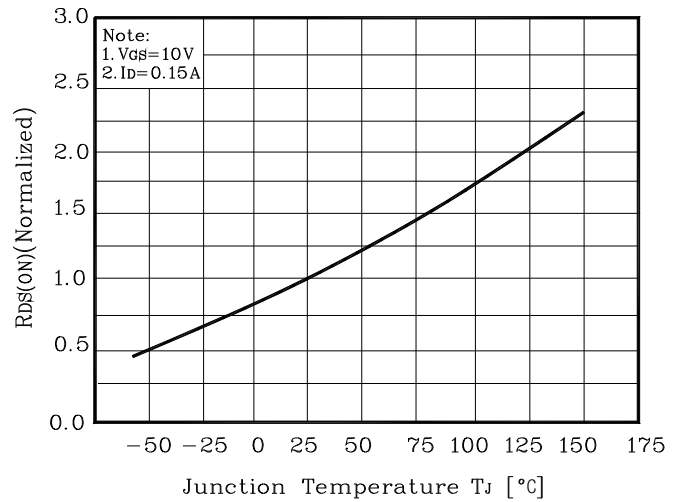


Fig. 9 $I_D - T_a$

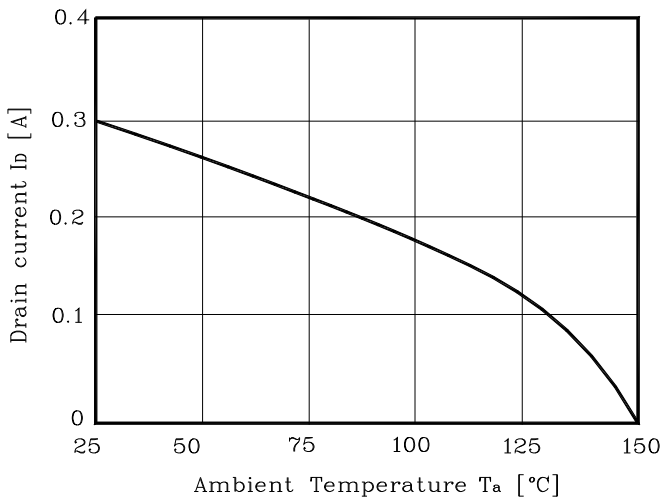


Fig. 10 Safe Operating Area

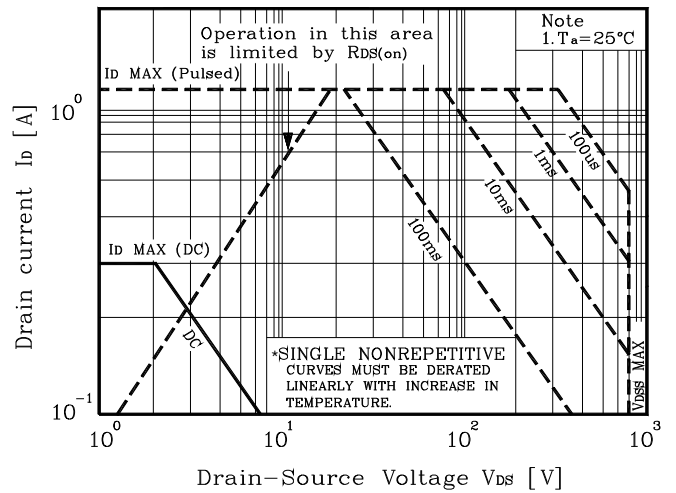


Fig. 11 Gate Charge Test Circuit & Waveform

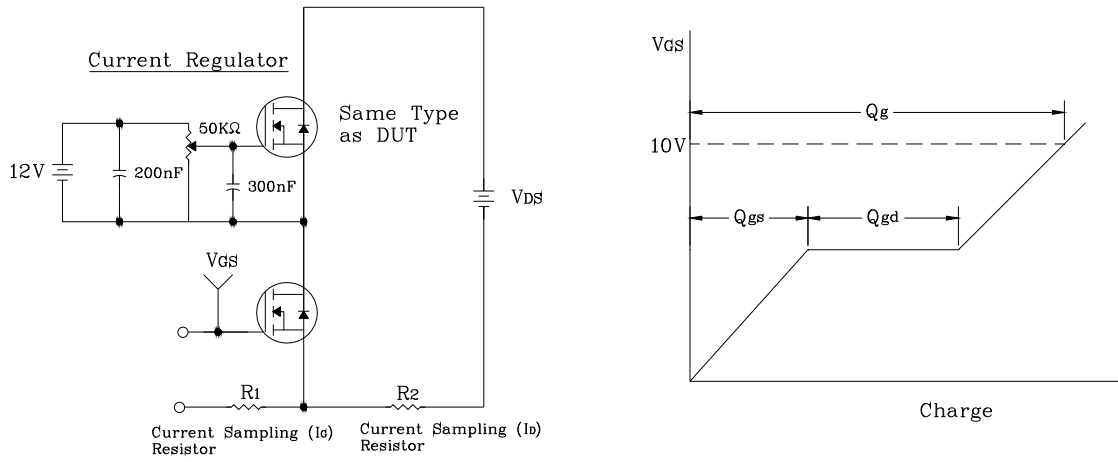


Fig. 12 Resistive Switching Test Circuit & Waveform

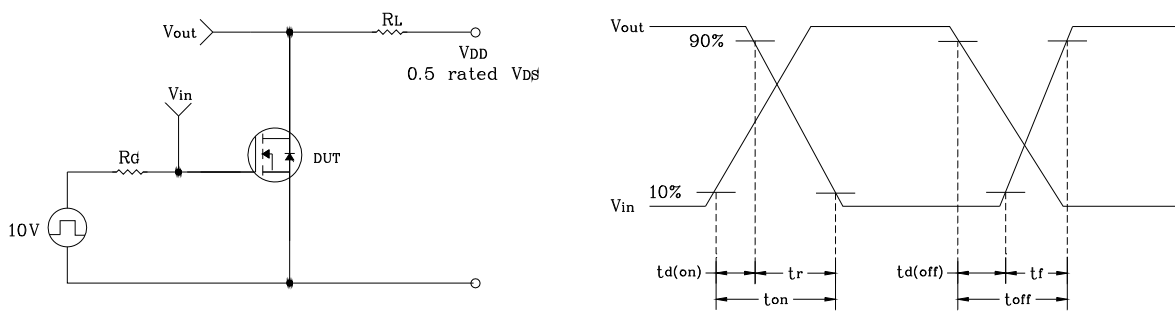


Fig. 13 E_{AS} Test Circuit & Waveform

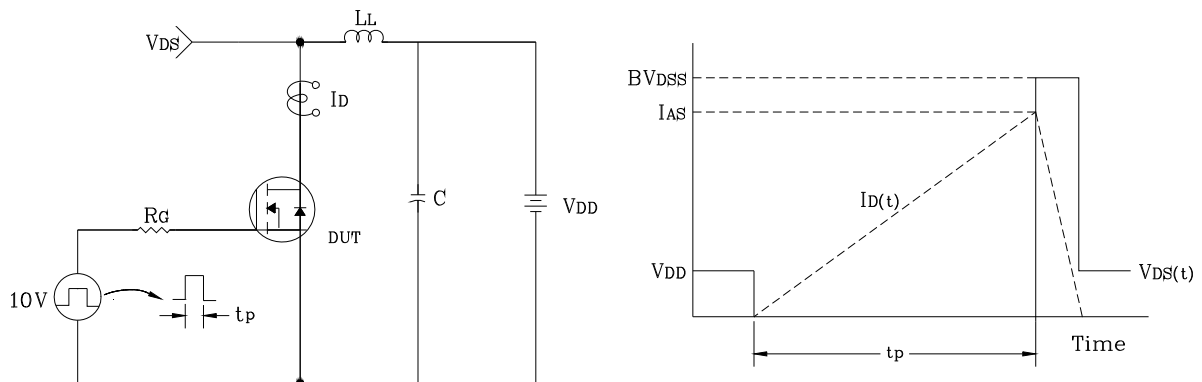
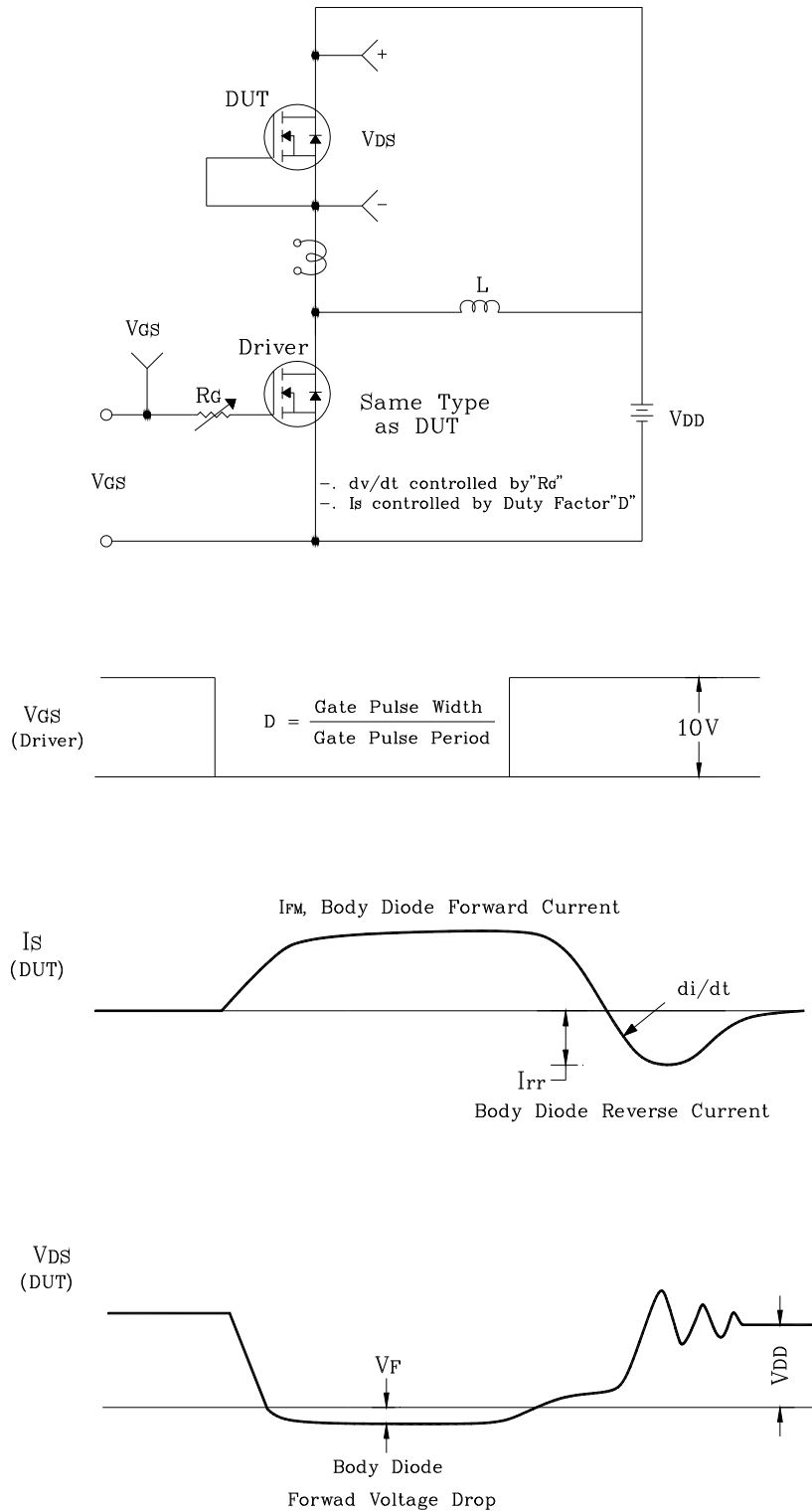
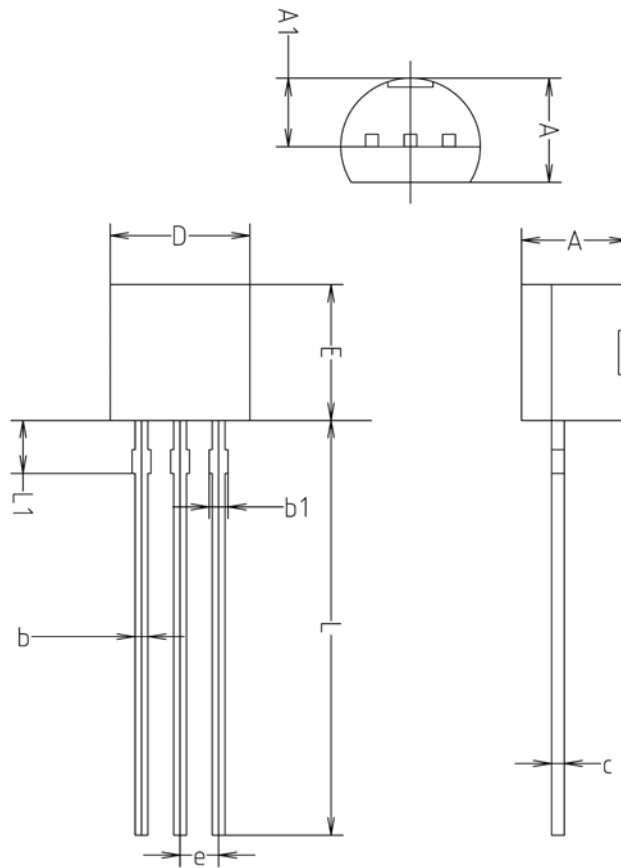


Fig. 14 Diode Reverse Recovery Time Test Circuit & Waveform



Package Outline Dimensions



SYMBOL	MILLMETERS(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

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