

## SWITCHING REGULATOR APPLICATIONS

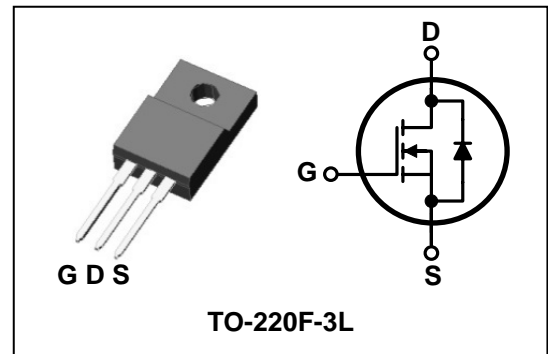
### Features

- High Voltage:  $BV_{DSS}=650V(\text{Min.})$
- Low  $C_{rSS}$  :  $C_{rSS}=13pF(\text{Typ.})$
- Low gate charge :  $Qg=32nC(\text{Typ.})$
- Low  $R_{DS(on)}$  :  $R_{DS(on)}=1.2\Omega(\text{Typ.})$

### Ordering Information

Type No.	Marking	Package Code
STK0765BF	STK0765	TO-220F-3L

### PIN Connection



### Absolute maximum ratings

( $T_c=25^\circ\text{C}$ )

Characteristic	Symbol	Rating	Unit
Drain-source voltage	$V_{DSS}$	650	V
Gate-source voltage	$V_{GSS}$	$\pm 30$	V
Drain current (DC)	$I_D$	( $T_c=25^\circ\text{C}$ )	7
		( $T_c=100^\circ\text{C}$ )	4.4
Drain current (Pulsed) *	$I_{DP}$	28	A
Drain power dissipation	$P_D$	52	W
Single pulsed avalanche energy ②	$E_{AS}$	340	mJ
Avalanche current (Repetitive) ①	$I_{AR}$	5.2	A
Repetitive avalanche energy ①	$E_{AR}$	13	mJ
Junction temperature	$T_J$	150	$^\circ\text{C}$
Storage temperature range	$T_{stg}$	-55~150	

\* Limited by maximum junction temperature

Characteristic		Symbol	Typ.	Max	Unit
Thermal resistance	Junction-case	$R_{th(J-C)}$	-	2.4	$^\circ\text{C}/\text{W}$
	Junction-ambient	$R_{th(J-a)}$	-	62.5	

## Electrical Characteristics

(Tc=25°C)

Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit	
Drain-source breakdown voltage	$BV_{DSS}$	$I_D=250\mu A, V_{GS}=0$	650	-	-	V	
Gate threshold voltage	$V_{GS(th)}$	$I_D=250\mu A, V_{DS}=V_{GS}$	2.0	-	4.0	V	
Drain-source cut-off current	$I_{DSS}$	$V_{DS}=650V, V_{GS}=0V$	-	-	1	$\mu A$	
Gate leakage current	$I_{GSS}$	$V_{DS}=0V, V_{GS}=\pm 30V$	-	-	$\pm 100$	nA	
Drain-source on-resistance ④	$R_{DS(ON)}$	$V_{GS}=10V, I_D=3.5A$	-	1.2	1.6	$\Omega$	
Forward transfer conductance ④	$g_{fs}$	$V_{DS}=10V, I_D=3.5A$	-	8.1	-	S	
Input capacitance	$C_{iss}$	$V_{GS}=0V, V_{DS}=25V, f=1MHz$	-	974	1460	pF	
Output capacitance	$C_{oss}$		-	105	236		
Reverse transfer capacitance	$C_{rss}$		-	13	20		
Turn-on delay time	$t_{d(on)}$	$V_{DD}=300V, I_D=7A$ $R_G=25\Omega$	-	18	-	ns	
Rise time	$t_r$		-	19	-		
Turn-off delay time	$t_{d(off)}$		③④	-	72		-
Fall time	$t_f$		-	28	-		
Total gate charge	$Q_g$	$V_{DS}=300V, V_{GS}=10V$ $I_D=7A$	-	32	48	nC	
Gate-source charge	$Q_{gs}$		③④	-	6.5		9.8
Gate-drain charge	$Q_{gd}$		-	11	17		

## Source-Drain Diode Ratings and Characteristics

(Tc=25°C)

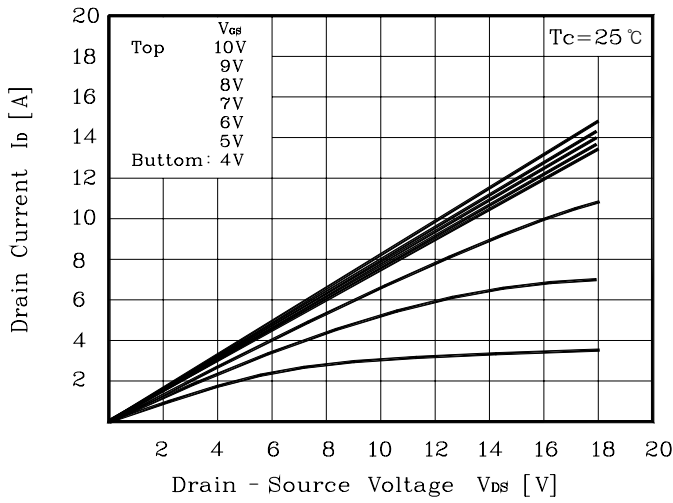
Characteristic	Symbol	Test Condition	Min	Typ	Max	Units
Continuous source current	$I_S$	Integral reverse diode in the MOSFET	-	-	7	A
Pulsed-source current ①	$I_{SM}$		-	-	28	
Forward voltage ④	$V_{SD}$	$V_{GS}=0V, I_S=7A$	-	-	1.4	V
Reverse recovery time	$t_{rr}$	$I_S=7A, V_{GS}=0$ $dI_S/dt=100A/us$	-	648	-	ns
Reverse recovery charge	$Q_{rr}$		-	4.8	-	$\mu C$

Note ;

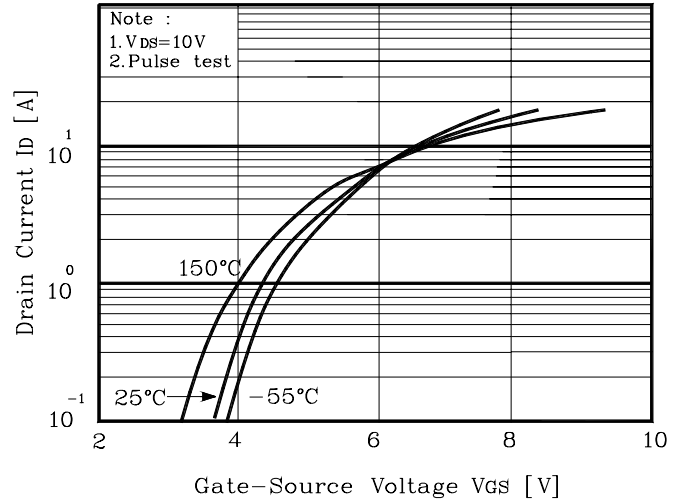
- ① Repetitive Rating : Pulse Width Limited by Maximum Junction Temperature
- ②  $L=10mH, I_{AS}=7A, V_{DD}=50V, R_G=25\Omega$  , starting  $T_J=25^\circ C$
- ③ Pulse Test : Pulse Width < 300us, Duty cycle  $\leq 2\%$
- ④ Essentially independent of operating temperature

## Electrical Characteristic Curves

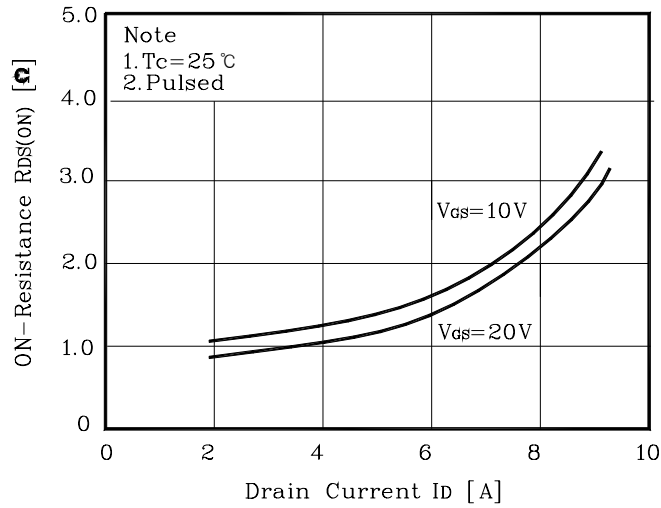
**Fig. 1  $I_D - V_{DS}$**



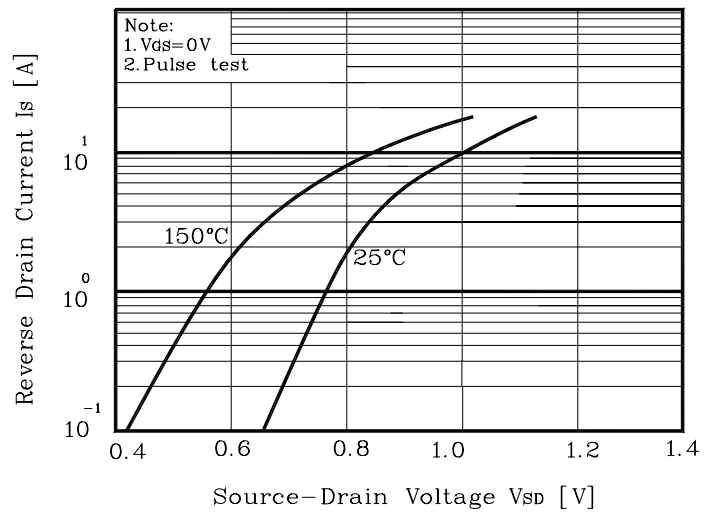
**Fig. 2  $I_D - V_{GS}$**



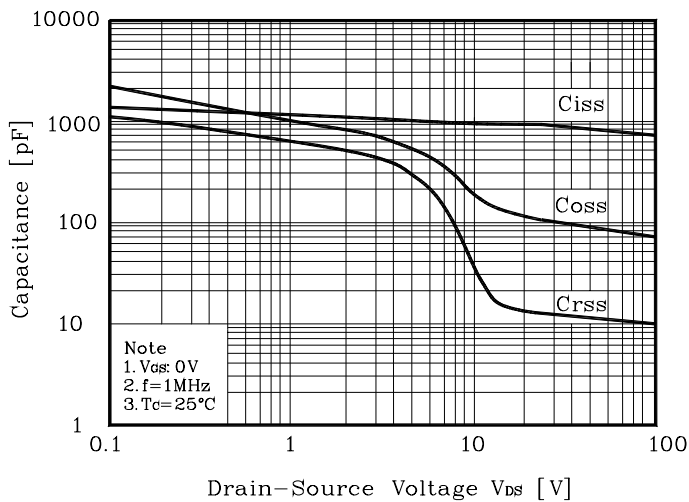
**Fig. 3  $R_{DS(on)} - I_D$**



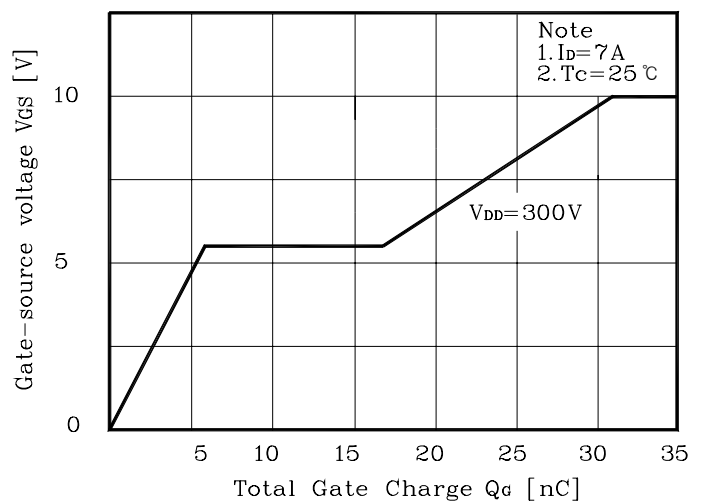
**Fig. 4  $I_S - V_{SD}$**



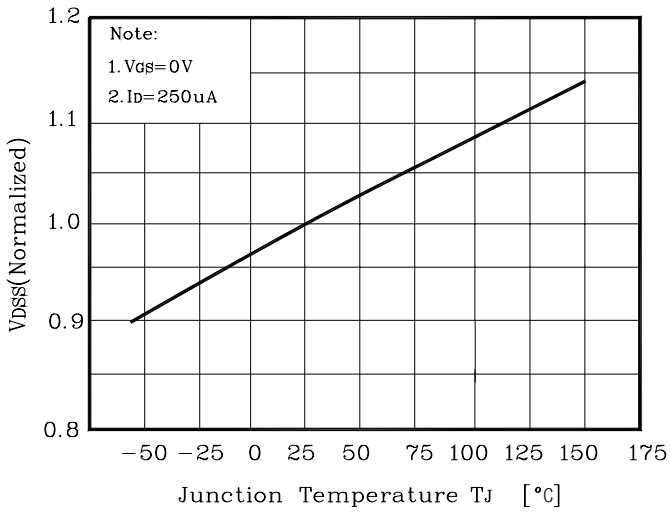
**Fig. 5 Capacitance -  $V_{DS}$**



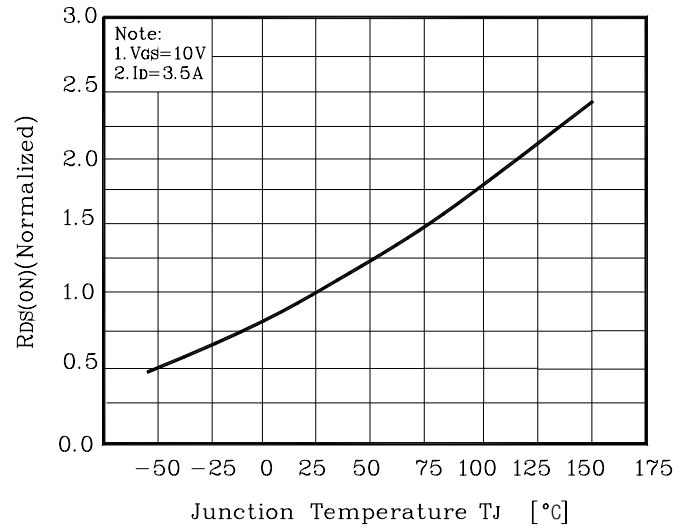
**Fig. 6  $V_{GS} - Q_G$**



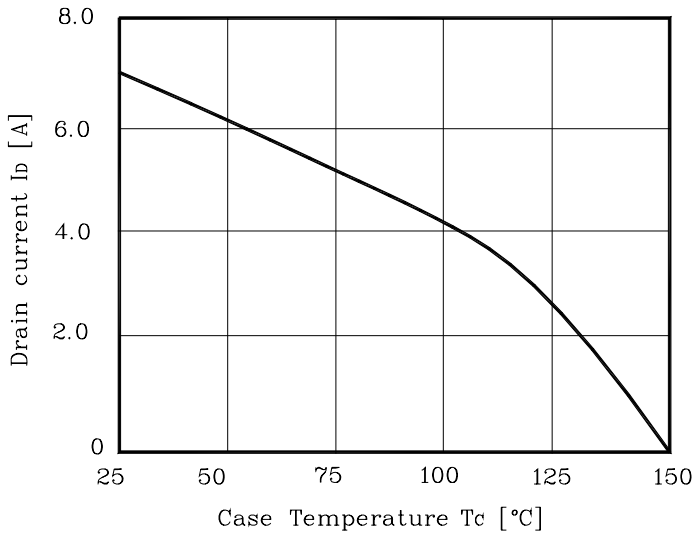
**Fig. 7  $V_{DSS} - T_J$**



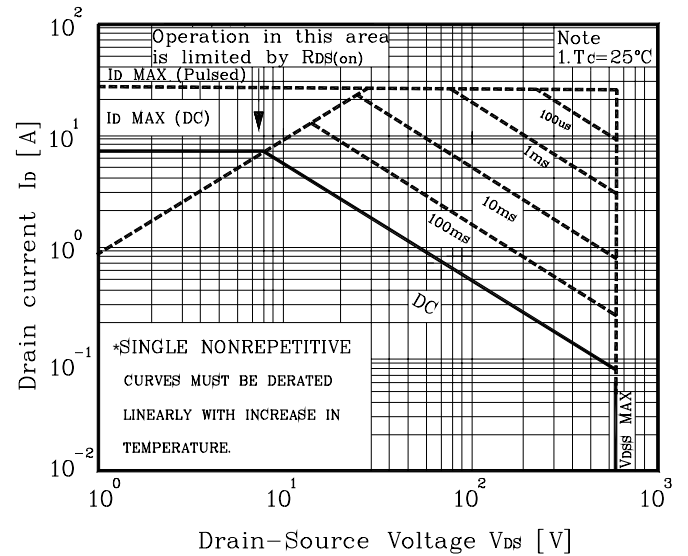
**Fig. 8  $R_{DS(on)} - T_J$**



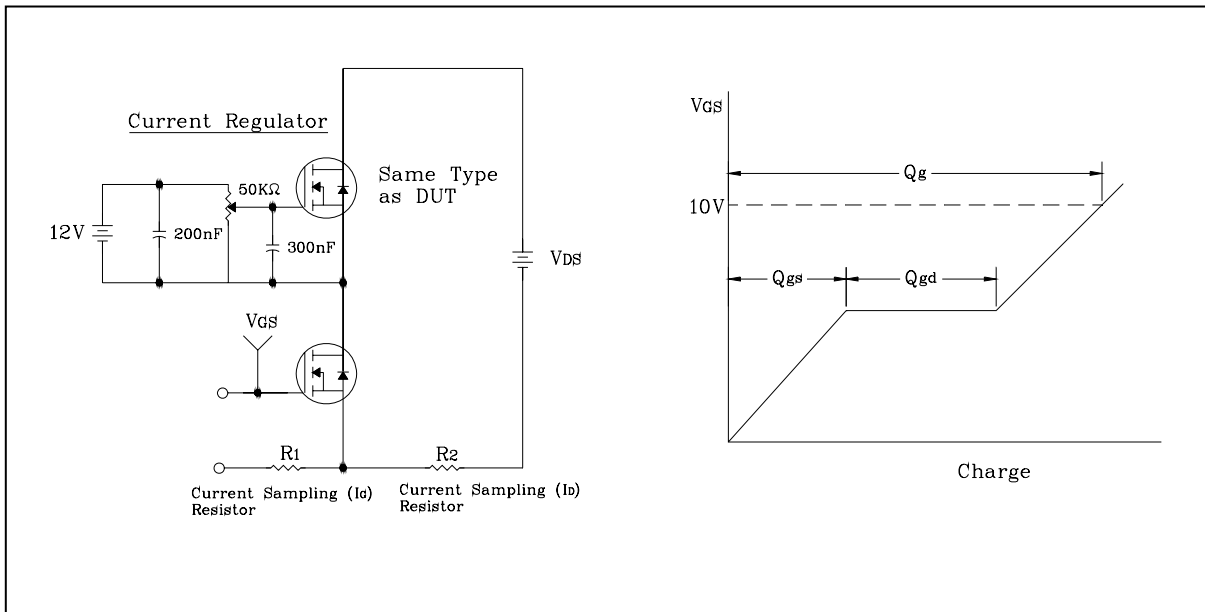
**Fig. 9  $I_D - T_C$**



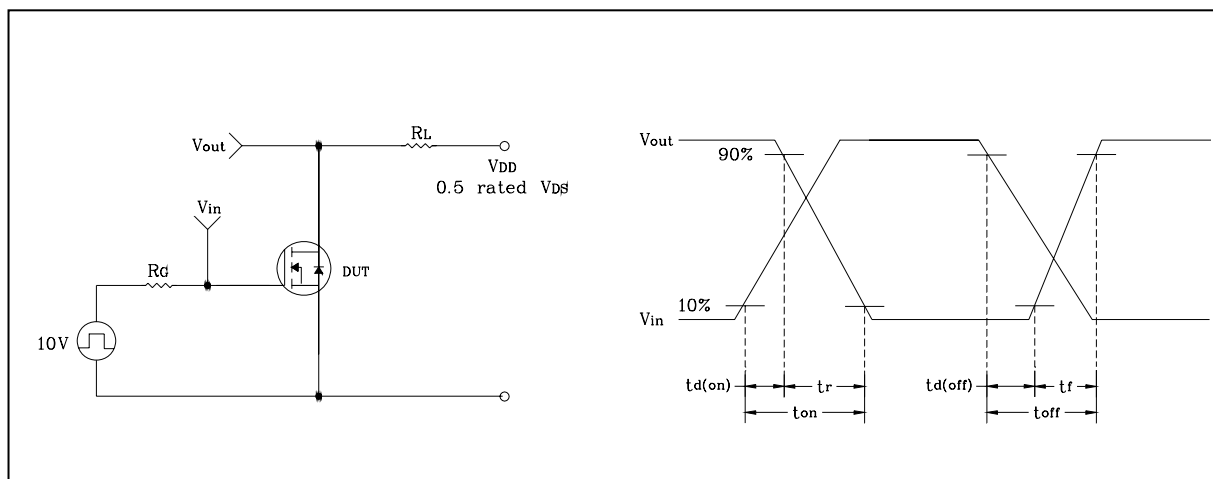
**Fig. 10 Safe Operating Area**



**Fig. 10 Gate Charge Test Circuit & Waveform**



**Fig. 11 Resistive Switching Test Circuit & Waveform**



**Fig. 12 E<sub>AS</sub> Test Circuit & Waveform**

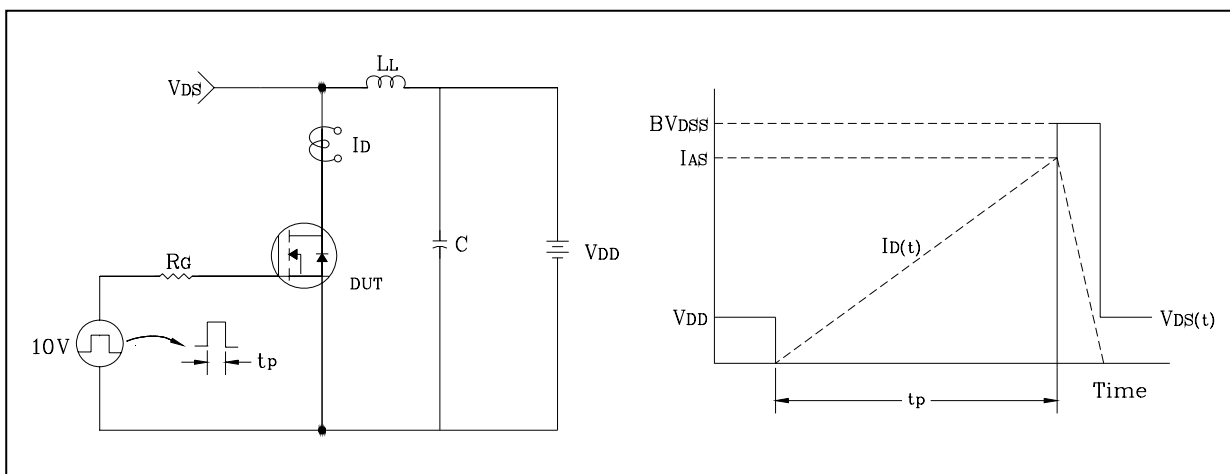
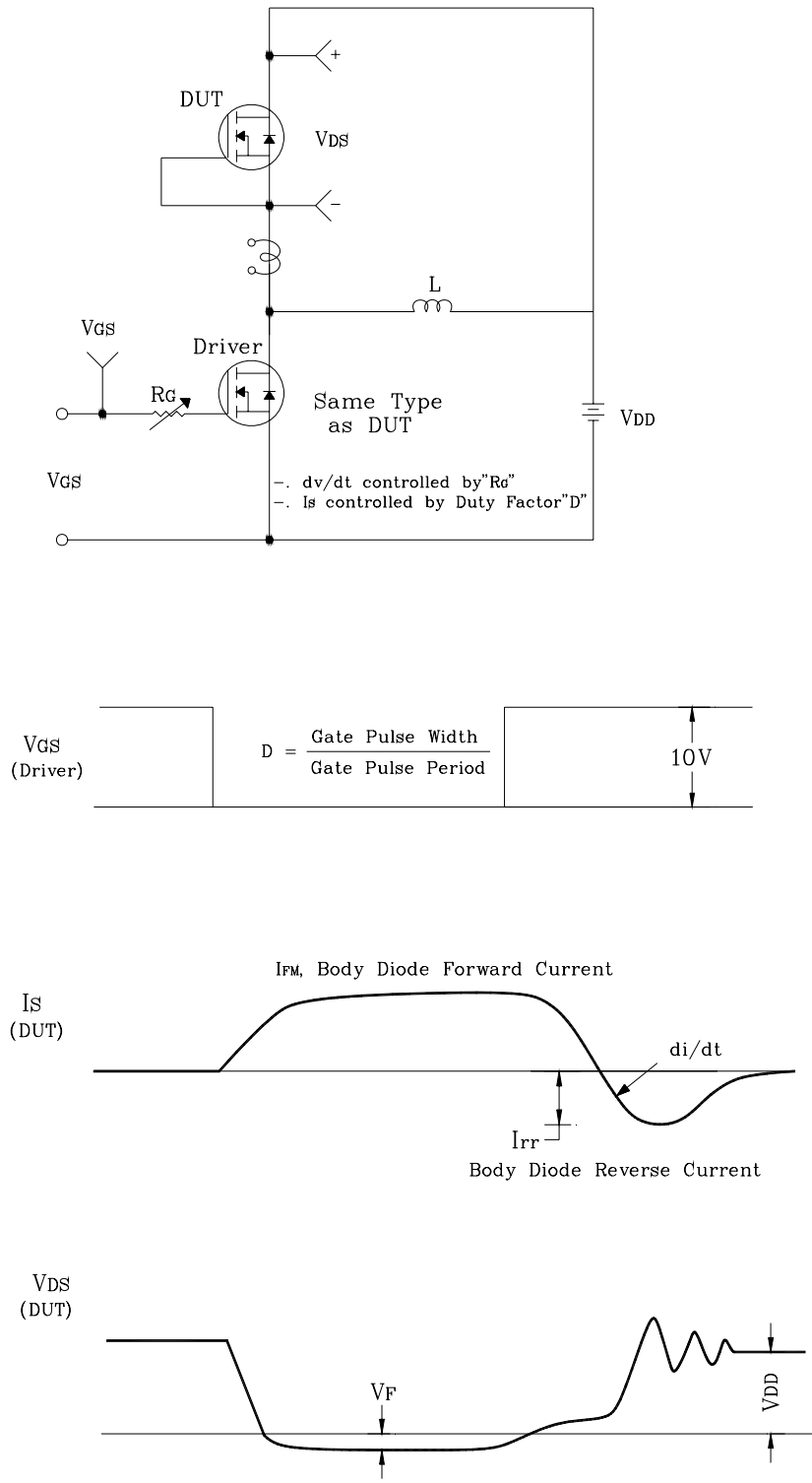
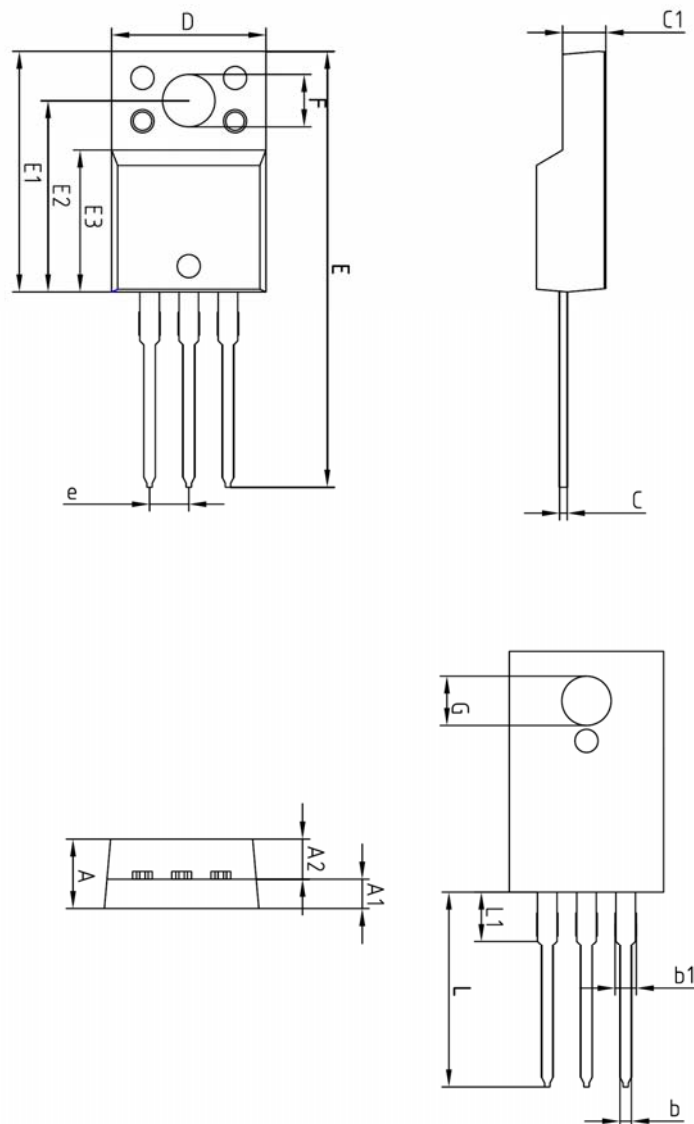


Fig. 13 Diode Reverse Recovery Time Test Circuit & Waveform



## Outline Dimension



SYMBOL	MILLIMETERS			NOTE
	MINIMUM	NOMINAL	MAXIMUM	
A	-	-	4.60	
A1	2.45	2.50	2.55	
A2	1.95	2.00	2.05	
b	0.65	0.75	0.85	
b1	1.07	1.27	1.47	
C	0.40	0.50	0.60	
C1	2.70	2.80	2.90	
D	9.90	10.00	10.10	
E	28.00	-	28.60	
E1	15.50	15.60	15.70	
E2	12.30	12.40	12.50	
E3	9.15	9.20	9.25	
F	3.30	3.40	3.50	
G	3.10	3.20	3.30	
e	2.54 BSC			
L	12.40	-	13.00	
L1	3.46 BSC			

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