

SWITCHING REGULATOR APPLICATIONS

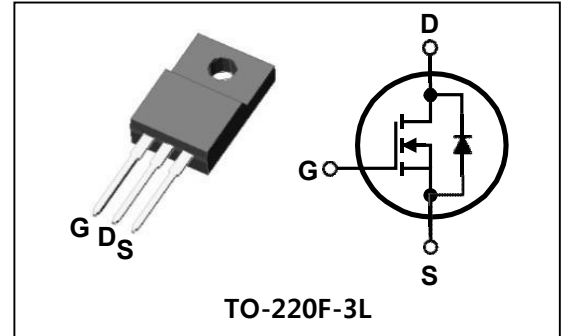
Features

- High Voltage : $BV_{DSS}=650V(\text{Min.})$
- Low C_{RSS} : $C_{RSS}=14.6pF(\text{Typ.})$
- Low gate charge : $Q_g=41nC(\text{Typ.})$
- Low $R_{DS(on)}$: $R_{DS(on)}=0.8\Omega(\text{Max.})$

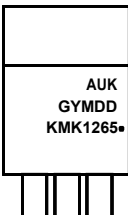
Ordering Information

Type No.	Marking	Package Code
KMK1265F	KMK1265	TO-220F-3L

PIN Connection



Marking Diagram

	<p>Column 1 : Manufacturer</p> <p>Column 2 : Production Information e.g.) GYMDD</p> <p>- . G : Factory management code</p> <p>- . YMDD : Date Code (year, month, date)</p> <p>Column 3 : Device Code • Dalian</p>
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Absolute maximum ratings ($T_C=25\text{ }^\circ\text{C}$ unless otherwise noted)

Characteristic	Symbol	Rating	Unit	
Drain-source voltage	V_{DSS}	650	V	
Gate-source voltage	V_{GSS}	± 30	V	
Drain current (DC) *	I_D	$T_C=25\text{ }^\circ\text{C}$	12	A
		$T_C=100\text{ }^\circ\text{C}$	4.5	A
Drain current (Pulsed) *	I_{DM}	48	A	
Power dissipation	P_D	45	W	
Avalanche current (Single) ②	I_{AS}	12	A	
Single pulsed avalanche energy ②	E_{AS}	140	mJ	
Avalanche current (Repetitive) ①	I_{AR}	12	A	
Repetitive avalanche energy ①	E_{AR}	7.6	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	$R_{th(J-C)}$	-	2.7	$^\circ\text{C/W}$
	Junction-ambient	$R_{th(J-A)}$	-	62.5	

Electrical Characteristics ($T_C=25\text{ C}$ unless otherwise noted)

Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit	
Drain-source breakdown voltage	BV_{DSS}	$I_D=250\mu A, V_{GS}=0V$	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	μA	
Gate leakage current	I_{GSS}	$V_{DS}=0V, V_{GS}=\pm 30V$	-	-	± 100	nA	
Drain-source on-resistance ④	$R_{DS(on)}$	$V_{GS}=10V, I_D=6.0A$	-	0.68	0.80	Ω	
Forward transfer conductance ④	g_{fs}	$V_{DS}=10V, I_D=6.0A$	-	10	-	S	
Input capacitance	C_{iss}	$V_{GS}=0V, V_{DS}=25V$ $f=1\text{ MHz}$	-	2162	2882	pF	
Output capacitance	C_{oss}		-	183	244		
Reverse transfer capacitance	C_{rss}		-	14.6	19.4		
Turn-on delay time	$t_{d(on)}$	$V_{DD}=300V, I_D=12A$ $R_G=25\Omega$	-	30	-	ns	
Rise time	t_r		-	85	-		
Turn-off delay time	$t_{d(off)}$		③④	-	140		-
Fall time	t_f		-	90	-		
Total gate charge	Q_g	$V_{DS}=520V, V_{GS}=10V$ $I_D=12A$	-	43	65	nC	
Gate-source charge	Q_{gs}		③④	-	13		-
Gate-drain charge	Q_{gd}		-	10.5	-		

Source-Drain Diode Ratings and Characteristics ($T_C=25\text{ C}$ unless otherwise noted)

Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Source current (DC)	I_S	Integral reverse diode in the MOSFET	-	-	12	A
Source current (Pulsed) ①	I_{SM}		-	-	48	
Forward voltage ④	V_{SD}	$V_{GS}=0V, I_S=12A$	-	-	1.4	V
Reverse recovery time	t_{rr}	$I_S=12A, V_{GS}=0V$ $dI_F/dt=100A/\mu s$	-	500	-	ns
Reverse recovery charge	Q_{rr}		-	4.3	-	μC

Note ;

- ① Repetitive rating : Pulse width limited by maximum junction temperature
- ② $L=1.8mH, I_{AS}=12A, V_{DD}=50V, R_G=25\Omega, \text{Starting } T_J=25\text{ }^\circ\text{C}$
- ③ Pulse Test : Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$
- ④ Essentially independent of operating temperature

Electrical Characteristic Curves

Fig. 1 $I_D - V_{DS}$

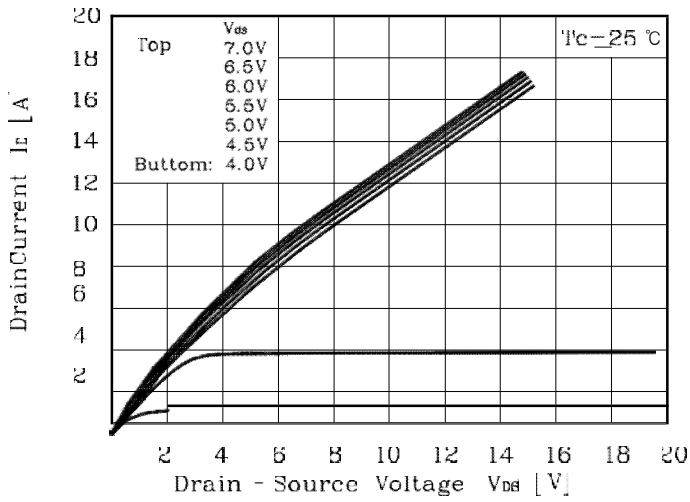


Fig. 2 $I_D - V_{GS}$

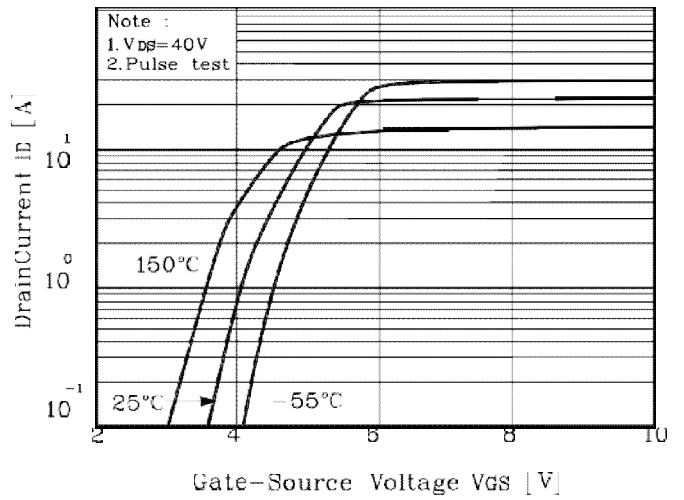


Fig. 3 $R_{DS(on)} - I_D$

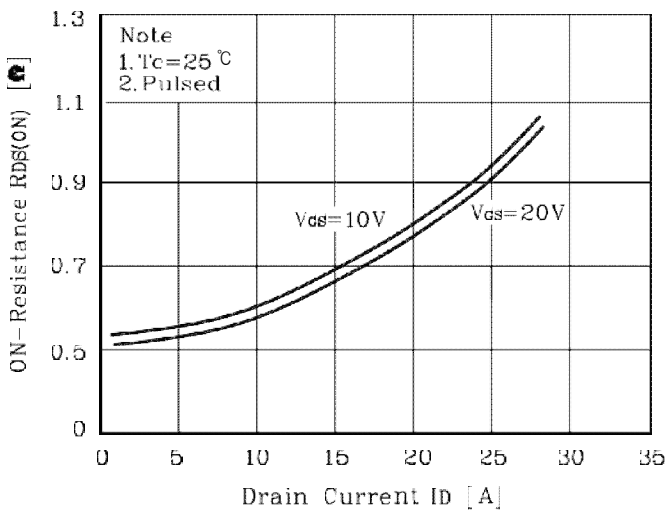


Fig. 4 $I_S - V_{SD}$

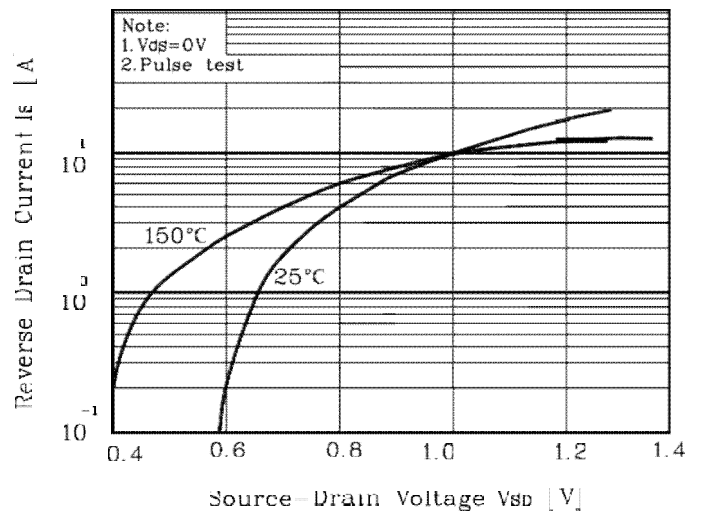


Fig. 5 Capacitance - V_{DS}

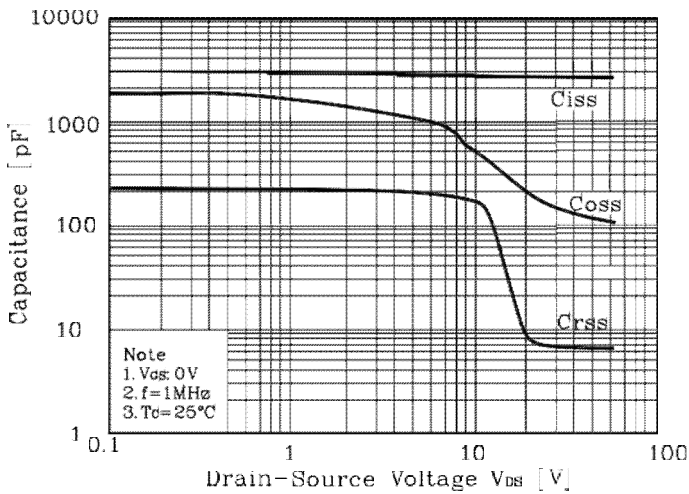
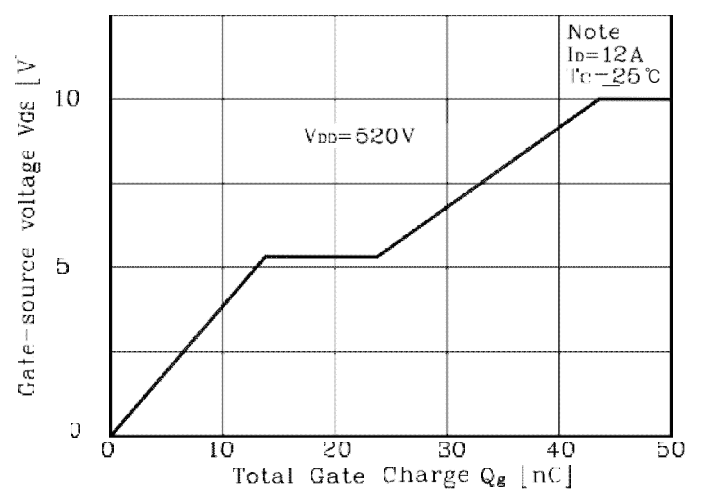


Fig. 6 $V_{GS} - Q_g$



Electrical Characteristic Curves

Fig. 7 $V_{DSS} - T_J$

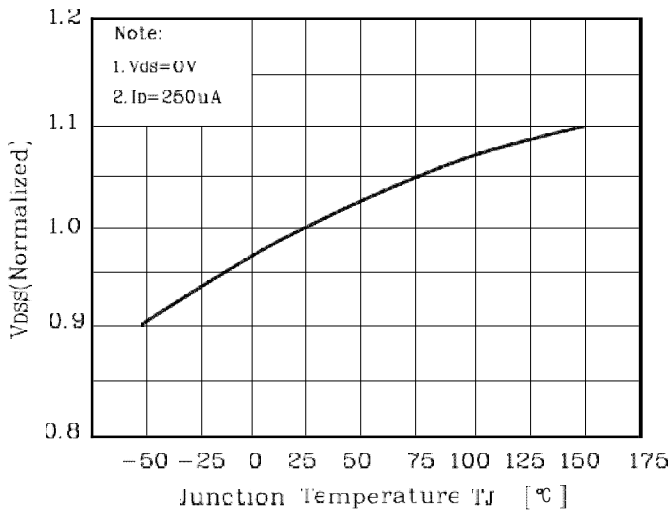


Fig.8 $R_{DS(on)} - T_J$

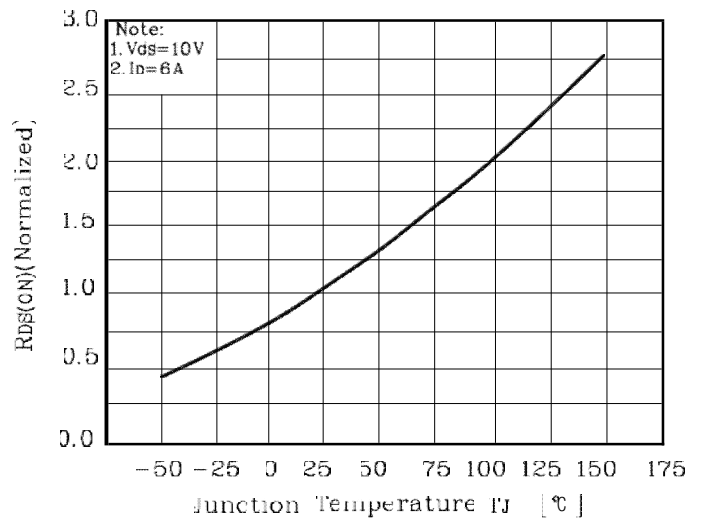


Fig. 9 $I_D - T_C$

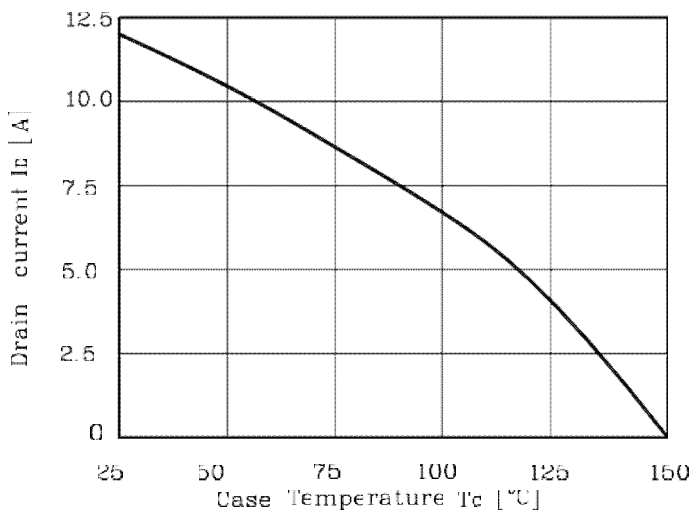


Fig. 10 Safe Operating Area

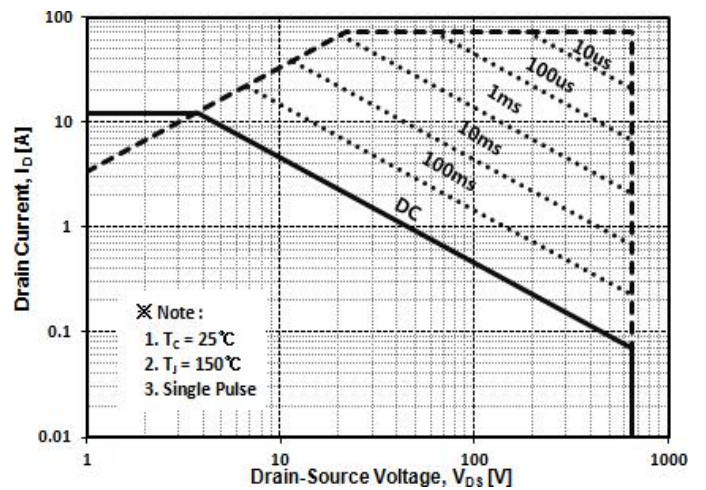


Fig. 11 Gate Charge Test Circuit & Waveform

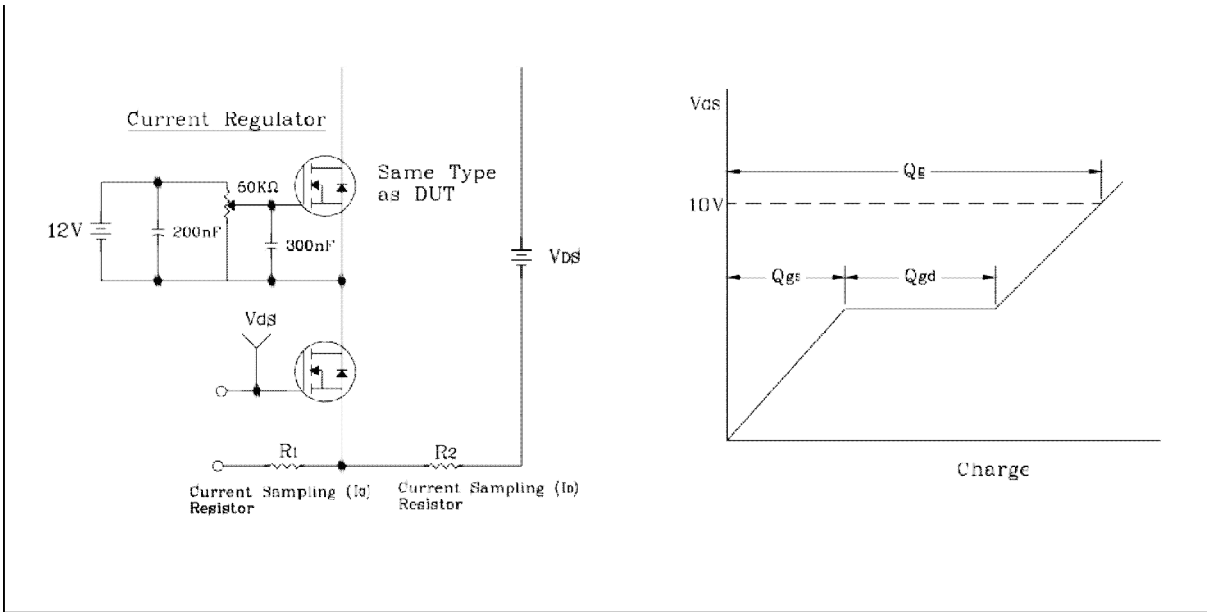


Fig. 12 Resistive Switching Test Circuit & Waveform

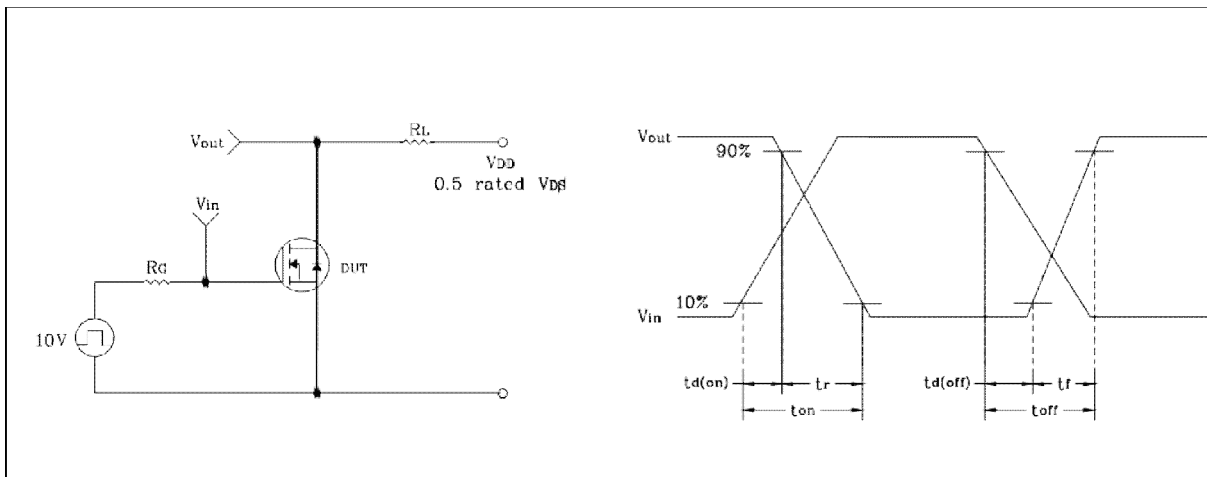


Fig. 13 EAS Test Circuit & Waveform

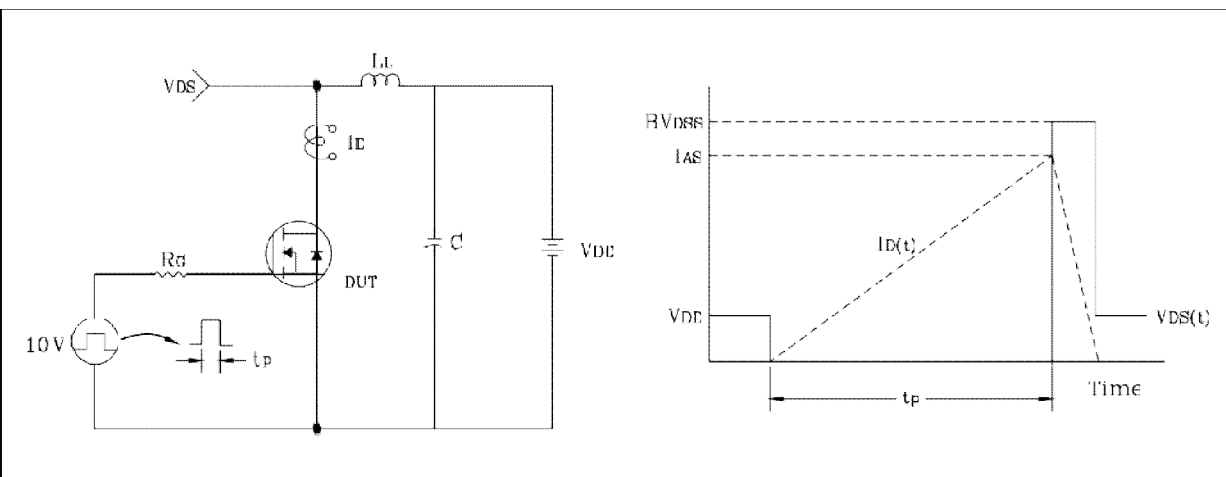
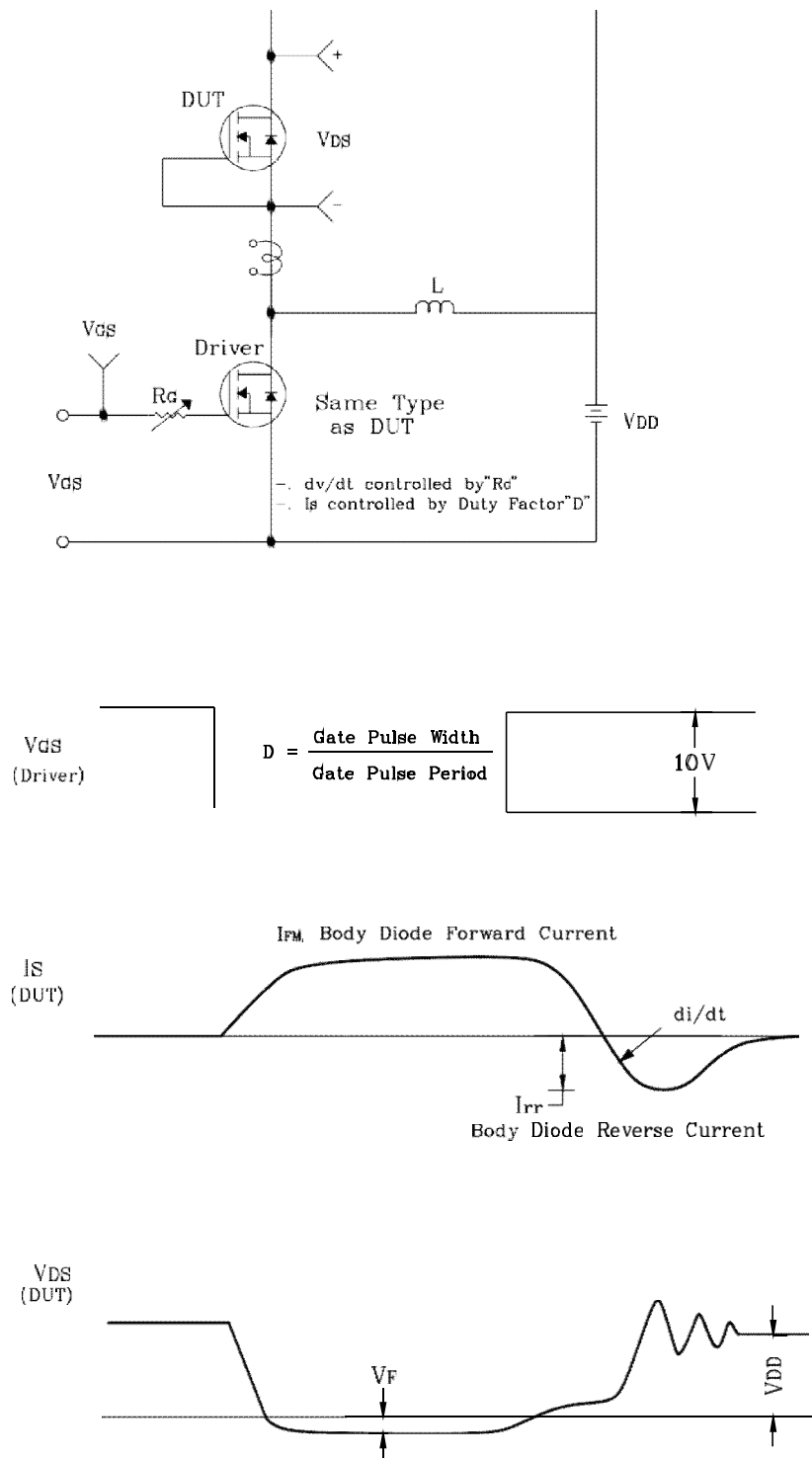
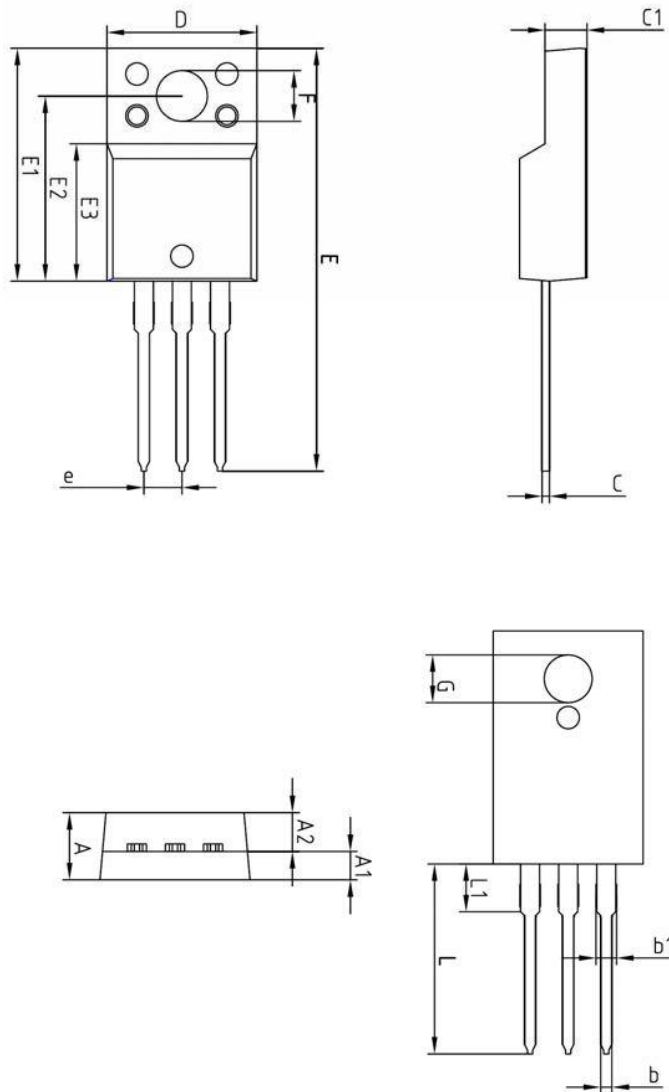


Fig. 14 Diode Reverse Recovery Time Test Circuit & Waveform



Outline Dimension

unit: mm



SYMBOL	MILLIMETERS			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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