KODENSHI AUK

SMK0160D

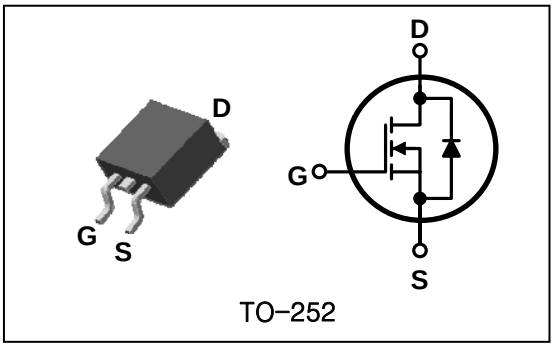
Advanced N-Ch Power MOSFET

SWITCHING REGULATOR APPLICATIONS

Features

- High Voltage : BV_{DSS}=600V(Min.)
- Low C_{rss} : C_{rss}=3.4pF(Typ.)
- Low gate charge : Qg=3.9nC(Typ.)
- Low $R_{DS(on)}$: $R_{DS(on)}$=11.5Ω(Max.)

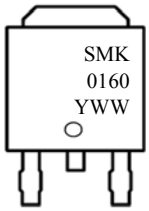
PIN Connection



Ordering Information

Type No.	Marking	Package Code
SMK0160D	SMK0160	TO-252

Marking Diagram



Column 1,2 : Device Code

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

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

Characteristic		Symbol		Rating	Unit
Drain-source voltage		V_{DSS}		600	V
Gate-source voltage		V_{GSS}		±30	V
Drain current (DC) *		I_D	(Tc=25℃)	1.0	A
			(Tc=100℃)	0.77	A
Drain current (Pulsed) *		I_{DM}		4.0	A
Power dissipation		P_D		28	W
Avalanche current (Single)	②	I_{AS}		1.0	A
Single pulsed avalanche energy	②	E_{AS}		22	mJ
Avalanche current (Repetitive)	①	I_{AR}		1.0	A
Repetitive avalanche energy	①	E_{AR}		2.5	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	°C/W
	Junction-ambient	$R_{th(J-A)}$	-	62.5	

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	600	-	-	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}=600V, 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=0.5A	-	9.3	11.5	Ω
Forward transfer conductance ④	g_{fs}	V_{DS}=10V, I_D=0.5A	-	0.32	-	S
Input capacitance	Ciss	V_{GS}=0V, V_{DS}=25V, f=1MHz	-	131	164	pF
Output capacitance	Coss		-	19.4	24.3	
Reverse transfer capacitance	Crss		-	3.4	4.3	
Turn-on delay time	$t_{d(on)}$	V_{DD}=300V, I_D=1.0A R_G=25Ω ③④	-	5.5	-	ns
Rise time	t_r		-	5	-	
Turn-off delay time	$t_{d(off)}$		-	13	-	
Fall time	t_f		-	28	-	
Total gate charge	Q_g	V_{DS}=480V, V_{GS}=10V I_D=1.0A ③④	-	3.9	4.9	nC
Gate-source charge	Q_{gs}		-	1.7	-	
Gate-drain charge	Q_{gd}		-	0.85	-	

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	-	-	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_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=1080mH, I_{AS}=0.3A, V_{DD}=50V, R_G=25Ω, Starting T_J=25℃

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

④ Essentially independent of operating temperature

Electrical Characteristic Curves

Fig. 1 I_D - V_{DS}

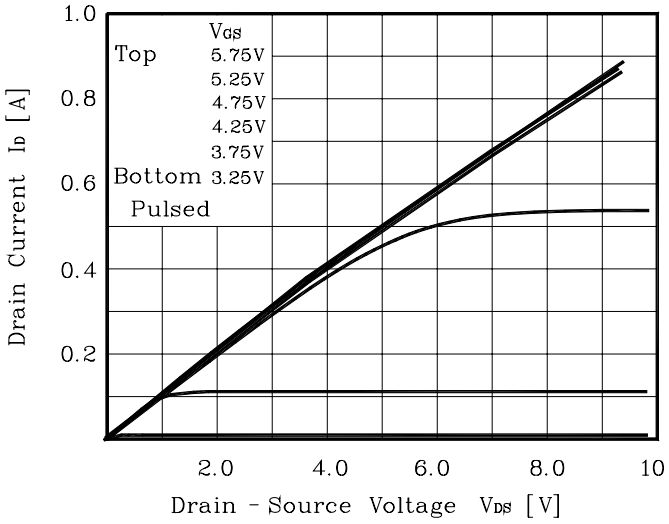


Fig. 2 I_D - V_{GS}

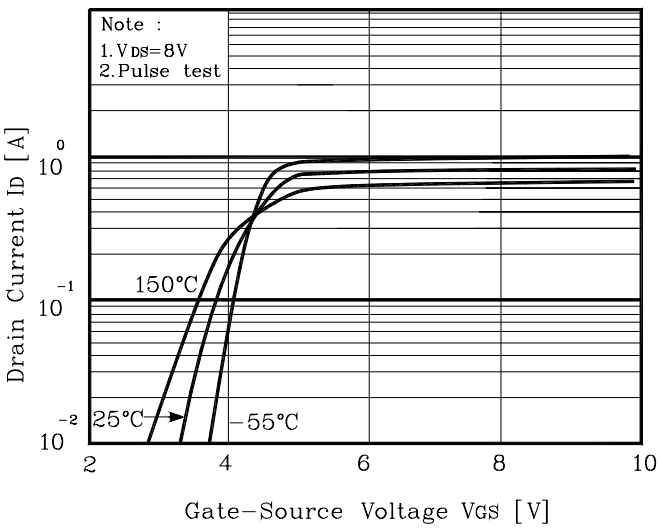


Fig. 3 $R_{DS(on)}$ - I_D

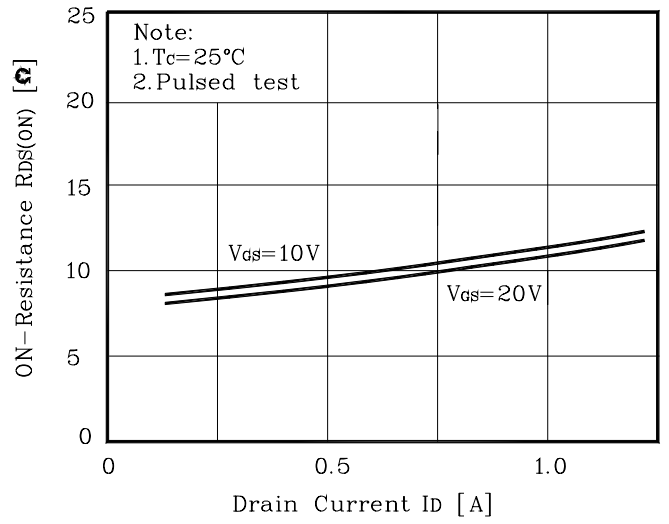


Fig. 4 I_S - V_{SD}

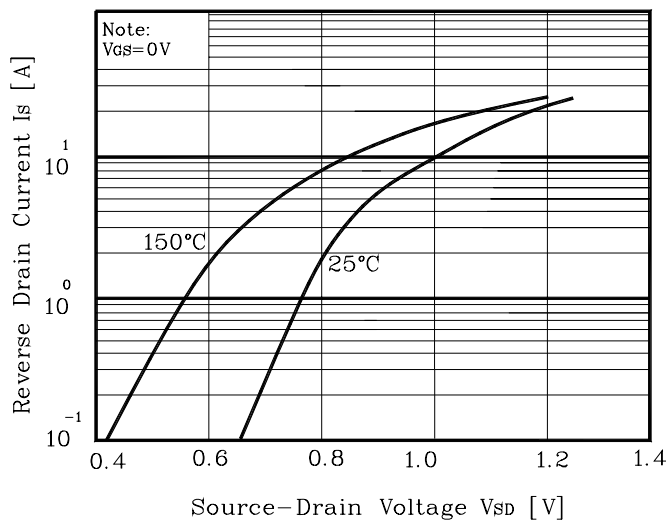


Fig. 5 Capacitance - V_{DS}

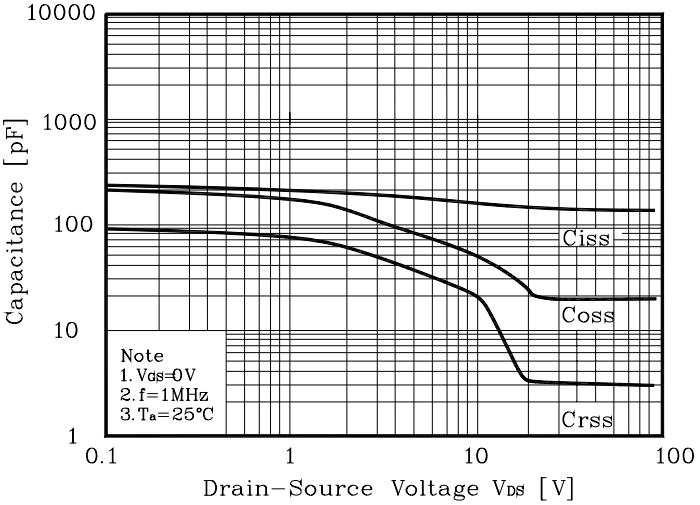


Fig. 6 V_{GS} - Q_G

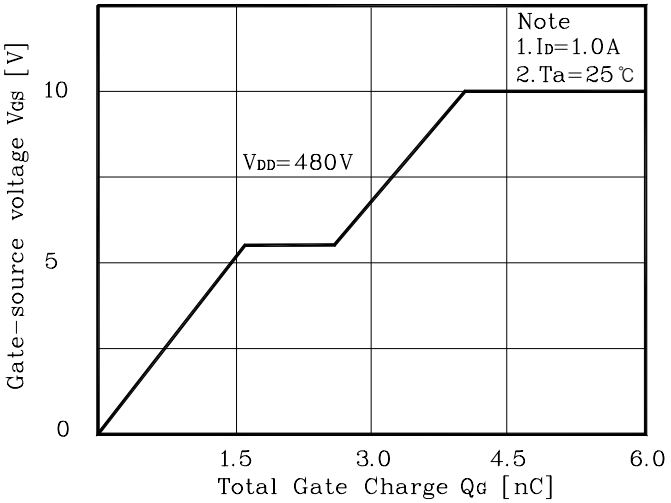


Fig. 7 V_{DSS} - T_J

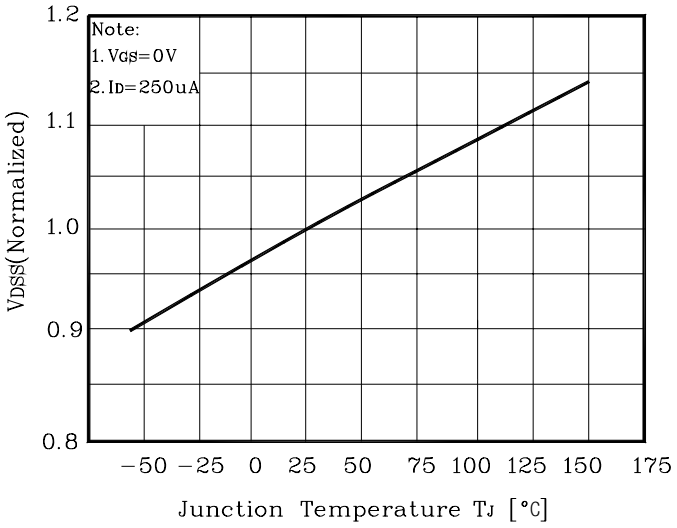


Fig. 8 $R_{DS(on)}$ - T_J

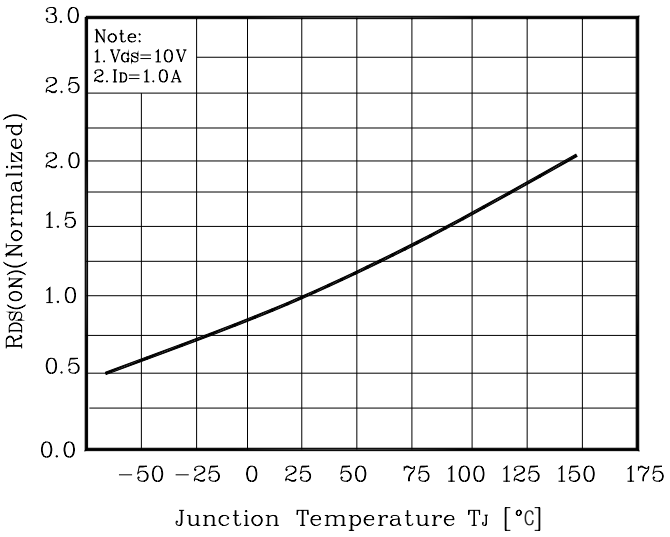


Fig. 9 I_D - T_a

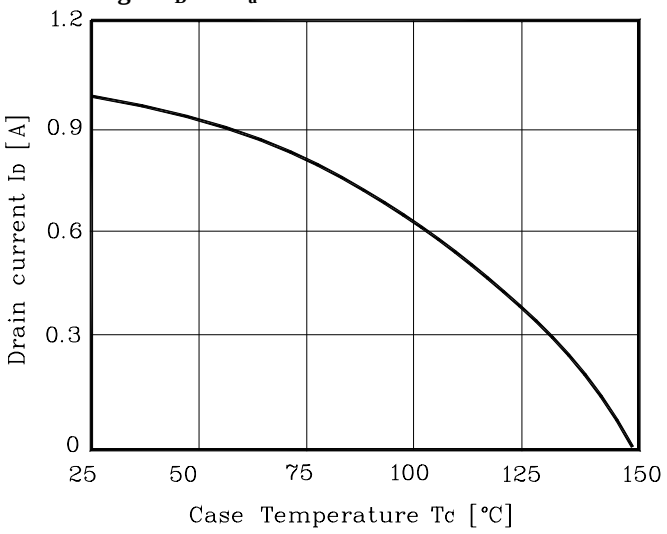


Fig. 10 Safe Operating Area

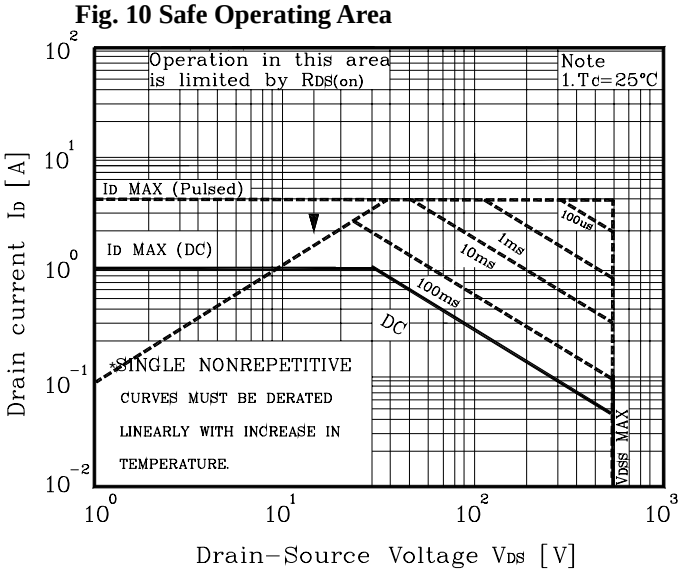


Fig. 11 Gate Charge Test Circuit & Waveform

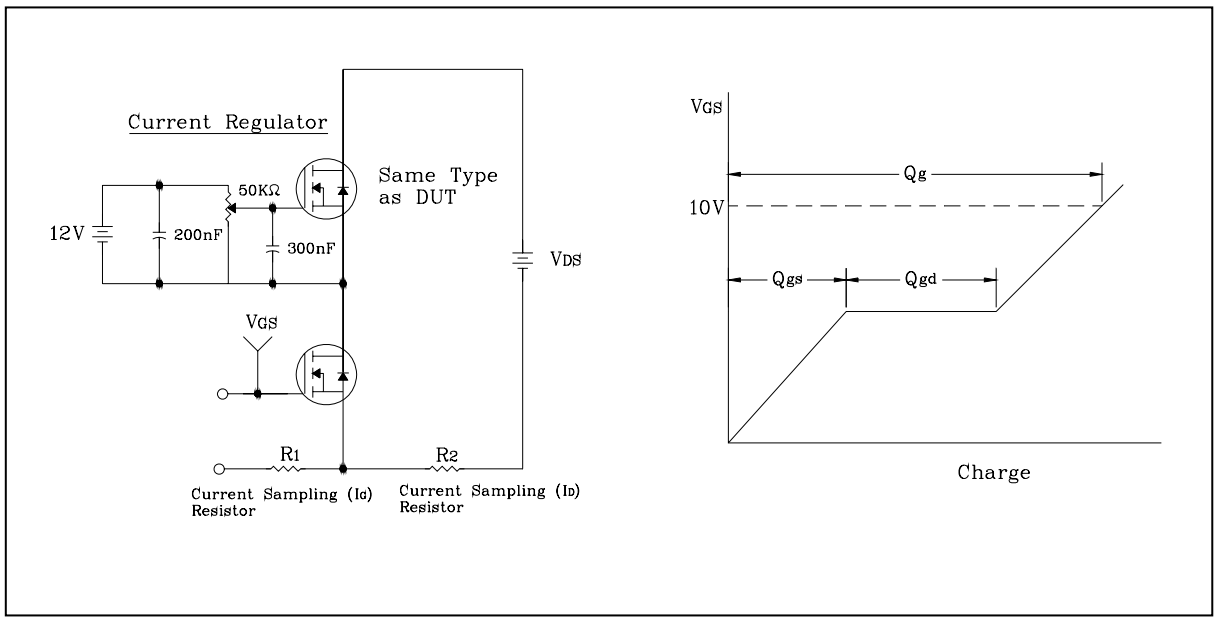


Fig. 12 Resistive Switching Test Circuit & Waveform

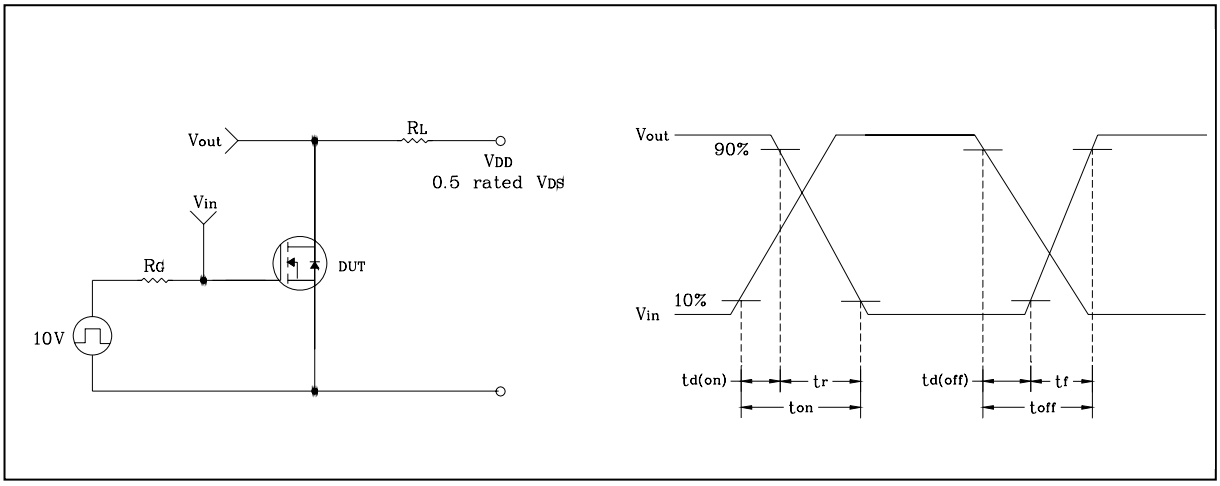


Fig. 13 E_{AS} Test Circuit & Waveform

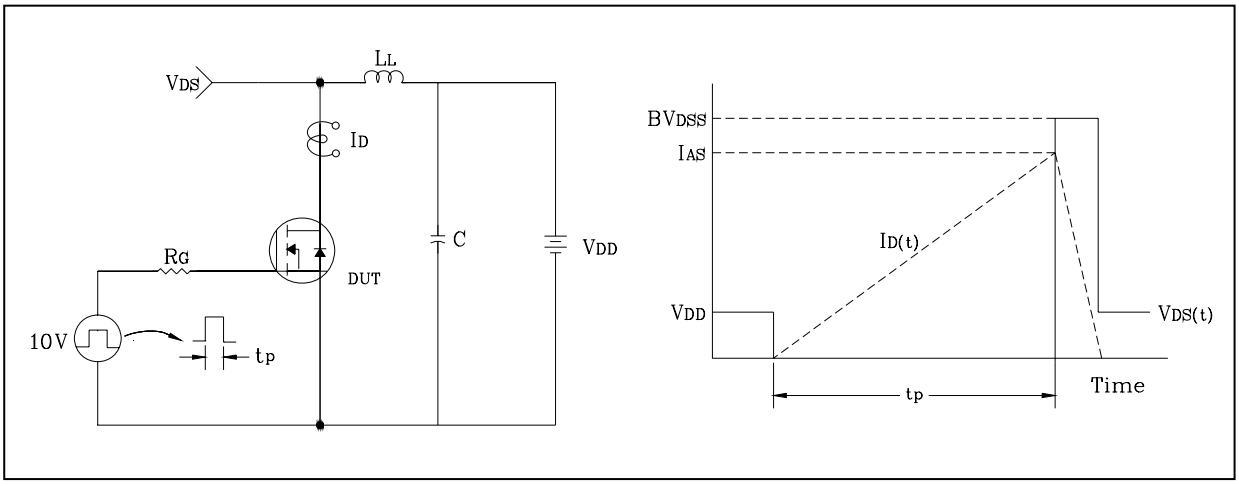
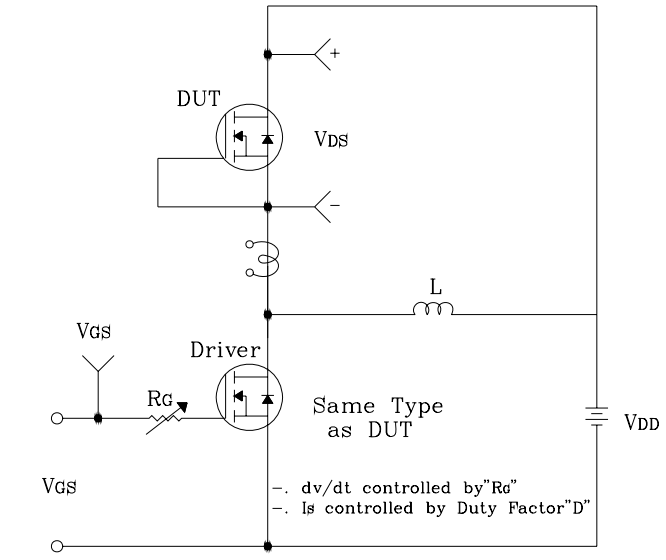
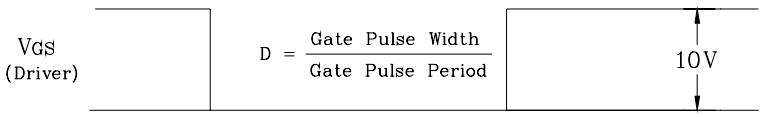
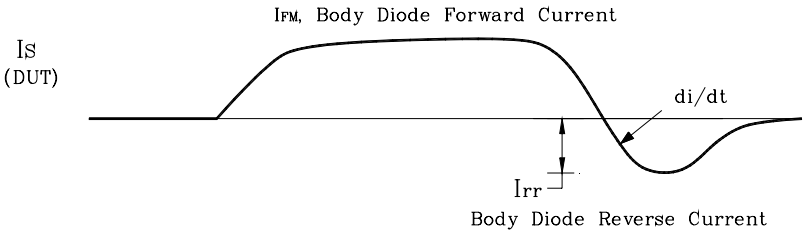
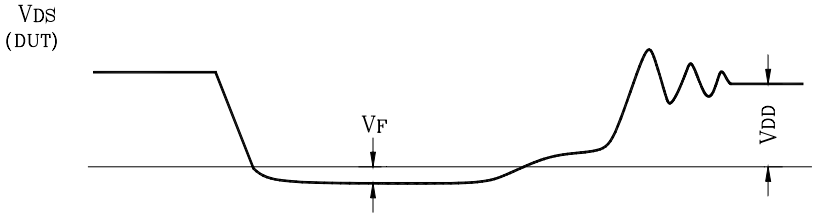


Fig. 14 Diode Reverse Recovery Time Test Circuit & Waveform



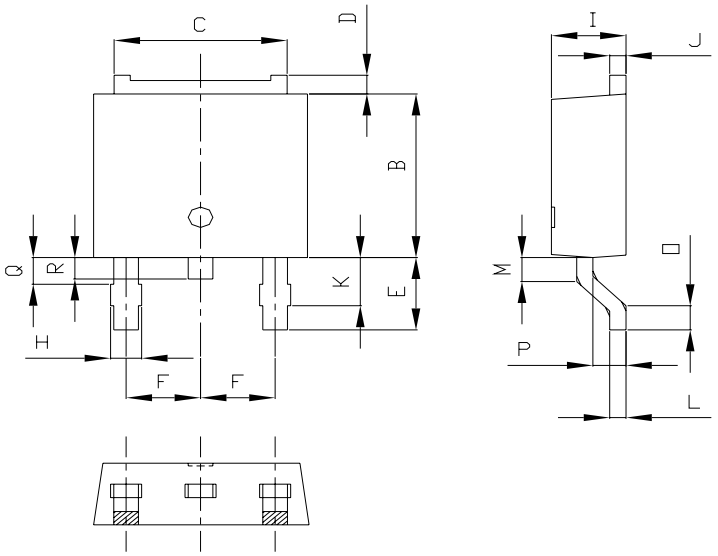






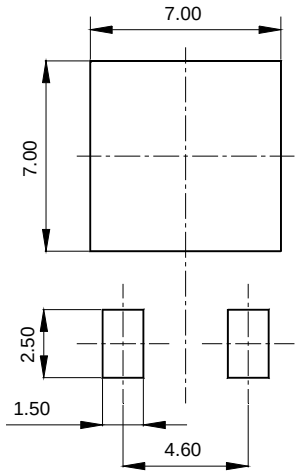
Outline Dimension

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	2.50	2.70	2.90	
F	2.10	2.30	2.50	
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	0.81	0.91	1.01	
O	0.80	0.90	1.00	
P	0.90	1.00	1.10	
Q	0.95 MAX			
R	0.60	0.80	1.00	

Recommended Land Pattern [unit: mm]



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