KODENSHI AUK

SMK630D

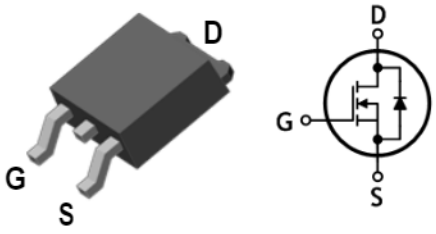
Advanced N-Ch Power MOSFET

DC-DC CONVERTER APPLICATION

HIGH VOLTAGE SWITCHING APPLICATIONS

Features

- High Voltage : BV_{DSS}=200V(Min.)
- Low C_{rss} : C_{rss}=24pF(Typ.)
- Low gate charge : Qg=12nC(Typ.)
- Low $R_{DS(on)}$: $R_{DS(on)}$=0.4Ω(Max.)

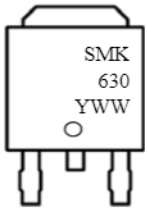


TO-252

Ordering Information

Type No.	Marking	Package Code
SMK630D	SMK630	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}		200	V
Gate-source voltage	V_{GSS}		±30	V
Drain current (DC) *	I_D	(Tc=25℃)	9	A
		(Tc=100℃)	5.7	A
Drain current (Pulsed) *	I_{DM}		36	A
Power dissipation	P_D		45	W
Avalanche current (Single) ②	I_{AS}		9	A
Single pulsed avalanche energy ②	E_{AS}		232	mJ
Avalanche current (Repetitive) ①	I_{AR}		9	A
Repetitive avalanche energy ①	E_{AR}		9.5	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	$R_{th(J-C)}$	-	2.77	°C/W
	Junction-ambient **	$R_{th(J-A)}$	-	50	

** When mounted on the minimum pad size recommended (PCB Mount)

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	200	-	-	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}=200V, 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=4.5A	-	0.34	0.40	Ω
Forward transfer conductance ④	g_{fs}	V_{DS}=10V, I_D=4.5A	-	5.5	-	S
Input capacitance	Ciss	V_{GS}=0V, V_{DS}=25V, f=1MHz	-	420	525	pF
Output capacitance	Coss		-	99	128	
Reverse transfer capacitance	Crss		-	24	28	
Turn-on delay time	$t_{d(on)}$	V_{DD}=100V, I_D=9A R_G=25Ω ③④	-	11	-	ns
Rise time	t_r		-	92	-	
Turn-off delay time	$t_{d(off)}$		-	70	-	
Fall time	t_f		-	72	-	
Total gate charge	Q_g	V_{DS}=160V, V_{GS}=10V I_D=9A ③④	-	12	17	nC
Gate-source charge	Q_{gs}		-	2.4	-	
Gate-drain charge	Q_{gd}		-	3.5	-	

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	-	-	9	A
Source current (Pulsed) ①	I_{SM}		-	-	36	
Forward voltage ④	V_{SD}	V_{GS}=0V, I_S=9A	-	-	1.4	V
Reverse recovery time	t_{rr}	I_S=9A, V_{GS}=0V dI_F/dt=100A/us	-	158	-	ns
Reverse recovery charge	Q_{rr}		-	0.97	-	uC

Note ;

① Repetitive rating : Pulse width limited by maximum junction temperature

② L=4.3mH, I_{AS}=9A, 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

Typical Characteristic Curves

Fig. 1 I_D - V_{DS}

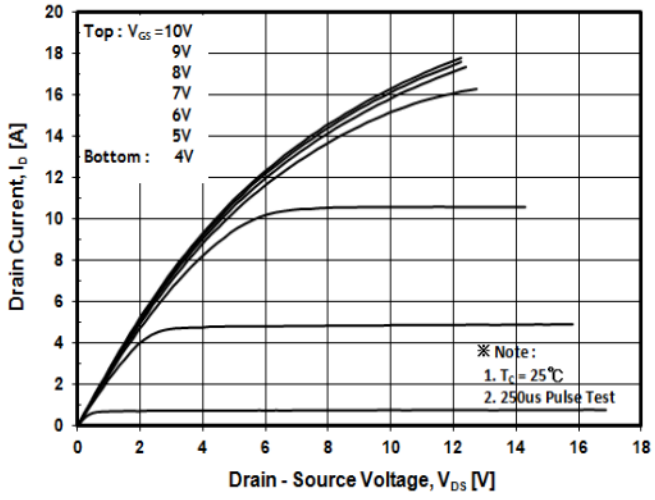


Fig. 2 I_D - V_{GS}

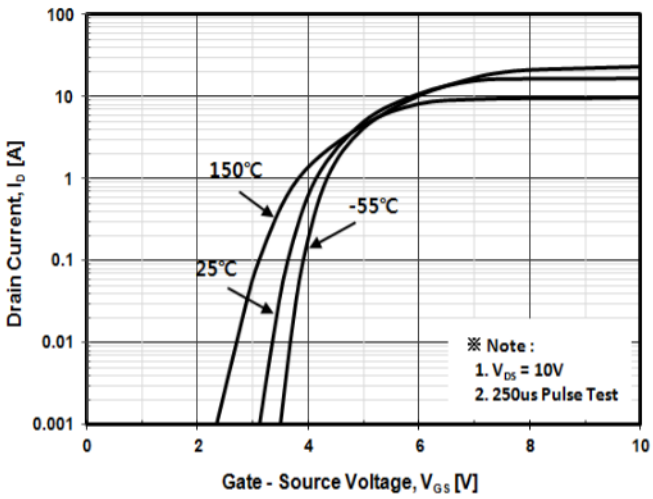


Fig. 3 $R_{DS(on)}$ - I_D

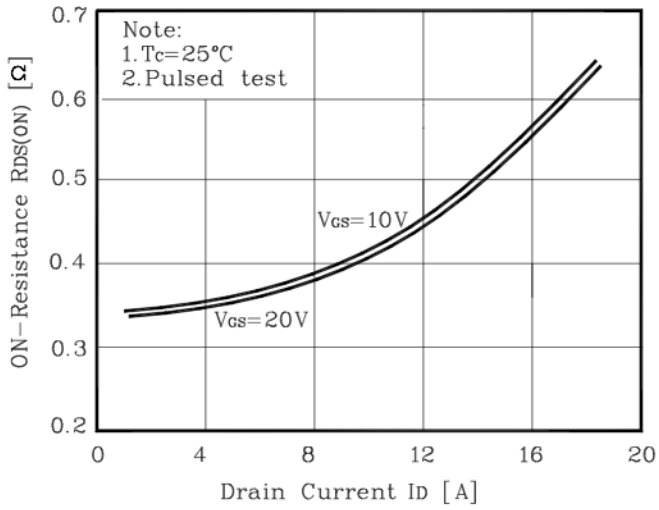


Fig. 4 I_S - V_{SD}

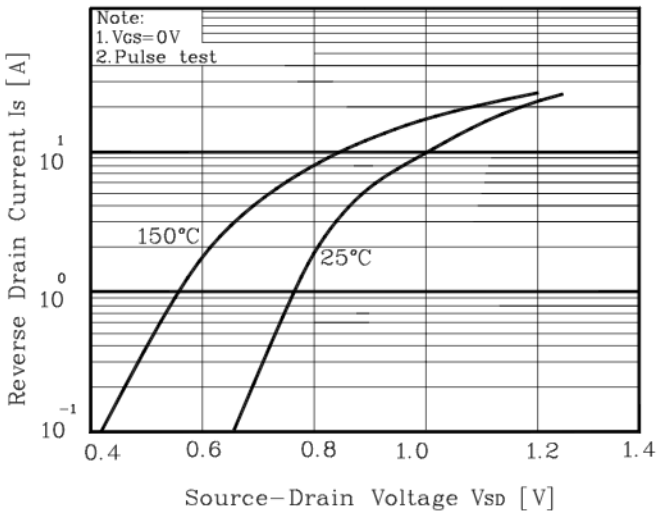


Fig. 5 Capacitance - V_{DS}

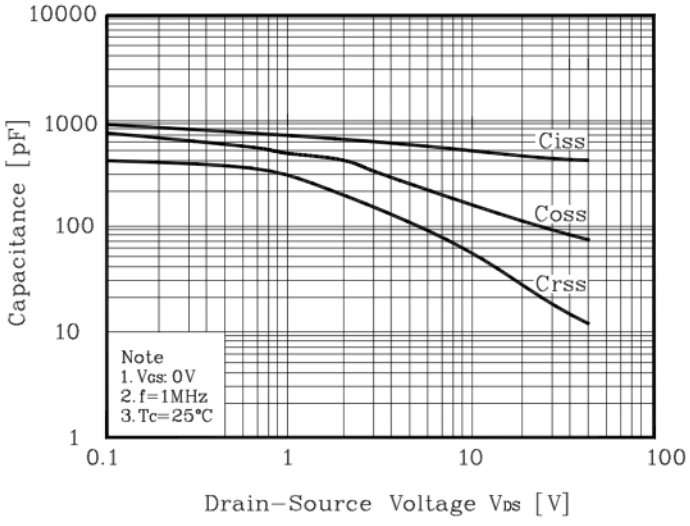


Fig. 6 V_{GS} - Q_G

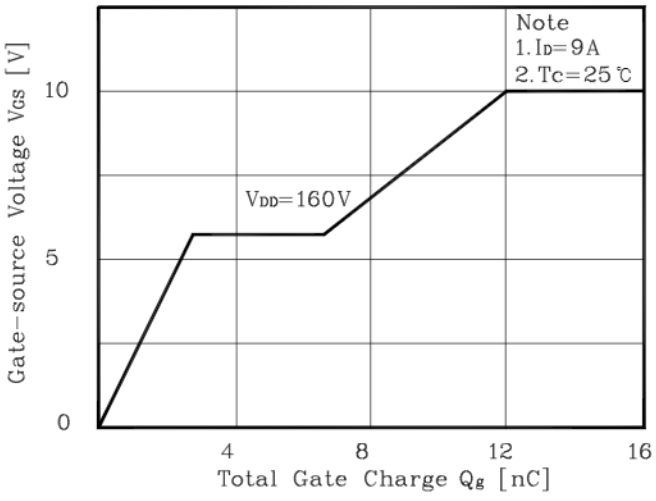


Fig. 7 V_{DSS} - T_J

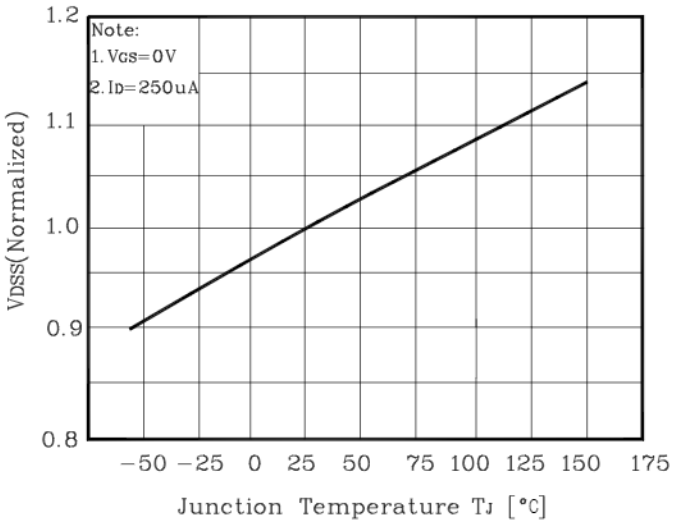


Fig. 8 $R_{DS(on)}$ - T_J

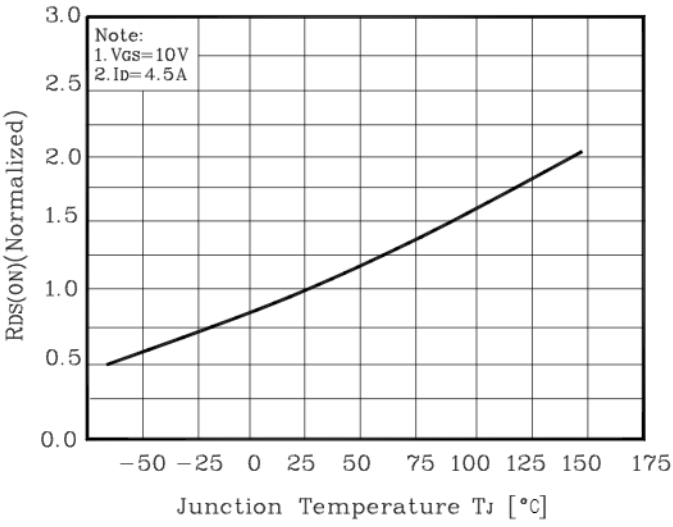


Fig. 9 I_D - T_C

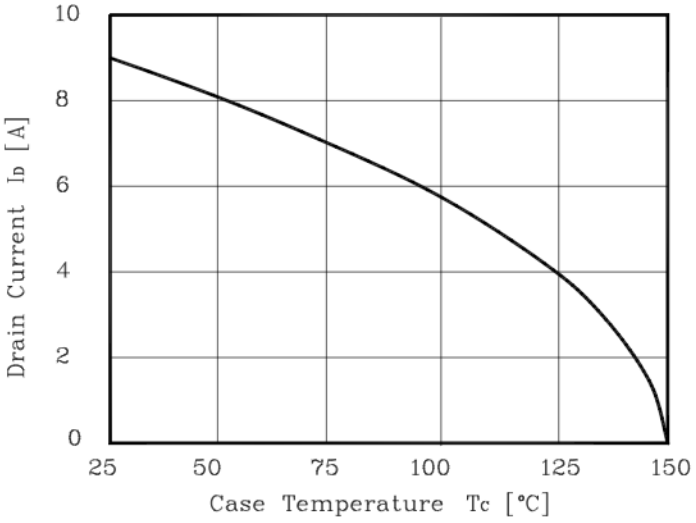


Fig. 10 Safe Operating Area

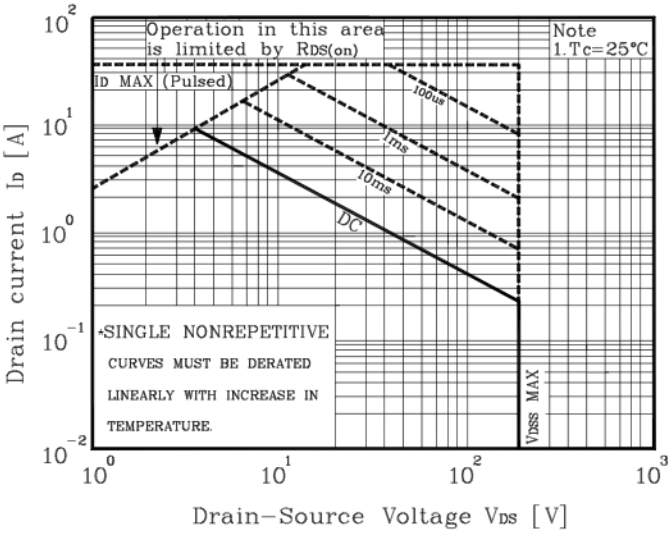


Fig. 11 Gate Charge Test Circuit & Waveform

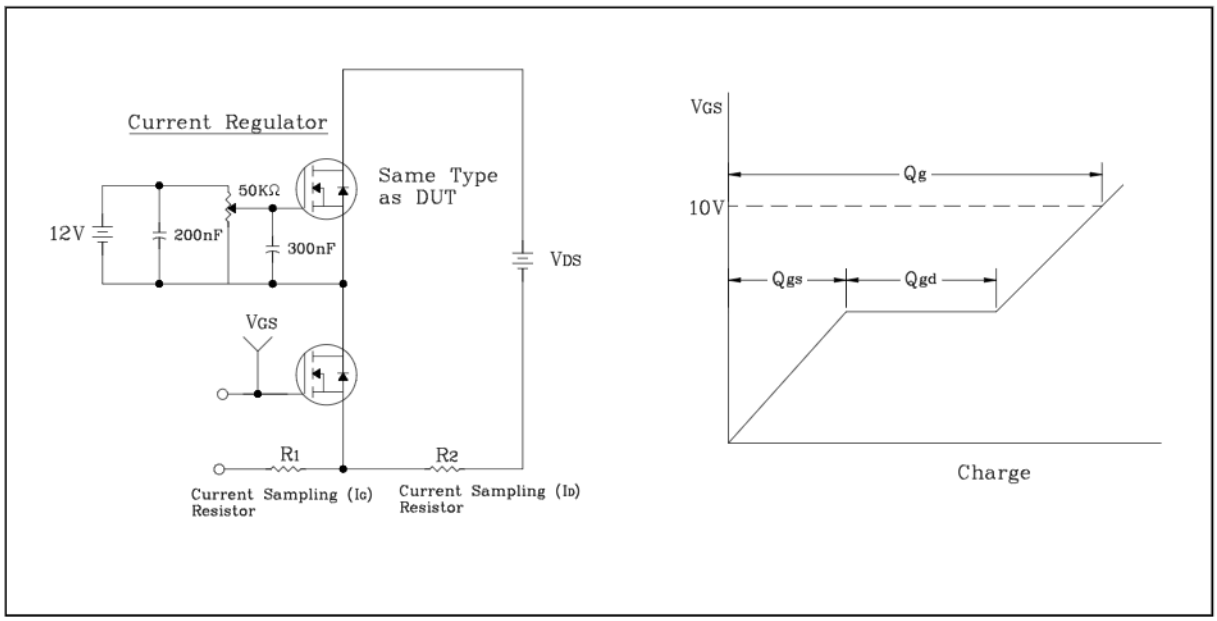


Fig. 12 Resistive Switching Test Circuit & Waveform

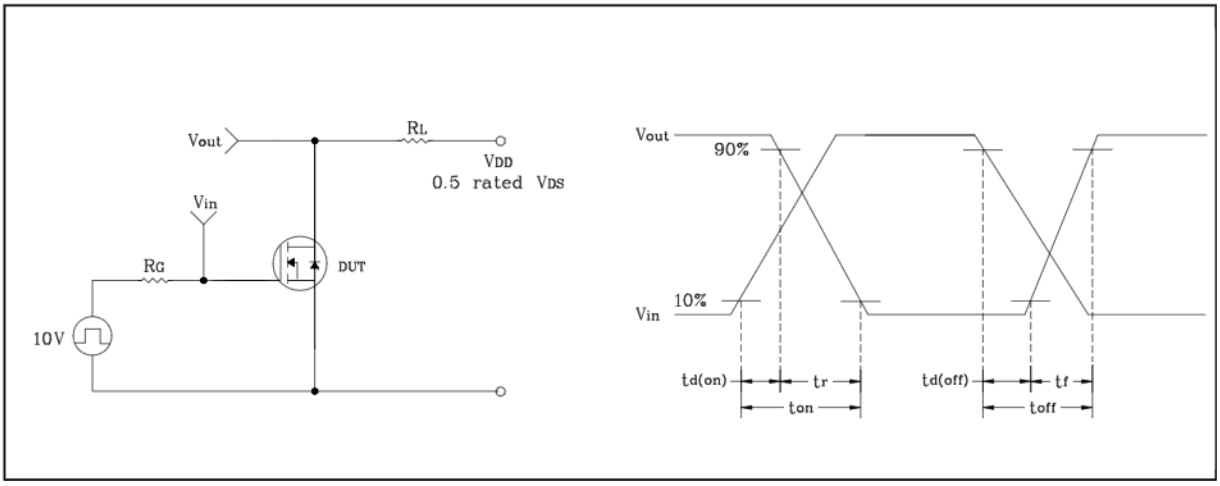


Fig. 13 E_{AS} Test Circuit & Waveform

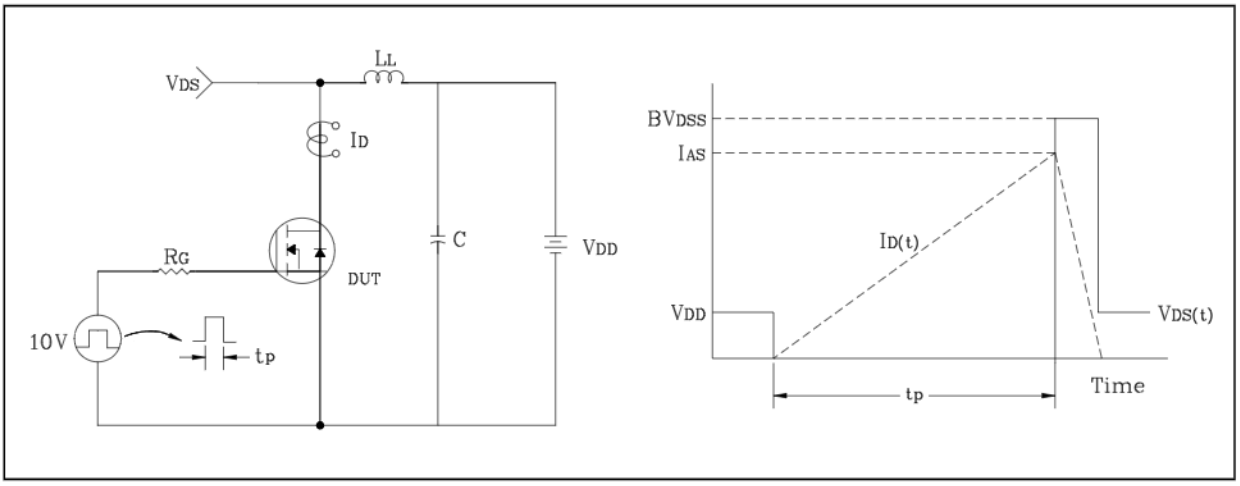
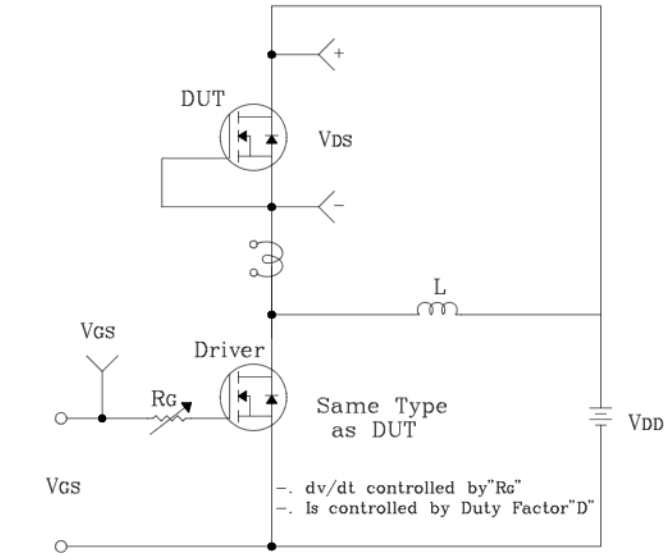
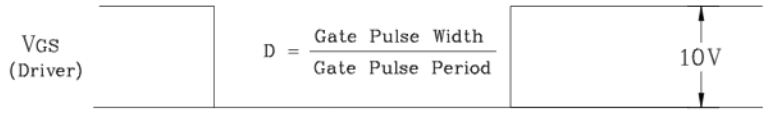
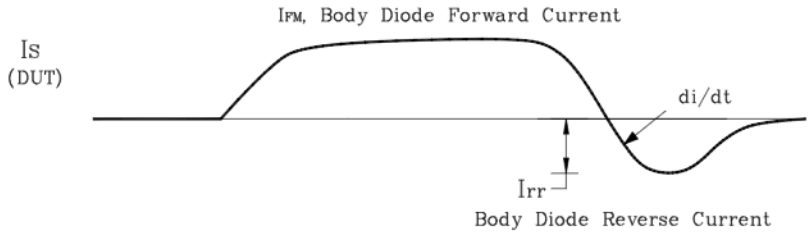
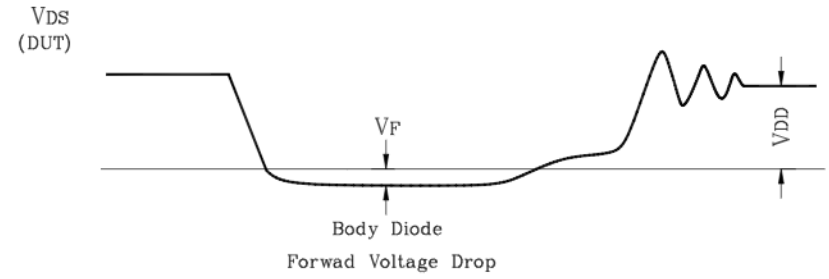


Fig. 14 Diode Reverse Recovery Time Test Circuit & Waveform



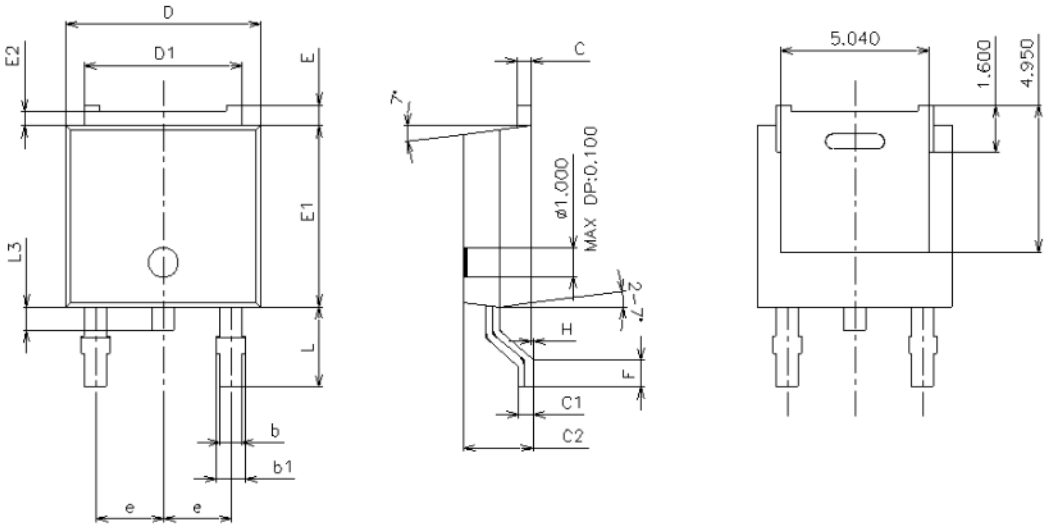


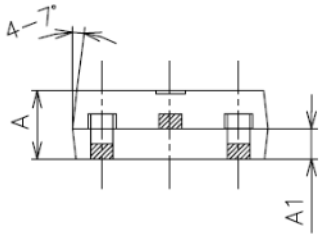




Outline Dimension

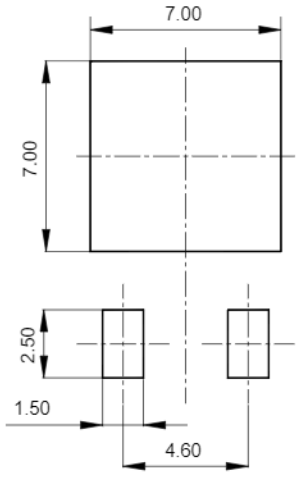
unit: mm





SYMBOL	MILLIMETERS			NOTE
	MINIMUM	NOMINAL	MAXIMUM	
D	6.40	6.60	6.80	
D1	5.14	5.34	5.54	
E	0.50	0.70	0.90	
E1	5.90	6.10	6.30	
E2		0.50 TYP		
A	2.20	2.30	2.40	
A1	0.87	1.07	1.27	
C	0.40	0.50	0.60	
C1	0.40	0.50	0.60	
C2	2.10	2.30	2.50	
L	2.50	2.70	2.90	
L3	0.60	0.80	1.00	
b	0.66	0.76	0.86	
b1		0.96 MAX		
e	2.10	2.30	2.50	
F		0.80 MIN		
H	0.00	-	0.10	

Recommended Land Pattern [unit: mm]



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