

DC-DC CONVERTER APPLICATION HIGH VOLTAGE SWITCHING APPLICATIONS

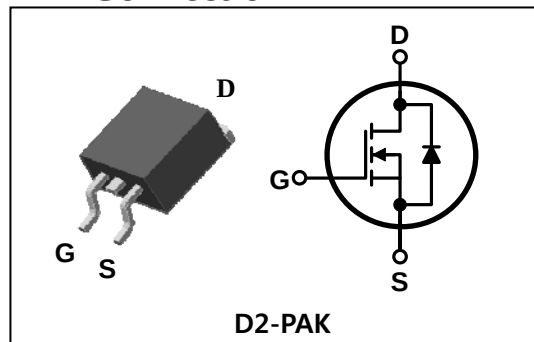
Features

- High Voltage : $BV_{DSS}=250V$ (Min.)
- Low C_{RSS} : $C_{RSS}=49pF$ (Typ.)
- Low gate charge : $Q_g=22nC$ (Typ.)
- Low $R_{DS(on)}$: $R_{DS(on)}=0.27\Omega$ (Max.)

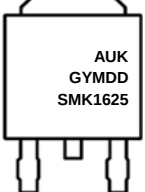
Ordering Information

Type No.	Marking	Package Code
SMK1625D2	SMK1625	D2-PAK

PIN Connection



Marking Diagram

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

Characteristic	Symbol	Rating	Unit
Drain-source voltage	V_{DSS}	250	V
Gate-source voltage	V_{GSS}	± 30	V
Drain current (DC) *	I_D	($T_C=25^\circ C$)	16
		($T_C=100^\circ C$)	7.2
Drain current (Pulsed) *	I_{DM}	64	A
Drain power dissipation *	P_D	130	W
Avalanche current (Single) ②	I_{AS}	16	A
Single pulsed avalanche energy ②	E_{AS}	480	mJ
Avalanche current (Repetitive) ①	I_{AR}	16	A
Repetitive avalanche energy ①	E_{AR}	13.9	mJ
Junction temperature	T_J	150	$^\circ C$
Storage temperature range	T_{stg}	-55~150	

* Limited by maximum junction temperature

Characteristic		Symbol	Typ.	Max.	Unit
Thermal resistance	Junction-case	$R_{th(J-C)}$	-	0.96	$^\circ C/W$
	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 =250μA, V _{GS} =0	250	-	-	V
Gate threshold voltage	V _{GS(th)}	I _D =250μA, V _{DS} =V _{GS}	2.0	-	4.0	V
Drain-source cut-off current	I _{DSS}	V _{DS} =250V, V _{GS} =0V	-	-	1	μA
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 =8.0A	-	0.22	0.27	Ω
Forward transfer conductance ④	g _{fs}	V _{DS} =10V, I _D =8.0A	-	10.5	-	S
Input capacitance	C _{iss}	V _{GS} =0V, V _{DS} =25V f=1MHz	-	968	1275	pF
Output capacitance	C _{oss}		-	204	278	
Reverse transfer capacitance	C _{rss}		-	49	64	
Turn-on delay time	t _{d(on)}	V _{DD} =125V, I _D =16A R _G =25Ω ③④	-	15	-	ns
Rise time	t _r		-	130	-	
Turn-off delay time	t _{d(off)}		-	135	-	
Fall time	t _f		-	105	-	
Total gate charge	Q _g	V _{DS} =200V, V _{GS} =10V I _D =16A ③④	-	22	28	nC
Gate-source charge	Q _{gs}		-	7.1	-	
Gate-drain charge	Q _{gd}		-	5.9	-	

Source-Drain Diode Ratings and Characteristics (T_C=25°C unless otherwise noted)

Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Source current	I _S	Integral reverse diode in the MOSFET	-	-	16	A
Source current (Pulsed) ①	I _{SM}		-	-	64	
Forward voltage ④	V _{SD}	V _{GS} =0V, I _S =16A	-	-	1.4	V
Reverse recovery time	t _{rr}	I _S =16A, V _{GS} =0 dI _F /dt=100A/μs	-	208	-	ns
Reverse recovery charge	Q _{rr}		-	1.63	-	μC

Note ;

- ① Repetitive Rating : Pulse Width Limited by Maximum Junction Temperature
- ② L=3.0mH, I_{AS}=16A, V_{DD}=50V, R_G=25Ω
- ③ Pulse Test : Pulse Width ≤ 300μs, Duty cycle ≤ 2%
- ④ Essentially independent of operating temperature

Electrical Characteristic Curves

Fig. 1 $I_D - V_{DS}$

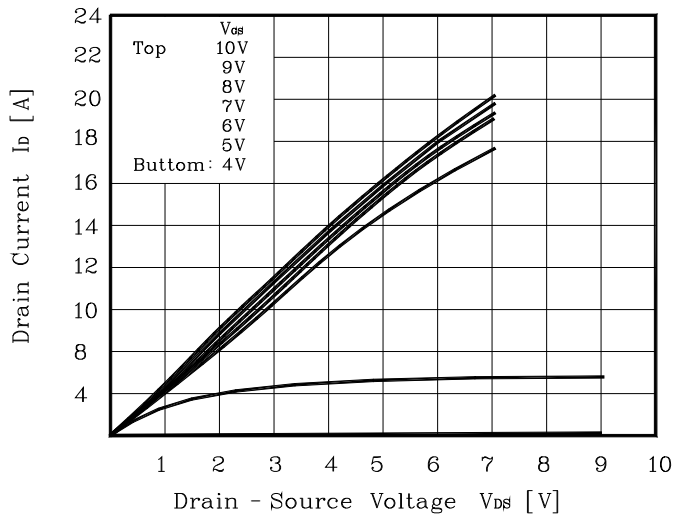


Fig. 2 $I_D - V_{GS}$

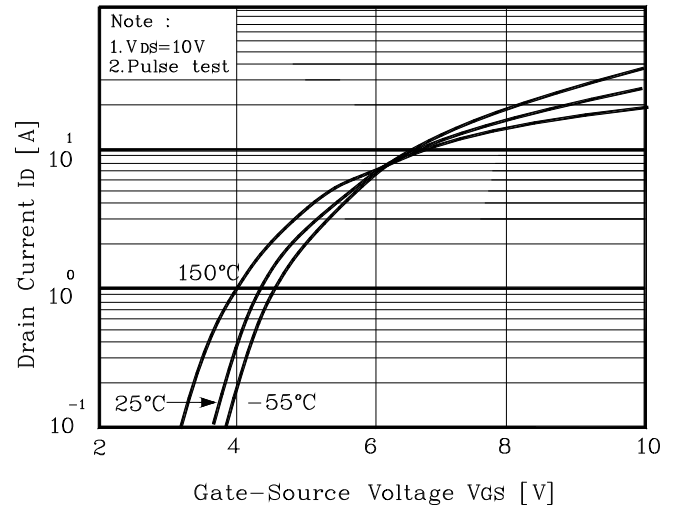


Fig. 3 $R_{DS(on)} - I_D$

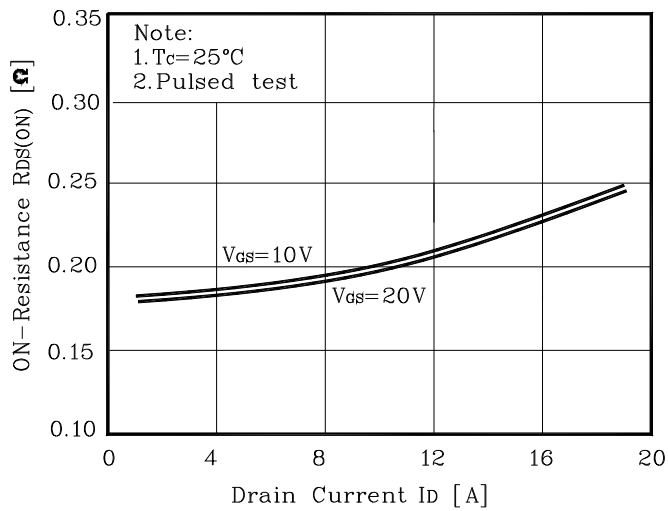


Fig. 4 $I_S - V_{SD}$

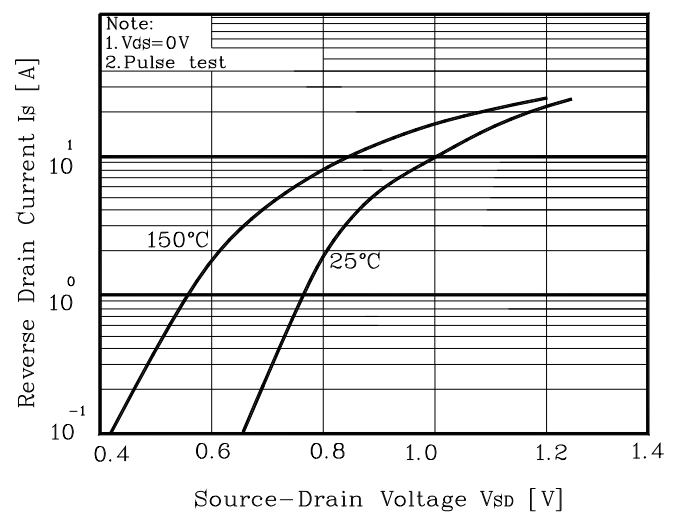


Fig. 5 Capacitance - V_{DS}

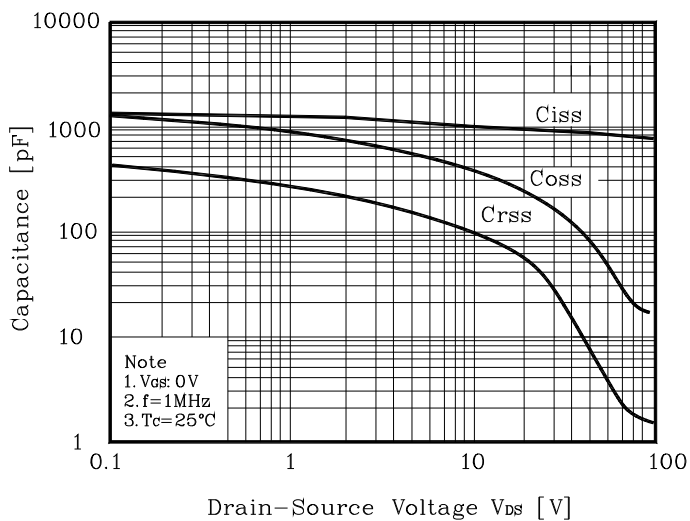


Fig. 6 $V_{GS} - Q_G$

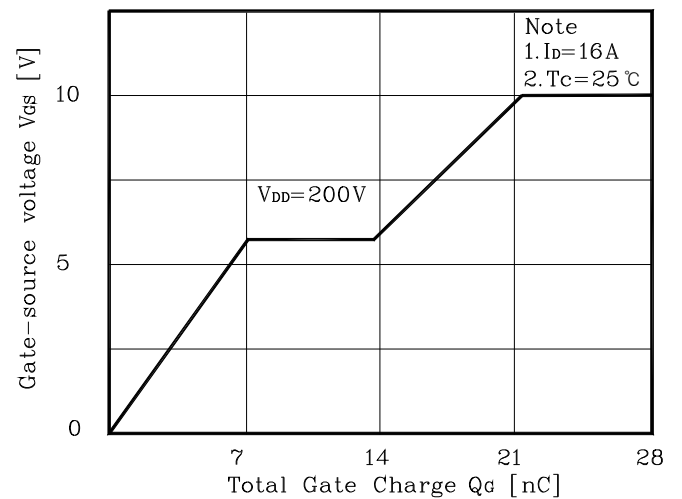


Fig. 7 $V_{DS} - T_J$

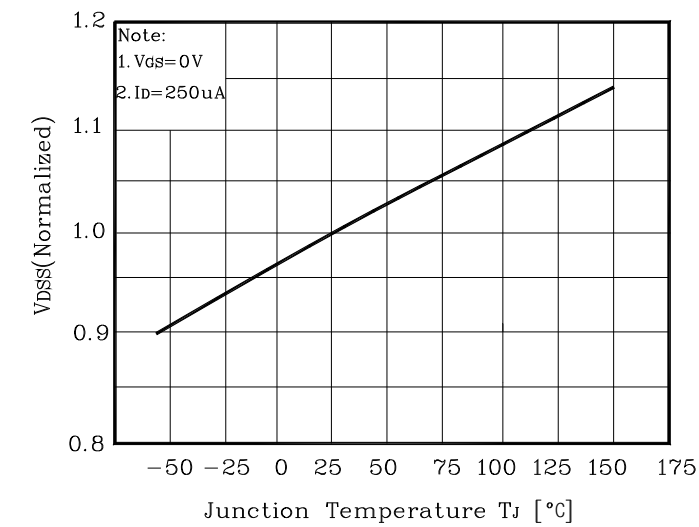


Fig. 8 $R_{DS(on)} - T_J$

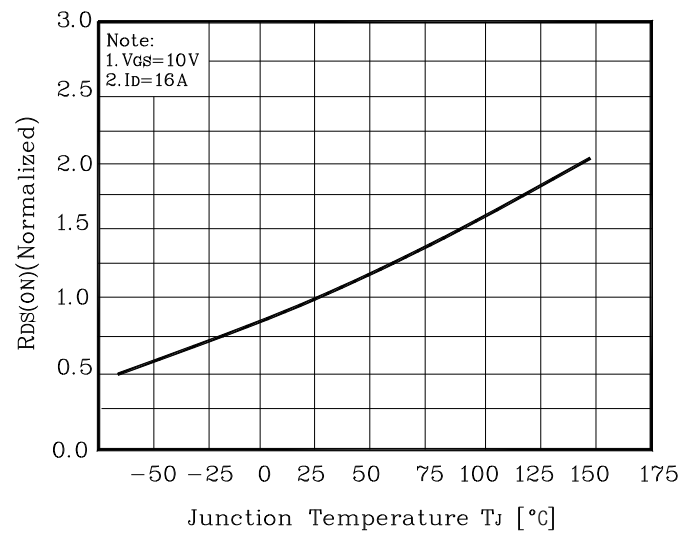


Fig. 9 $I_D - T_C$

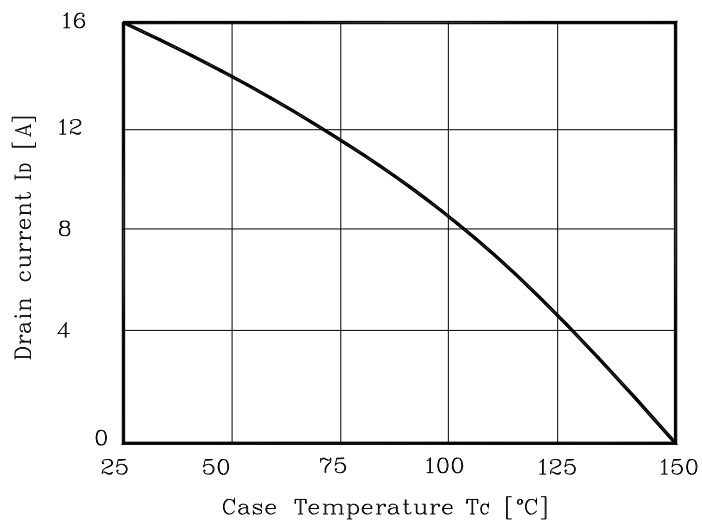


Fig. 10 Safe Operating Area

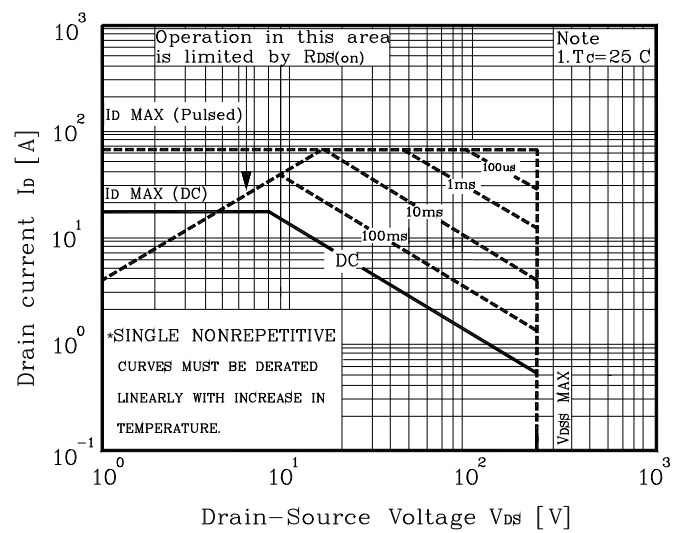


Fig. 11 Gate Charge Test Circuit & Waveform

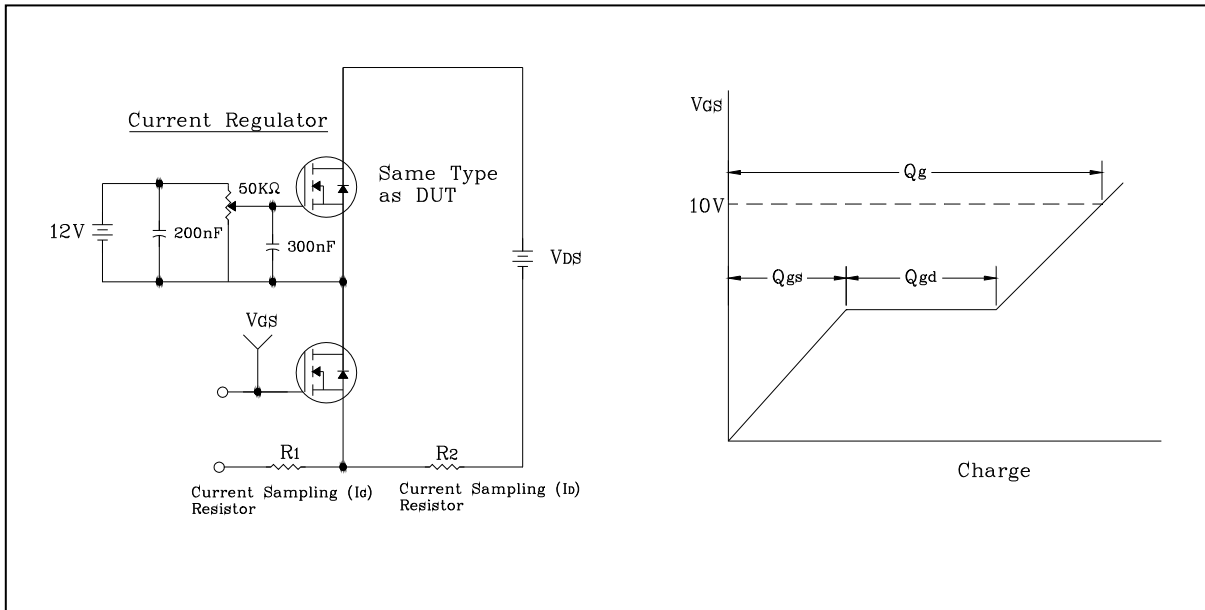


Fig. 12 Resistive Switching Test Circuit & Waveform

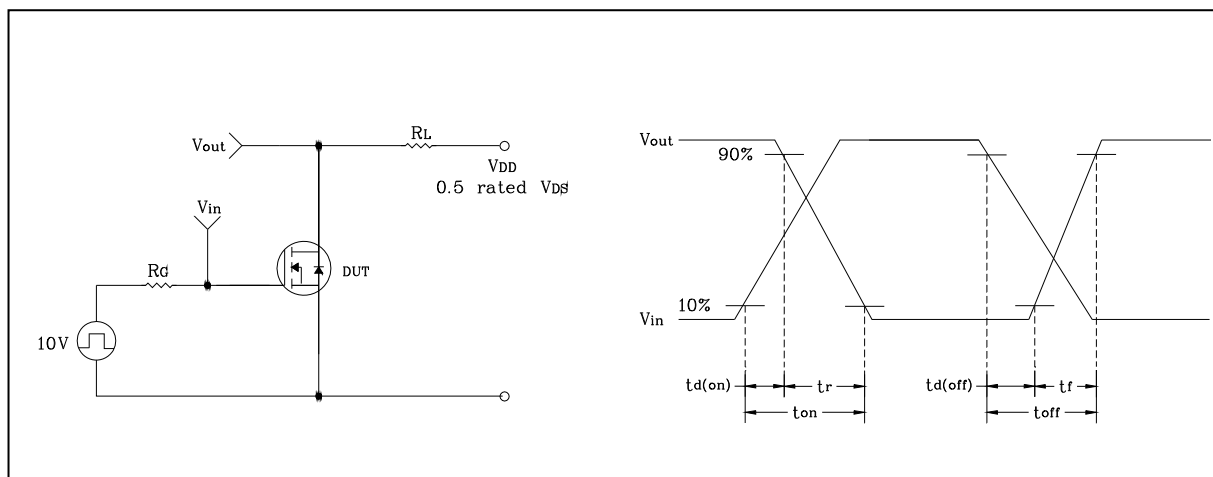


Fig. 13 E_{AS} Test Circuit & Waveform

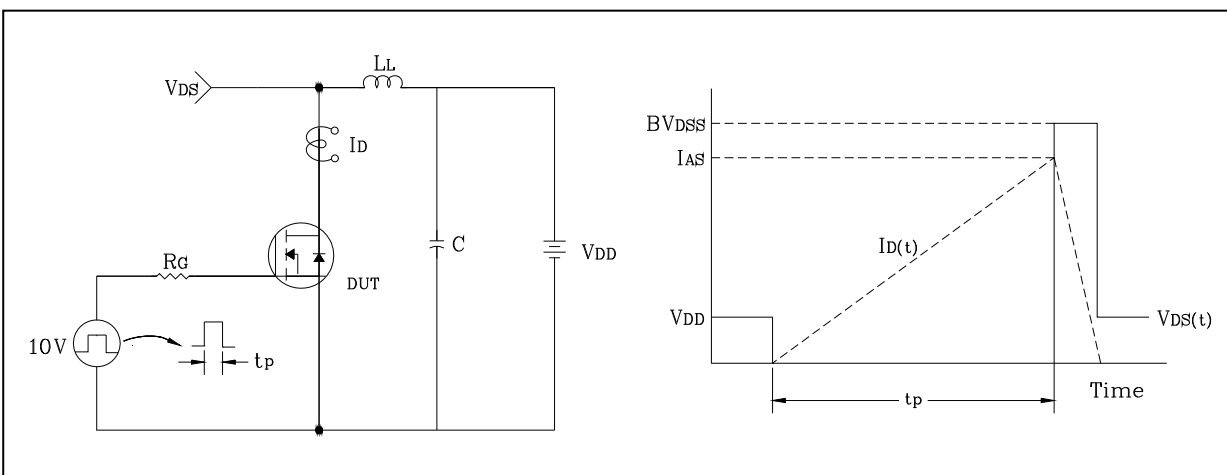
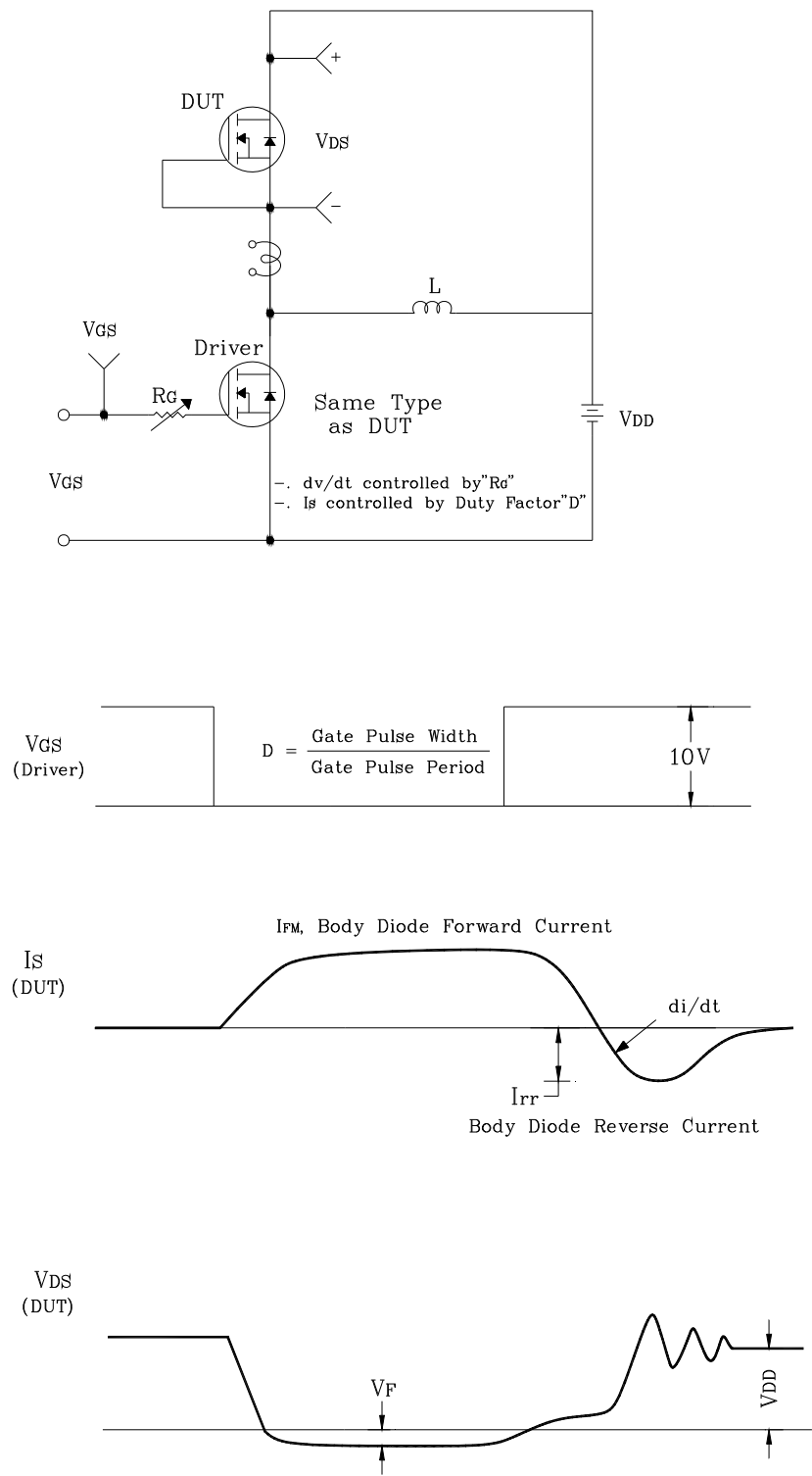
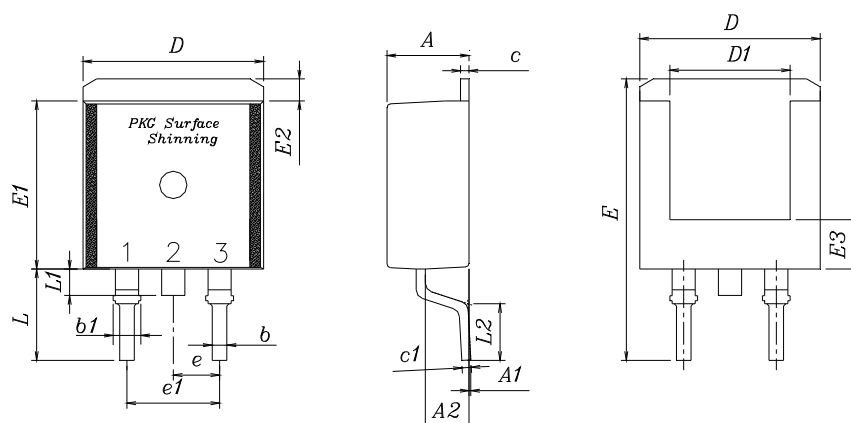


Fig. 14 Diode Reverse Recovery Time Test Circuit & Waveform



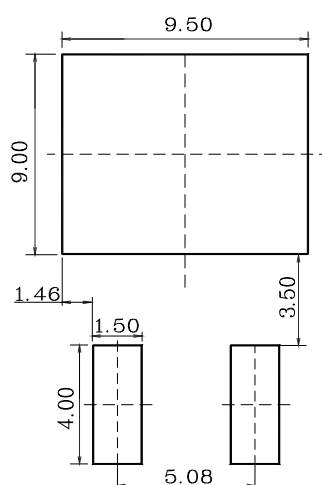
Outline Dimension

unit : mm



SYMBOL	MILLIMETERS			NOTE
	MINIMUM	NOMINAL	MAXIMUM	
A	4.35	4.50	4.65	
A1	—	—	0.15	
A2	2.20	2.40	2.60	
b	0.70	0.80	0.90	
b1	1.17	1.27	1.37	
c	0.40	0.50	0.60	
c1	0.40	0.50	0.60	
D	9.80	10.00	10.20	
D1	6.40	6.60	6.80	
E	15.00	15.40	15.80	
E1	9.05	9.20	9.35	
E2	1.00	1.20	1.40	
E3	2.50	2.70	2.90	
e	2.34	2.54	2.74	
e1	4.88	5.08	5.28	
L	4.60	5.00	5.40	
L1	1.40	1.45	1.50	
L2	2.50	—	—	

※ Recommended Land Pattern [unit: mm]



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