

SWITCHING REGULATOR APPLICATIONS

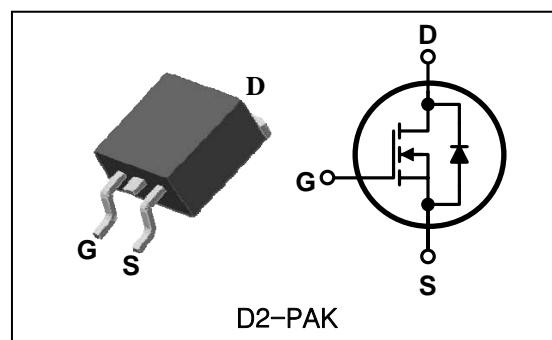
Features

- High Voltage : $BV_{DSS}=300V$ (Min.)
- Low C_{rss} : $C_{rss}=19pF$ (Typ.)
- Low gate charge : $Q_g=24nC$ (Typ.)
- Low $R_{DS(on)}$: $R_{DS(on)}=0.29\Omega$ (Max.)

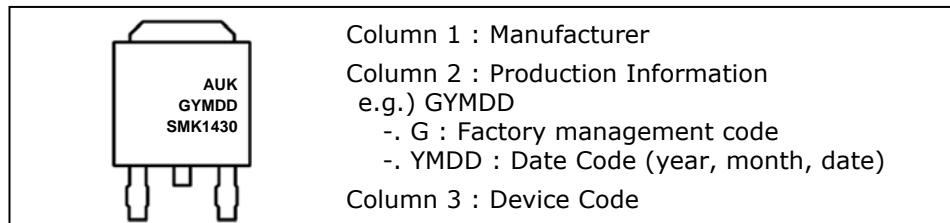
Ordering Information

Type No.	Marking	Package Code
SMK1430DI	SMK1430	D2-PAK

PIN Connection



Marking Diagram



Absolute maximum ratings ($T_c=25^\circ C$ unless otherwise noted)

Characteristic	Symbol	Rating	Unit
Drain-source voltage	V_{DSS}	300	V
Gate-source voltage	V_{GSS}	± 30	V
Drain current (DC) *	I_D	$T_c=25^\circ C$	A
		$T_c=100^\circ C$	A
Drain current (Pulsed) *	I_{DM}	90	A
Power dissipation	P_D	140	W
Avalanche current (Single) ②	I_{AS}	14	A
Single pulsed avalanche energy ②	E_{AS}	800	mJ
Avalanche current (Repetitive) ①	I_{AR}	14	A
Repetitive avalanche energy ①	E_{AR}	25	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	$R_{th(J-C)}$	-	0.89	$^\circ C/W$
	$R_{th(J-A)}$	-	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} =0V	300	-	-	V
Gate threshold voltage	V _{GS(th)}	I _D =250uA, V _{DS} =V _{GS}	3.0	-	5.0	V
Drain-source cut-off current	I _{DSS}	V _{DS} =300V, V _{GS} =0V	-	-	1	uA
		V _{DS} =300V, T _C =125°C	-	-	200	
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 =7A	-	0.24	0.29	Ω
Forward transfer conductance ④	g _{fs}	V _{DS} =5V, I _D =7A	-	7.8	-	S
Input capacitance	C _{iss}	V _{GS} =0V, V _{DS} =25V f=1 MHz	-	1075	1344	pF
Output capacitance	C _{oss}		-	182	228	
Reverse transfer capacitance	C _{rss}		-	19	23.8	
Turn-on delay time	t _{d(on)}	V _{DD} =150V, I _D =14A R _G =25Ω	-	22	-	ns
Rise time	t _r		-	145	-	
Turn-off delay time	t _{d(off)}		-	45	-	
Fall time	t _f		-	70	-	
Total gate charge	Q _g	V _{DS} =240V, V _{GS} =10V I _D =14A	-	24	30	nC
Gate-source charge	Q _{gs}		-	8.5	-	
Gate-drain charge	Q _{gd}		-	9.5	-	

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	-	-	14	A
Source current (Pulsed) ①	I _{SM}		-	-	56	
Forward voltage ④	V _{SD}	V _{GS} =0V, I _S =14A	-	-	1.4	V
Reverse recovery time	t _{rr}	I _S =14A, V _{GS} =0V dI _F /dt=100A/us	-	235	-	ns
Reverse recovery charge	Q _{rr}		-	1.6	-	uC

Note :

- ① Repetitive rating : Pulse width limited by maximum junction temperature
- ② L=6.8mH, I_{AS}=14A, V_{DD}=50V, R_G=25Ω, Starting T_J=25 °C
- ③ Pulse Test : Pulse width≤300us, Duty cycle≤2%
- ④ Essentially independent of operating temperature

Electrical Characteristic Curves

Fig. 1 I_D - V_{DS}

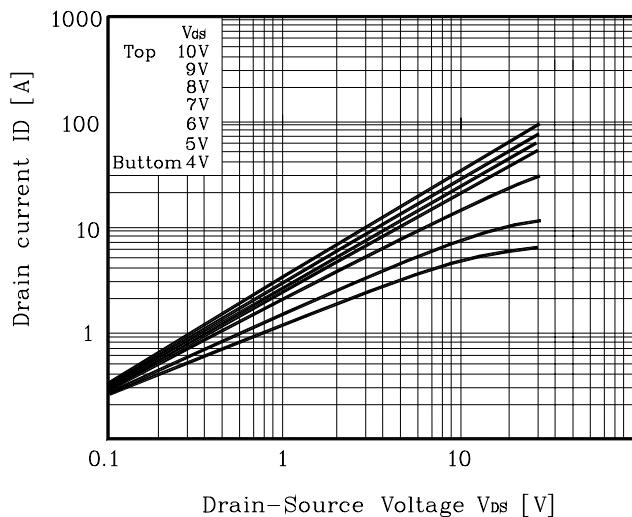


Fig. 2 I_D - V_{GS}

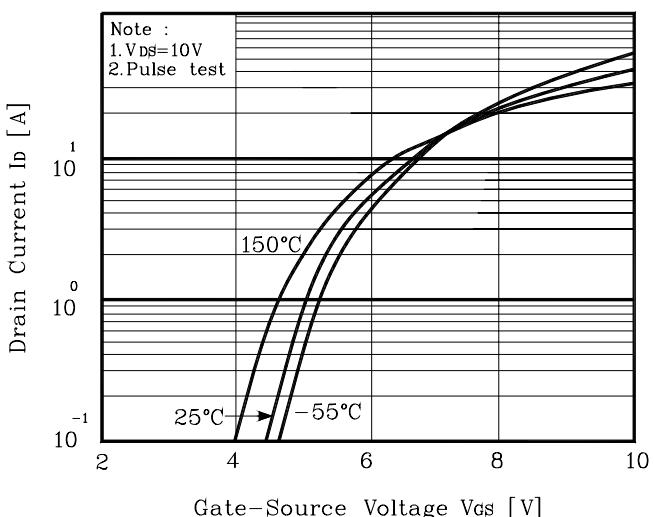


Fig. 3 $R_{DS(on)}$ - I_D

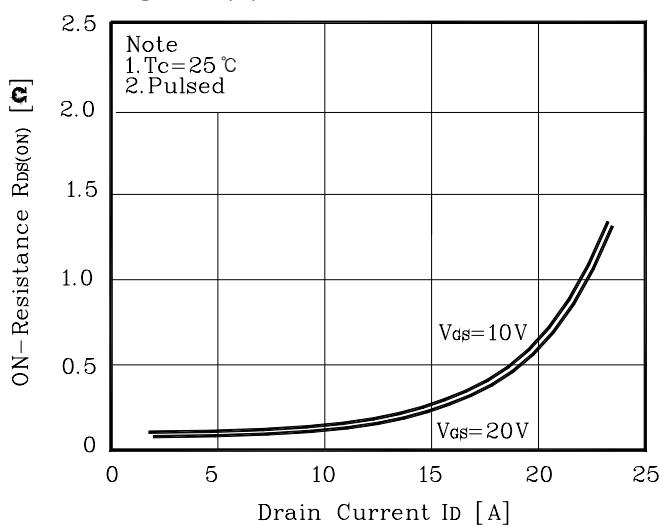


Fig. 4 I_S - V_{SD}

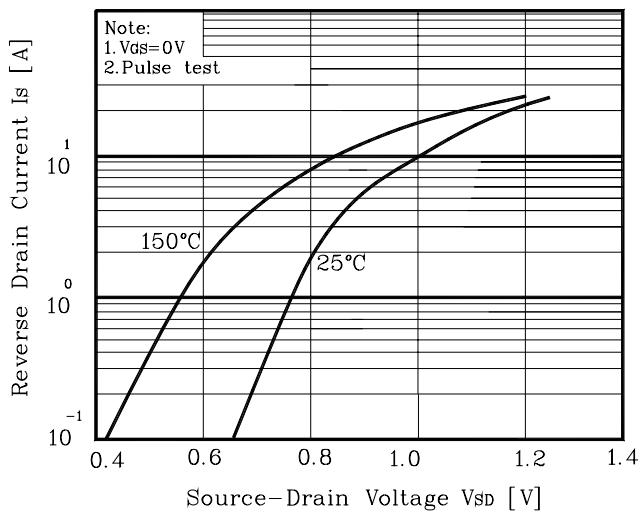


Fig. 5 Capacitance - V_{DS}

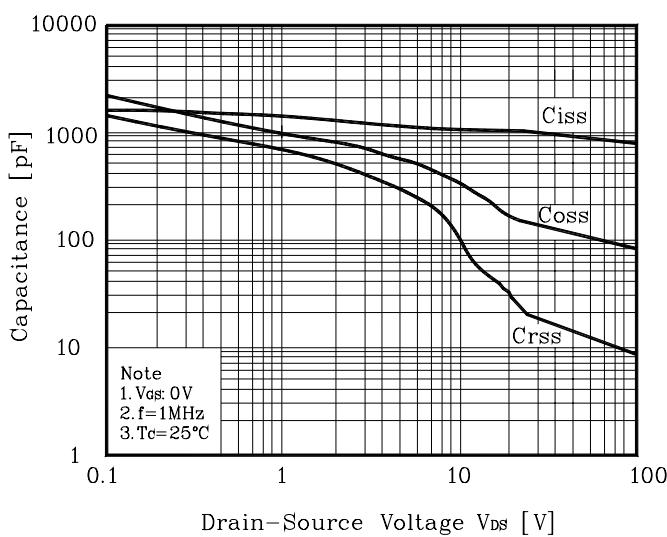


Fig. 6 V_{GS} - Q_G

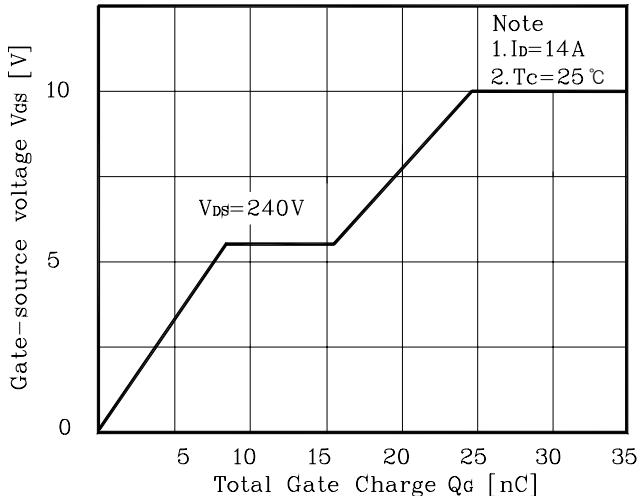


Fig. 7 V_{DSS} - T_J

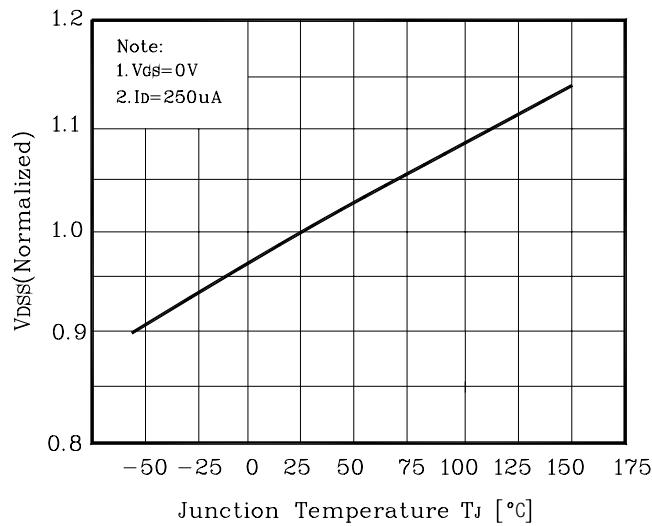


Fig. 8 $R_{DS(on)}$ - T_J

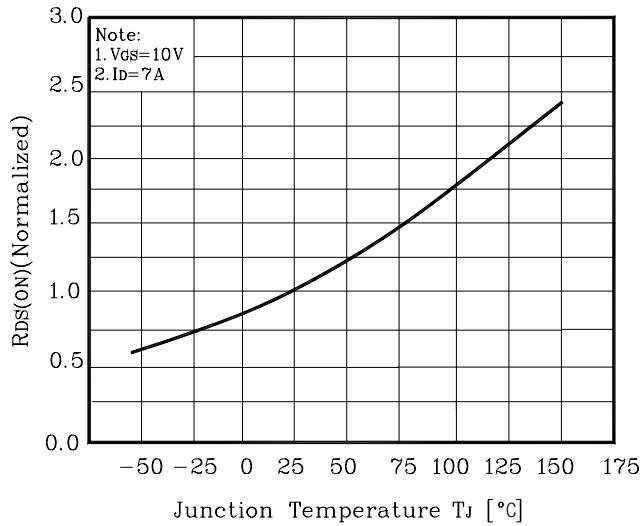


Fig. 9 I_D - T_C

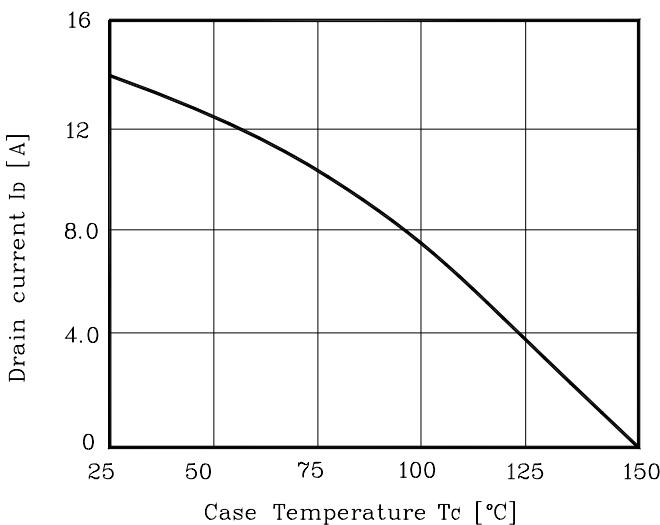


Fig. 10 Safe Operating Area

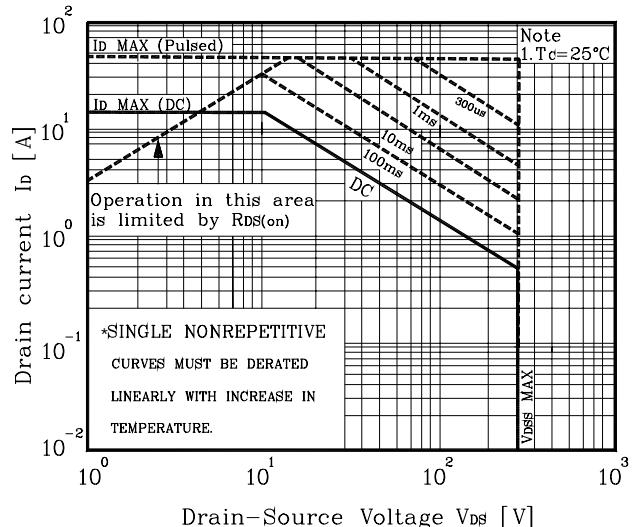


Fig. 11 Transient Thermal Impedance

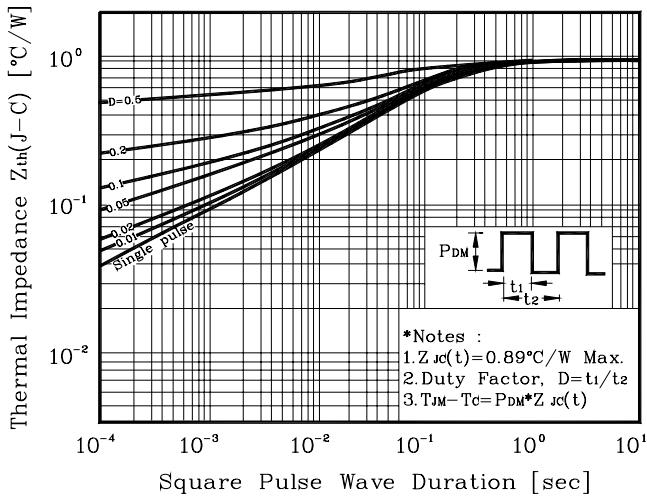


Fig. 11 Gate Charge Test Circuit & Waveform

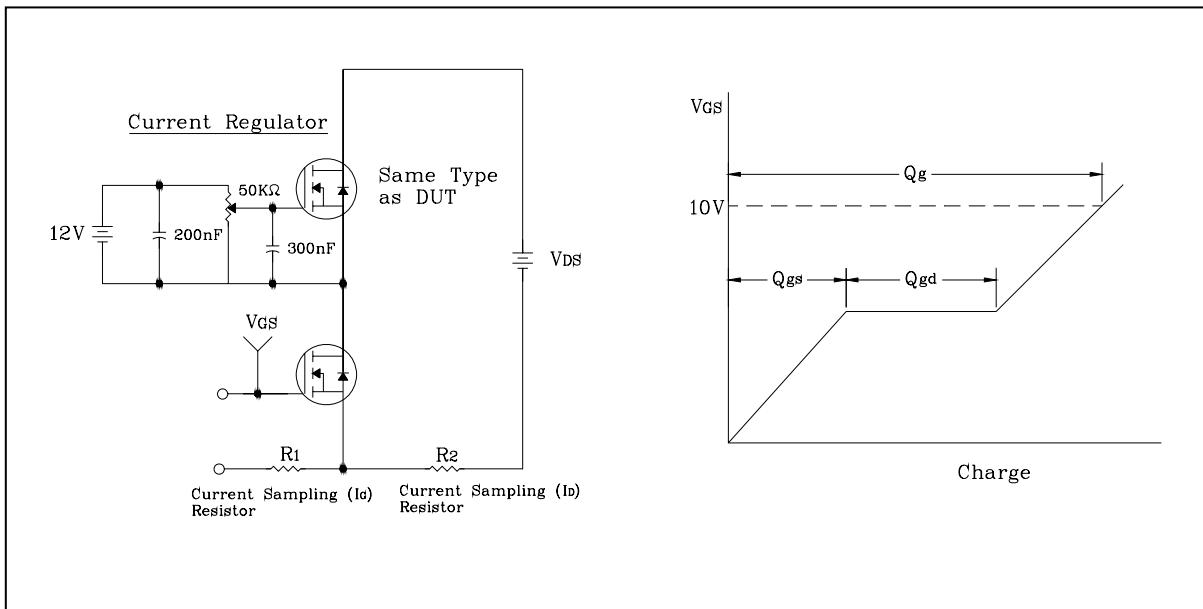


Fig. 12 Resistive Switching Test Circuit & Waveform

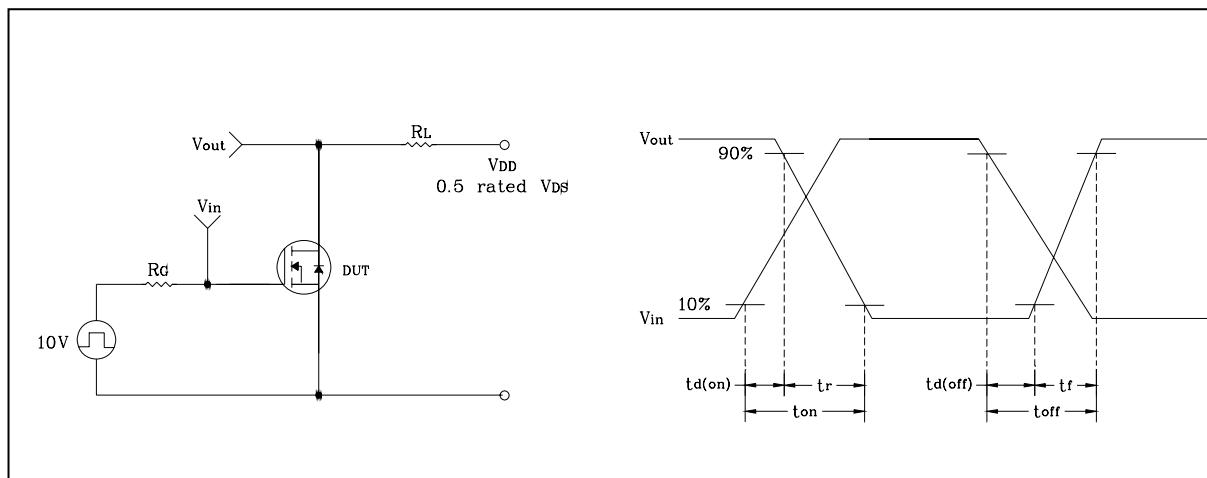


Fig. 13 E_{AS} Test Circuit & Waveform

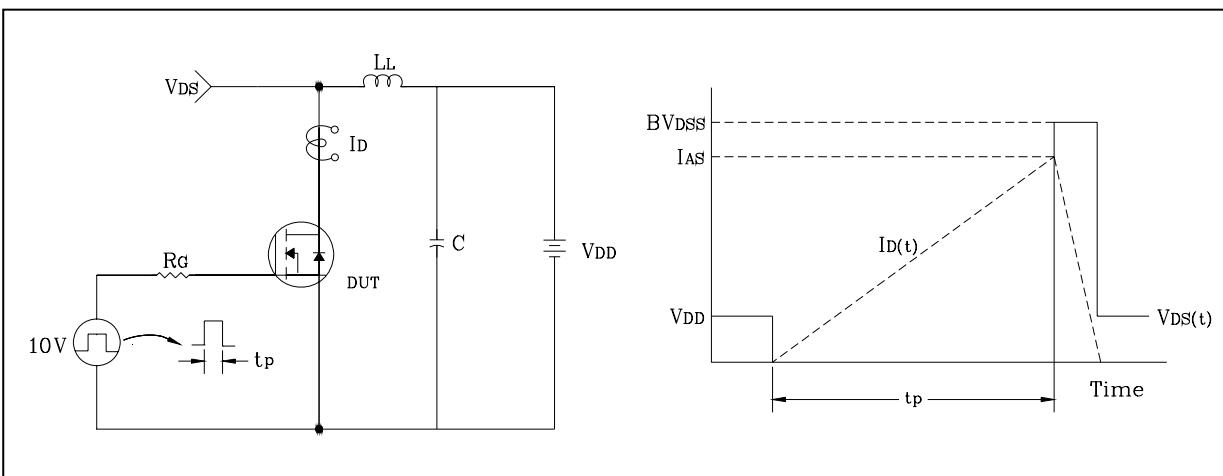
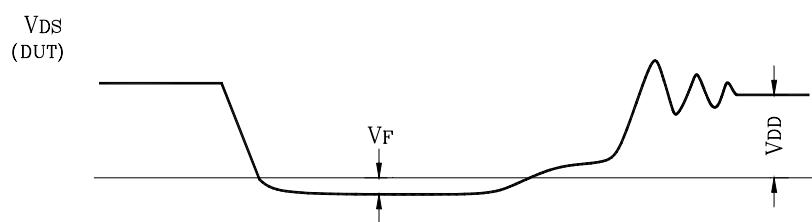
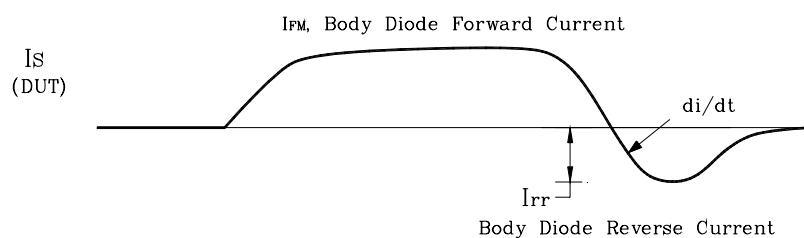
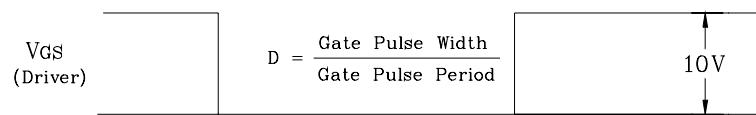
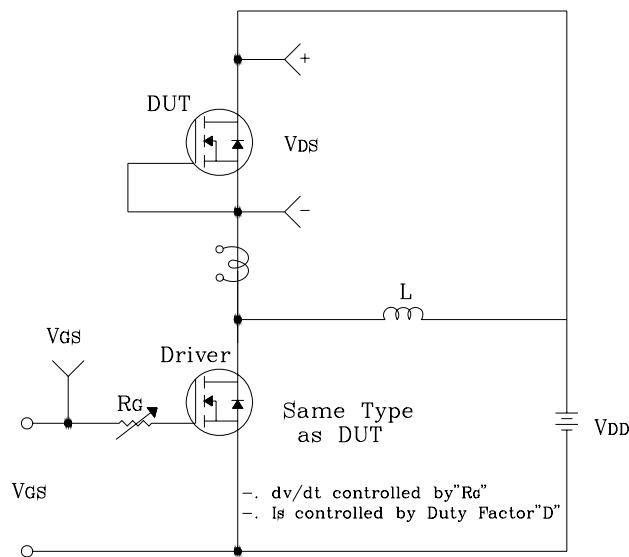
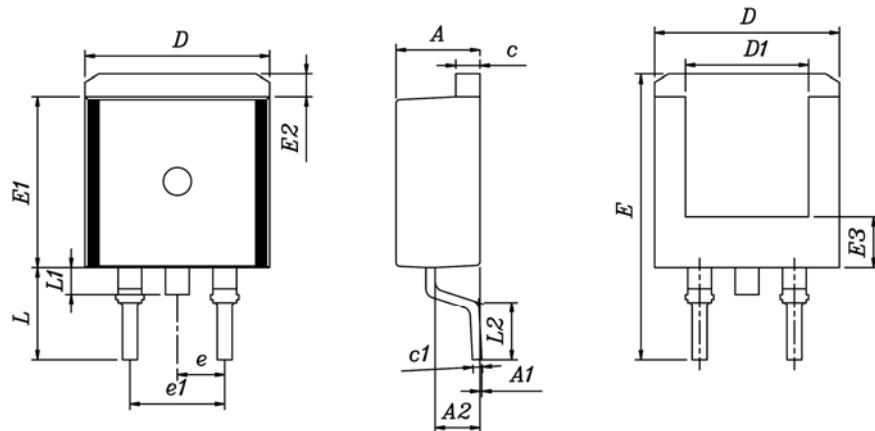


Fig. 14 Diode Reverse Recovery Time Test Circuit & Waveform



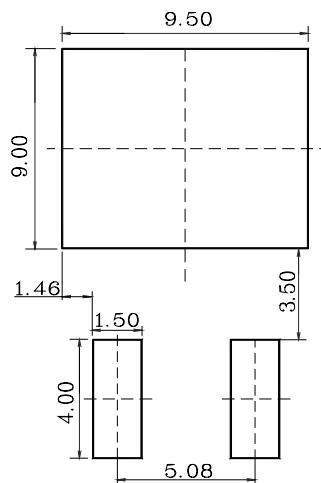
Outline Dimension

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	
c	1.20	1.30	1.40	
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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