AUK Semiconductor

SMK1060P

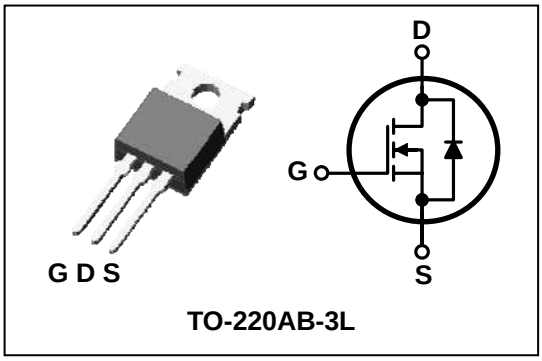
Advanced N-Ch Power MOSFET

SWITCHING REGULATOR APPLICATIONS

Features

- High Voltage: BV_{DSS}=600V(Min.)
- Low C_{rss} : C_{rss}=18pF(Typ.)
- Low gate charge : Qg=35nc(Typ.)
- Low $R_{DS(on)}$:$R_{DS(on)}$=0.75Ω(Max.)

PIN Connection



TO-220AB-3L

Ordering Information

Type No.	Marking	Package Code
SMK1060P	SMK1060	TO-220AB-3L

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℃)	10	A
		(Tc=100℃)	6.32	A
Drain current (Pulsed)*	I_{DM}		40	A
Drain power dissipation	P_D		120	W
Avalanche current (Single) ②	I_{AS}		10	A
Single pulsed avalanche energy ②	E_{AS}		490	mJ
Avalanche current (Repetitive) ①	I_{AR}		10	A
Repetitive avalanche energy ①	E_{AR}		11.6	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	$R_{th(J-C)}$	-	1.04	℃/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	600	-	-	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}=600V, 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=5.0A	-	0.60	0.75	Ω
Forward transfer conductance ④	g_{fs}	V_{DS}=10V, I_D=5.0A	-	8.0	-	S
Input capacitance	Ciss	V_{GS}=0V, V_{DS}=25V f=1MHz	-	2000	2350	pF
Output capacitance	Coss		-	160	215	
Reverse transfer capacitance	Crss		-	18	-	
Turn-on delay time	$t_{d(on)}$	V_{DD}=300V, I_D=10A R_G=25Ω ③④	-	23	-	ns
Rise time	t_r		-	69	-	
Turn-off delay time	$t_{d(off)}$		-	144	-	
Fall time	t_f		-	77	-	
Total gate charge	Q_g	V_{DS}=480V, V_{GS}=10V I_D=10A ③④	-	35	57	nC
Gate-source charge	Q_{gs}		-	9.0	-	
Gate-drain charge	Q_{gd}		-	10	-	

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	-	-	10	A
Source current (Pulsed) ①	I_{SM}		-	-	40	
Forward voltage ④	V_{SD}	V_{GS}=0V, I_S=10A	-	-	1.4	V
Reverse recovery time	t_{rr}	I_s=10A, V_{GS}=0, di_S/dt=100A/ us	-	470	-	ns
Reverse recovery charge	Q_{rr}		-	6	-	uC

Note ;

① Repetitive Rating : Pulse Width Limited by Maximum Junction Temperature

② L=10mH, I_{AS}=9.5A, 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}

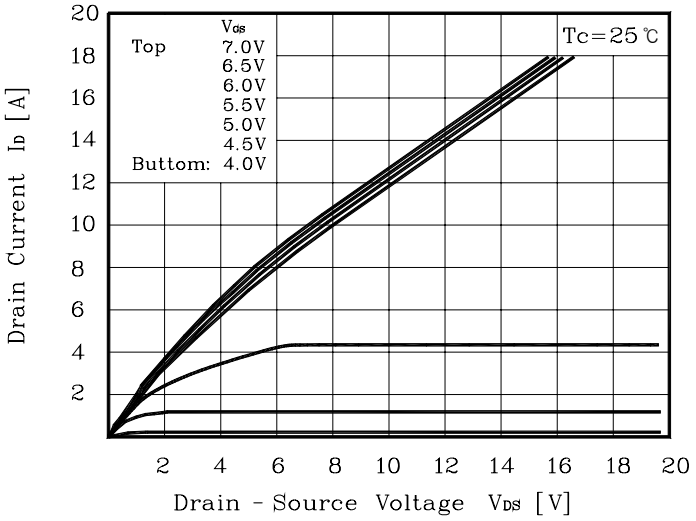


Fig. 2 I_D - V_{GS}

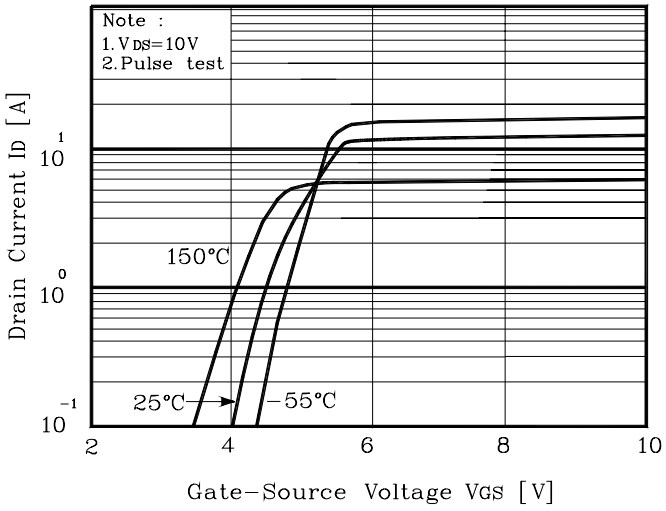


Fig. 3 $R_{DS(on)}$ - I_D

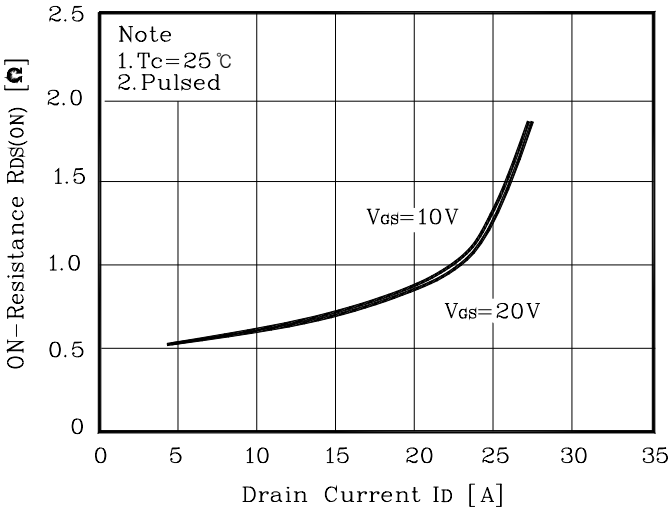


Fig. 4 I_S - V_{SD}

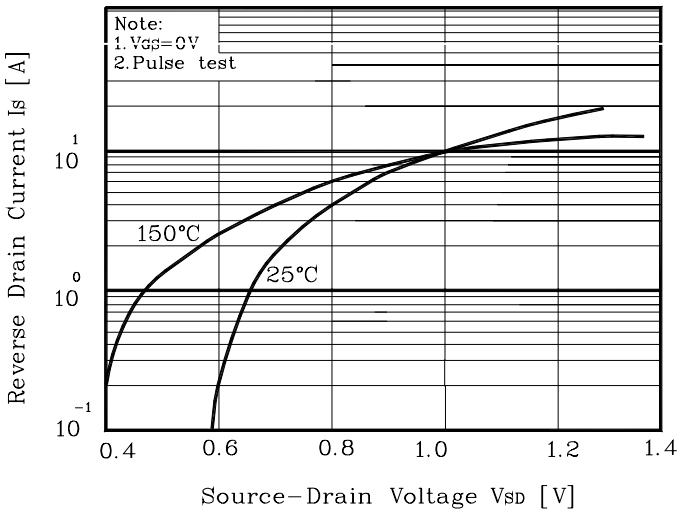


Fig. 5 Capacitance - V_{DS}

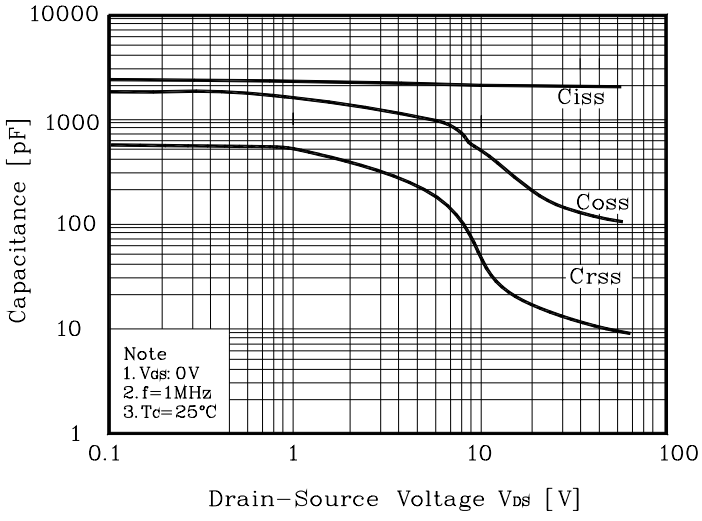
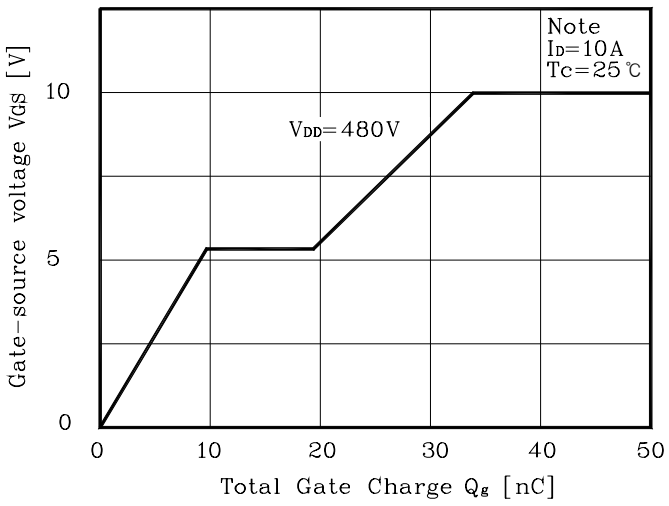


Fig.6 V_{GS} - Q_G



Electrical Characteristic Curves

Fig. 7 V_{DSS} - T_J

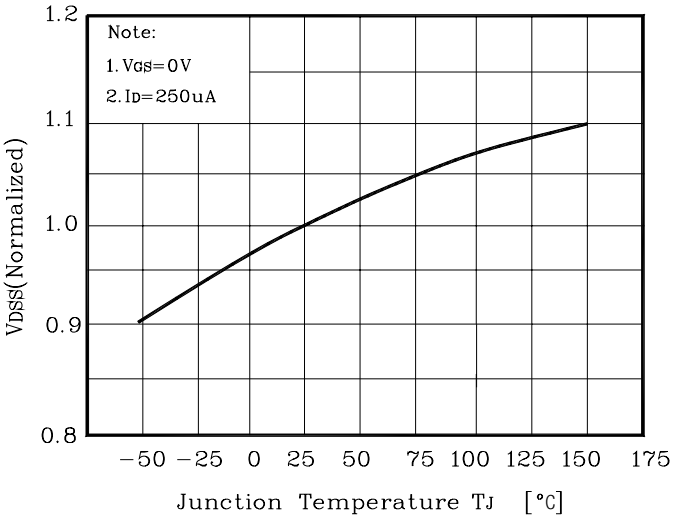


Fig.8 $R_{DS(on)}$ - T_J

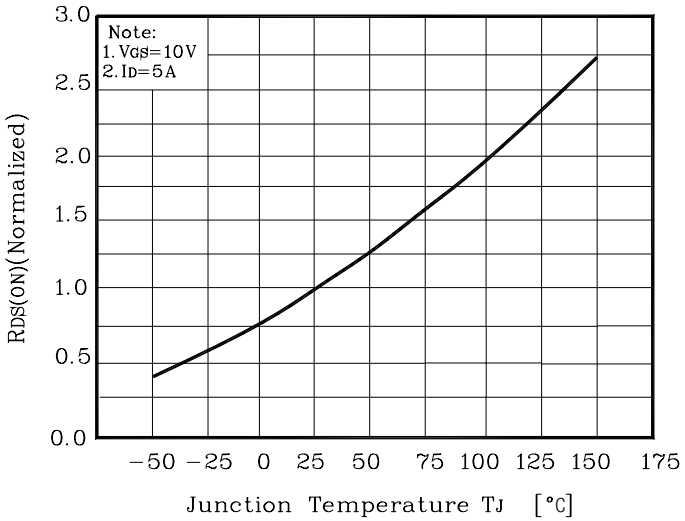


Fig. 9 I_D - T_C

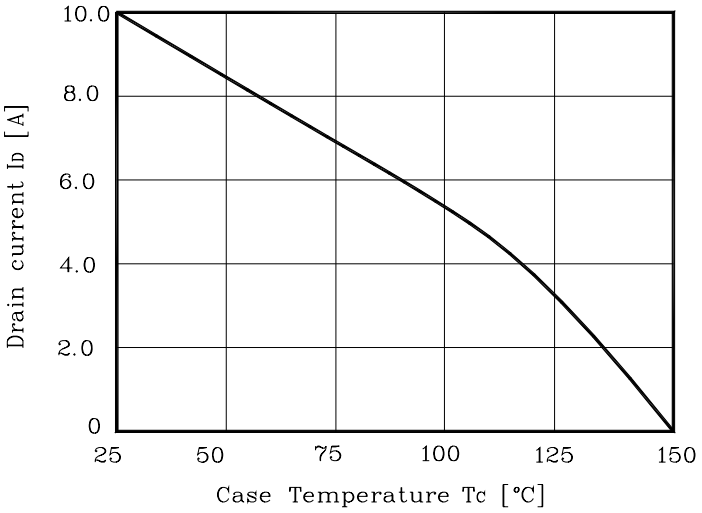


Fig. 10 Safe Operating Area

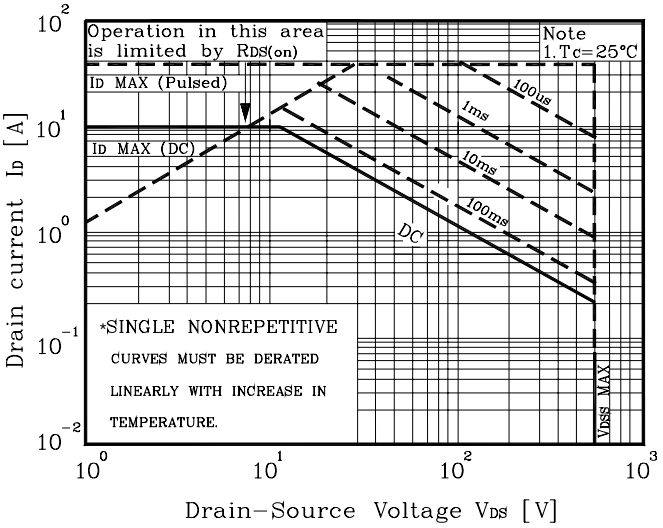


Fig. 10 Gate Charge Test Circuit & Waveform

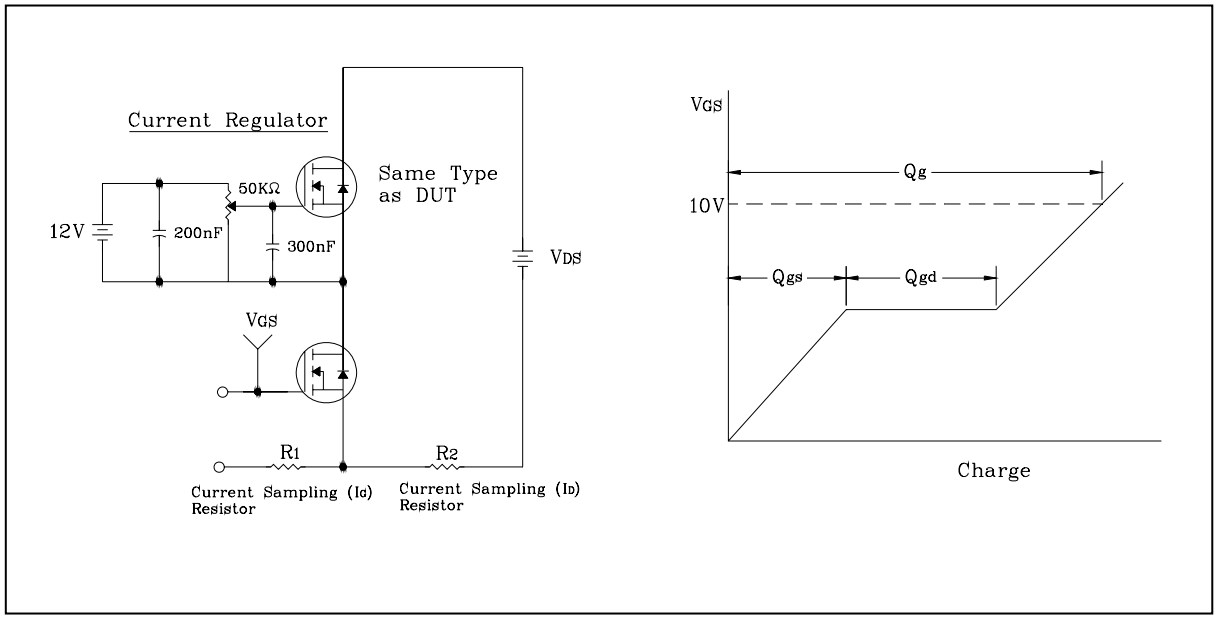


Fig. 11 Resistive Switching Test Circuit & Waveform

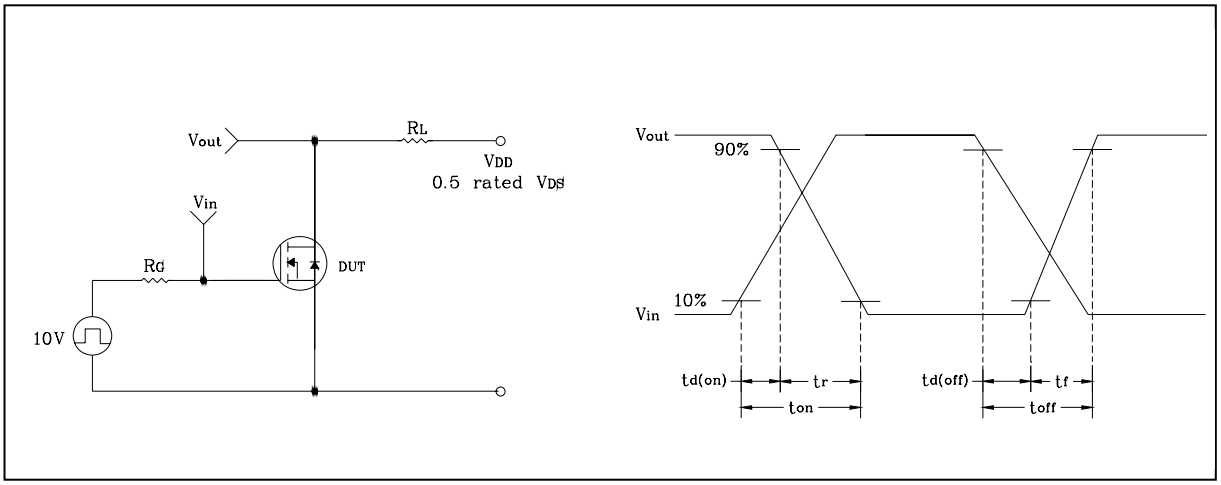


Fig. 12 E_{AS} Test Circuit & Waveform

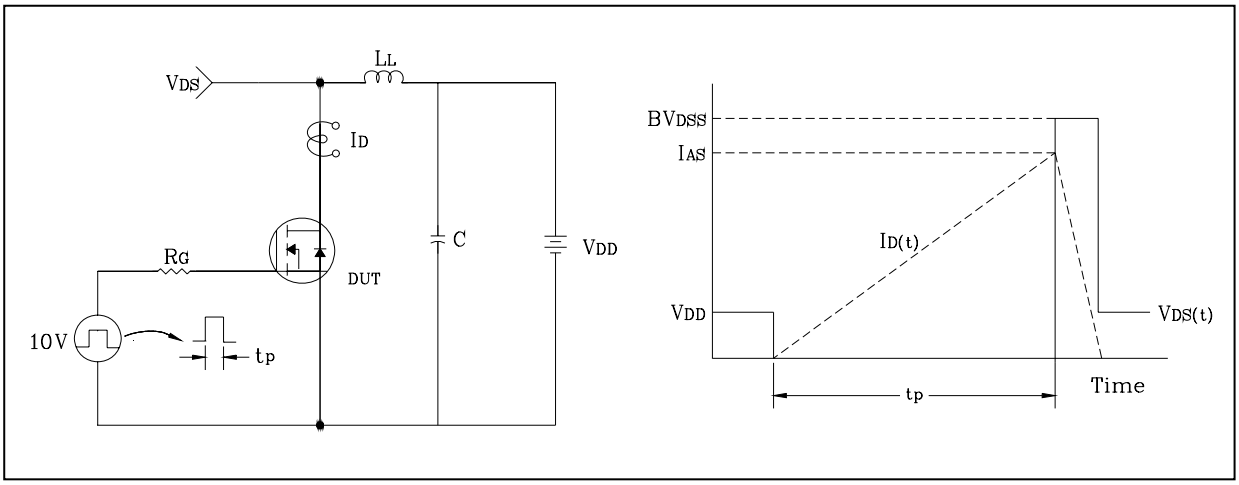
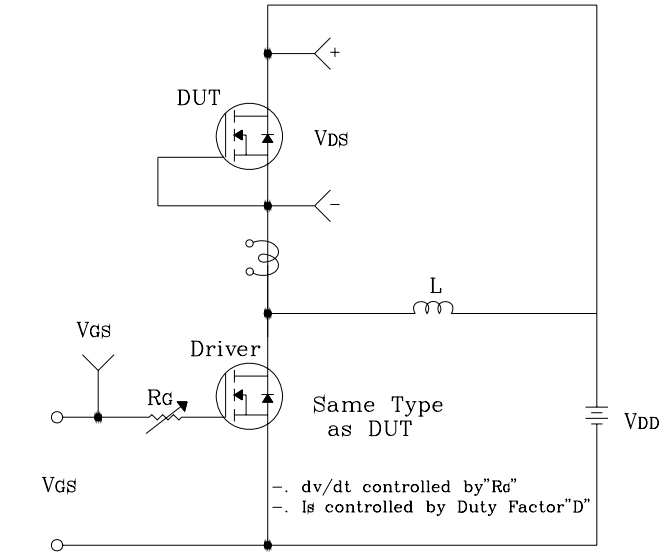
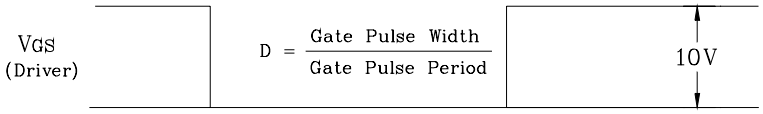
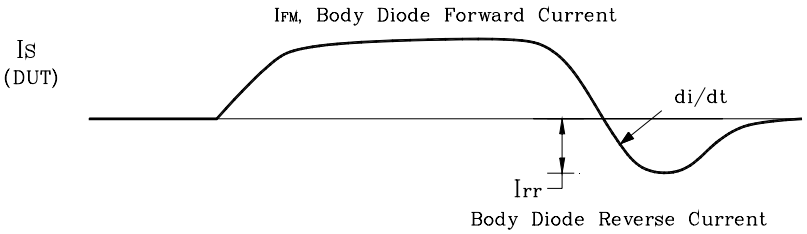
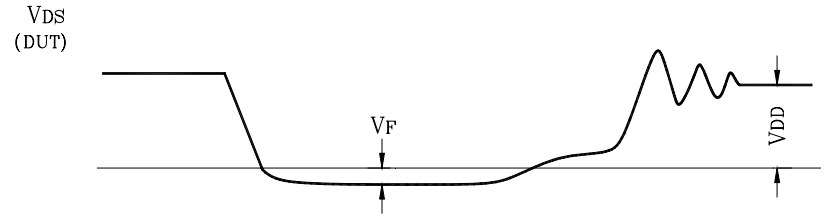


Fig. 13 Diode Reverse Recovery Time Test Circuit & Waveform

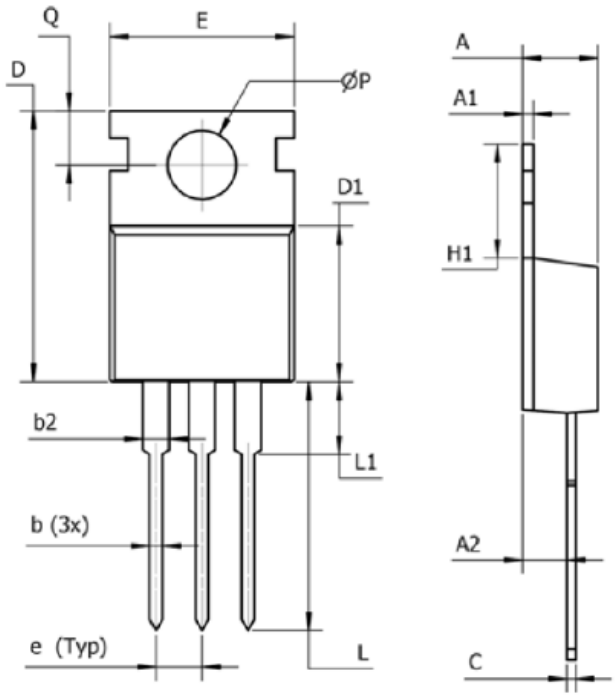








Outline Dimension



DIM	MM	INCHES
D	14.22-16.51	0.560-0.650
ØP	Ø3.53-4.09	Ø0.139-0.161
H1	5.84-6.86	0.230-0.270
b	0.38-1.02	0.015-0.040
b2	1.14-1.78	0.045-0.070
D1	8.38-9.02	0.330-0.355
e	2.54	0.100
E	9.65-10.67	0.380-0.420
L1	6.35(MAX)	0.250(MAX)
A	3.56-4.83	0.140-0.190
A1	0.51-0.71	0.020-0.028
L	12.70-14.73	0.500-0.580
A2	2.03-2.92	0.080-0.115
Q	2.54-3.43	0.100-0.135
C	0.36-0.61	0.014-0.024

The AUK Corp. products are intended for the use as components in general electronic equipment (Office and communication equipment, measuring equipment, home appliance, etc.).

Please make sure that you consult with us before you use these AUK Corp. products in equipments which require high quality and / or reliability, and in equipments which could have major impact to the welfare of human life(atomic energy control, airplane, spaceship, transportation, combustion control, all types of safety device, etc.). AUK Corp. cannot accept liability to any damage which may occur in case these AUK Corp. products were used in the mentioned equipments without prior consultation with AUK Corp..

Specifications mentioned in this publication are subject to change without notice.