AUK Semiconductor

SMK0860P

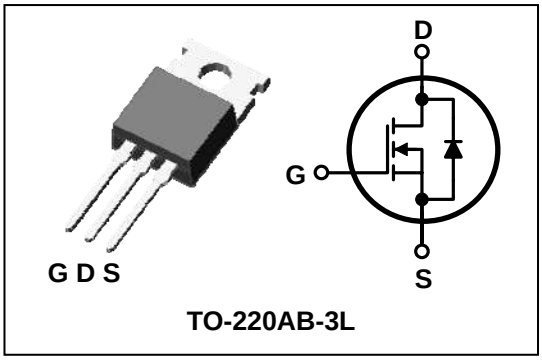
Advanced N-Ch Power MOSFET

SWITCHING REGULATOR APPLICATIONS

Features

- High Voltage: BV_{DSS}=600V(Min.)
- Low C_{rss} : C_{rss}=9.7pF(Typ.)
- Low gate charge : Qg=22nC(Typ.)
- Low $R_{DS(on)}$:$R_{DS(on)}$=1.2Ω(Max.)

PIN Connection



Ordering Information

Type No.	Marking	Package Code
SMK0860P	SMK0860	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℃)	7.5	A
		(Tc=100℃)	4.7	A
Drain current (Pulsed) *	I_{DM}		30	A
Drain power dissipation	P_D		90	W
Avalanche current (Single) ②	I_{AS}		7.5	A
Single pulsed avalanche energy ②	E_{AS}		325	mJ
Avalanche current (Repetitive) ①	I_{AR}		7.5	A
Repetitive avalanche energy ①	E_{AR}		21.7	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	$R_{th(J-C)}$	-	1.38	℃/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=3.75A	-	1.0	1.2	Ω
Forward transfer conductance ④	g_{fs}	V_{DS}=10V, I_D=3.75A	-	7.3	-	S
Input capacitance	Ciss	V_{GS}=0V, V_{DS}=25V f=1MHz	-	968	1210	pF
Output capacitance	Coss		-	105	131	
Reverse transfer capacitance	Crss		-	9.7	12.1	
Turn-on delay time	$t_{d(on)}$	V_{DD}=300V, I_D=7.5A R_G=25Ω ③④	-	18	-	ns
Rise time	t_r		-	19	-	
Turn-off delay time	$t_{d(off)}$		-	72	-	
Fall time	t_f		-	28	-	
Total gate charge	Q_g	V_{DS}=480V, V_{GS}=10V I_D=7.5A ③④	-	22	27	nC
Gate-source charge	Q_{gs}		-	5.2	-	
Gate-drain charge	Q_{gd}		-	6.3	-	

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	-	-	7.5	A
Source current (Pulsed) ①	I_{SM}		-	-	30	
Forward voltage ④	V_{SD}	V_{GS}=0V, I_S=7.5A	-	-	1.4	V
Reverse recovery time	t_{rr}	I_S=7.5A, V_{GS}=0, di_S/dt=100A/us	-	365	-	ns
Reverse recovery charge	Q_{rr}		-	3.4	-	uC

Note ;

① Repetitive Rating : Pulse Width Limited by Maximum Junction Temperature

② L=10.6mH, I_{AS}=7.5A, V_{DD}=50V, R_G=27Ω

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

④ Essentially independent of operating temperature

Electrical Characteristic Curves

Fig. 1 I_D - V_{DS}

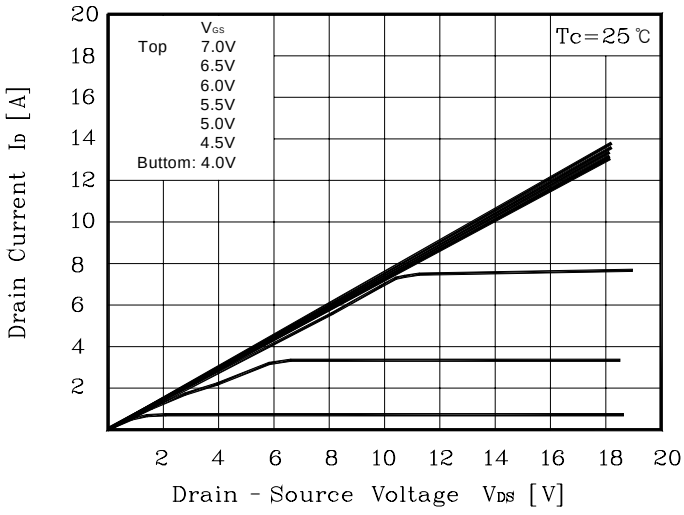


Fig. 2 I_D - V_{GS}

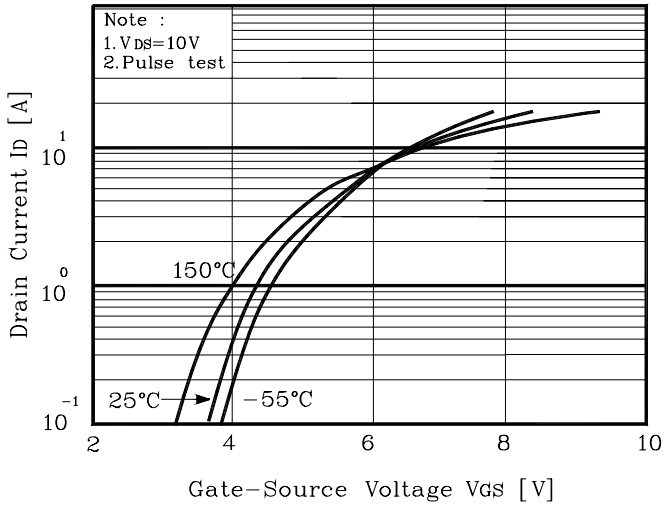


Fig. 3 $R_{DS(on)}$ - I_D

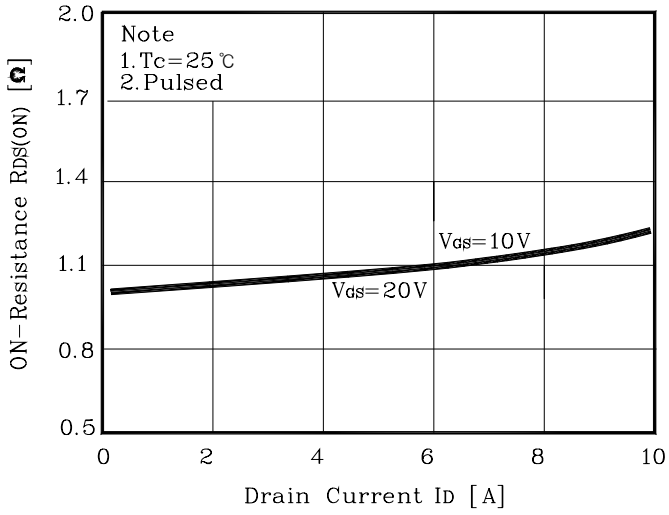


Fig. 4 I_S - V_{SD}

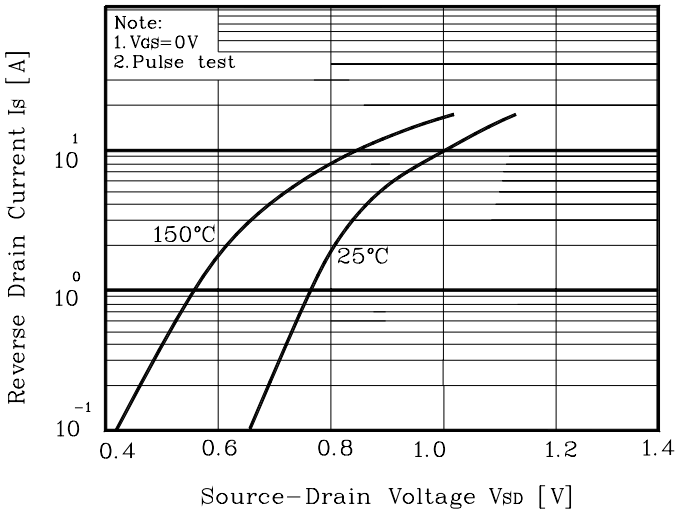


Fig. 5 Capacitance - V_{DS}

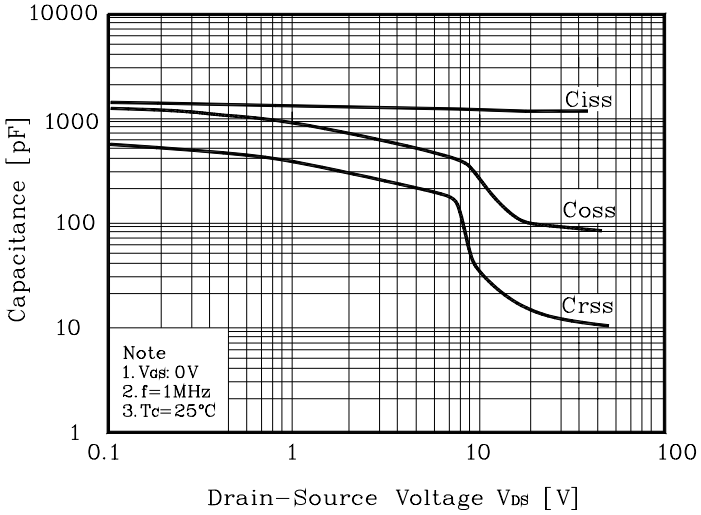
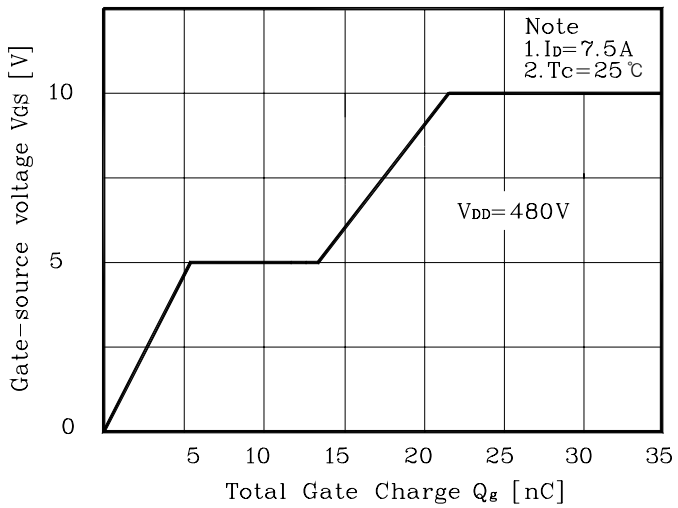


Fig.6 V_{GS} - Q_G



Electrical Characteristic Curves

Fig. 7 V_{DSS} - T_J

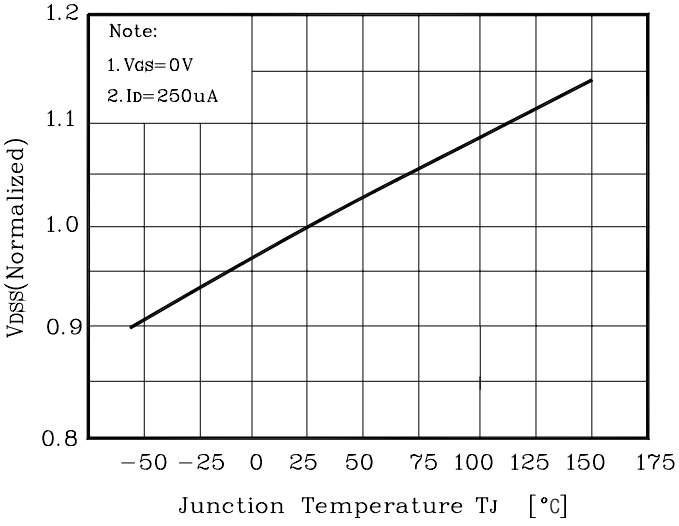


Fig.8 $R_{DS(on)}$ - T_J

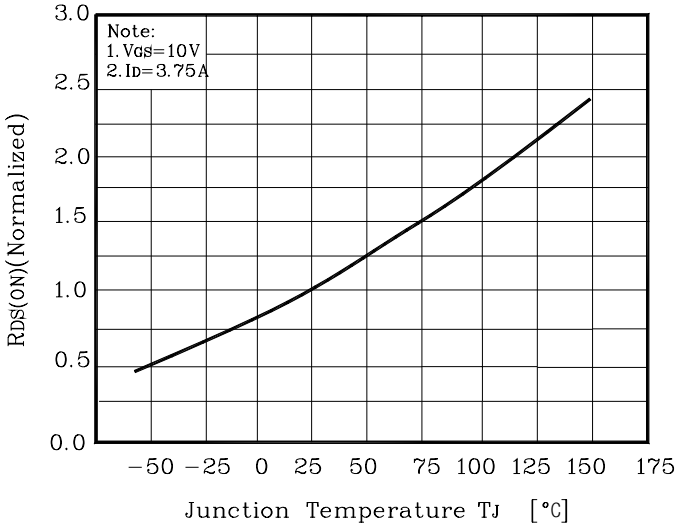


Fig. 9 I_D - T_C

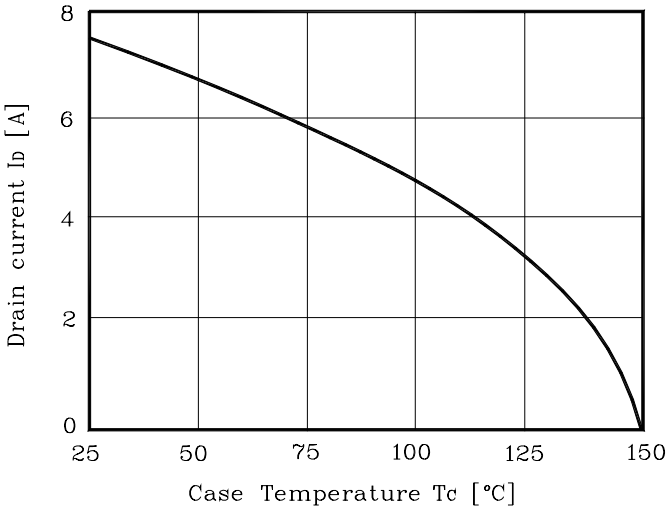


Fig. 10 Safe Operating Area

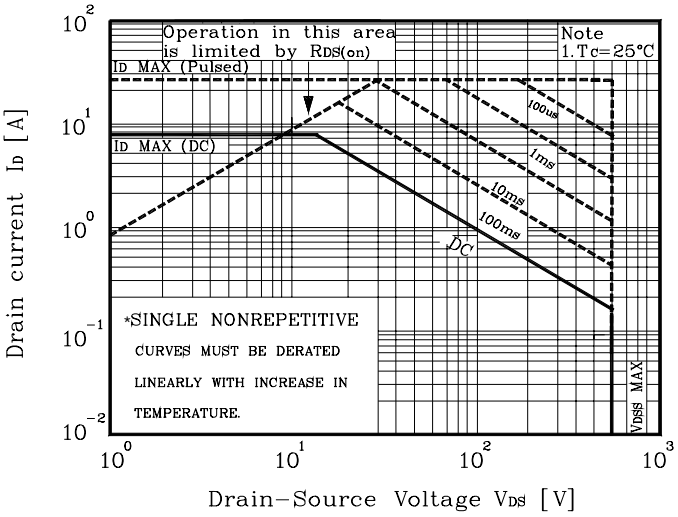


Fig. 10 Gate Charge Test Circuit & Waveform

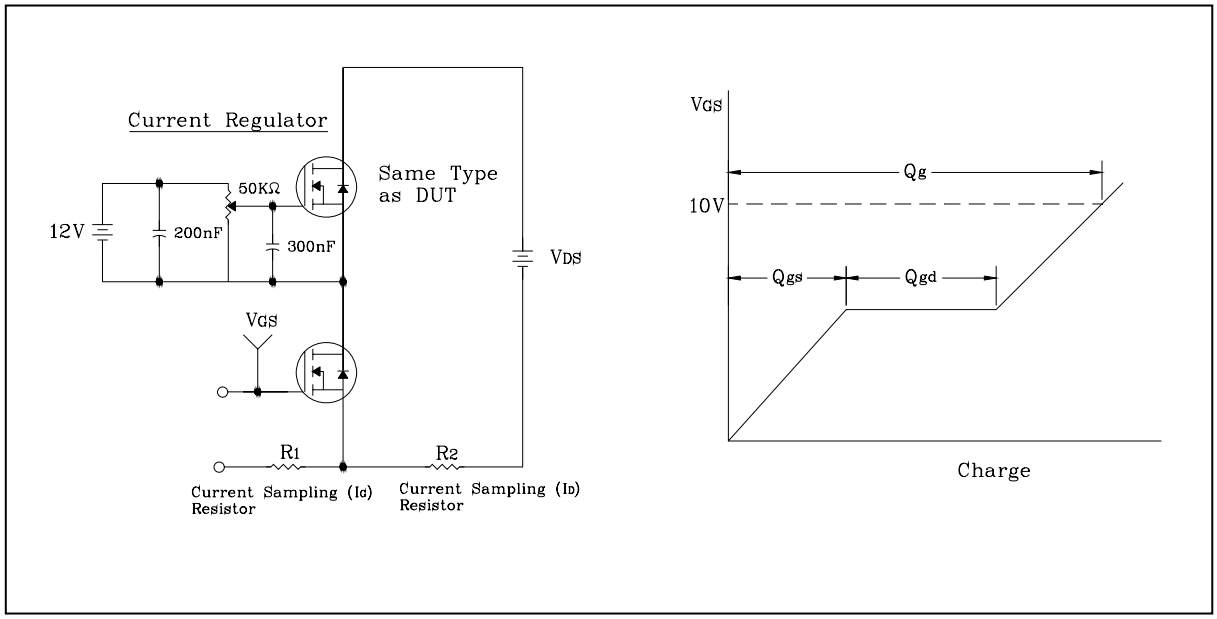


Fig. 11 Resistive Switching Test Circuit & Waveform

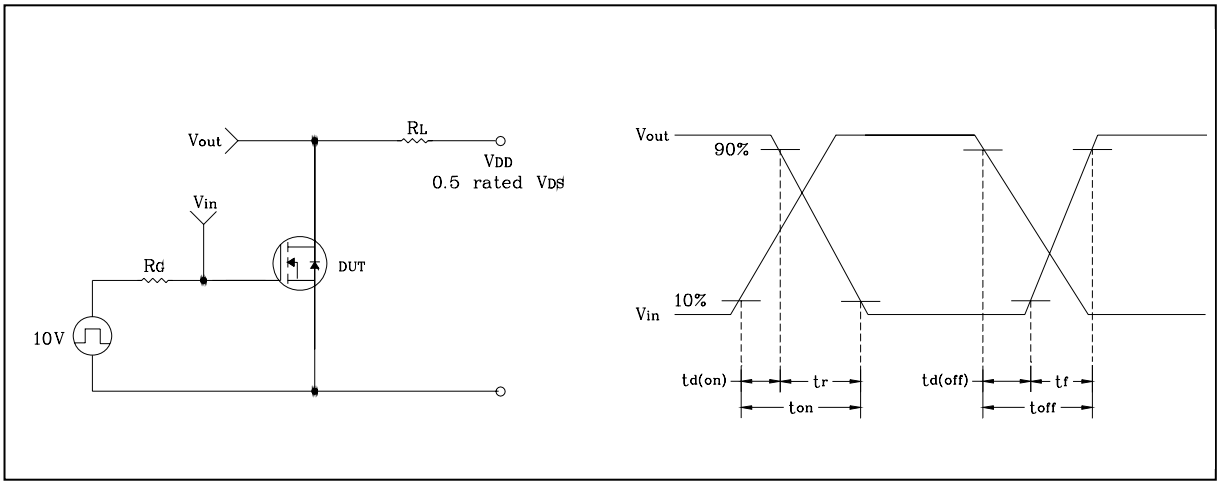


Fig. 12 E_{AS} Test Circuit & Waveform

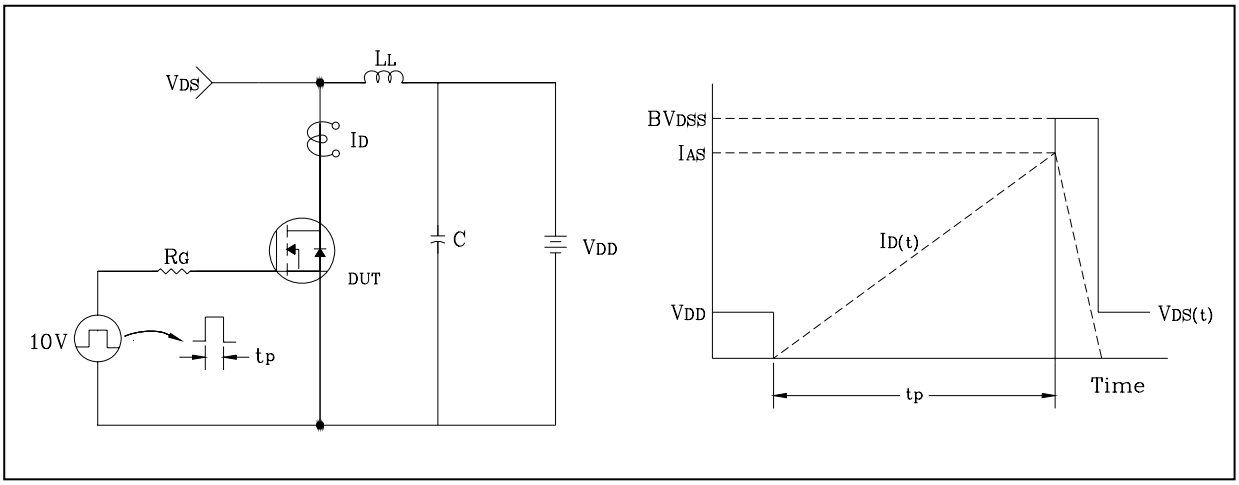
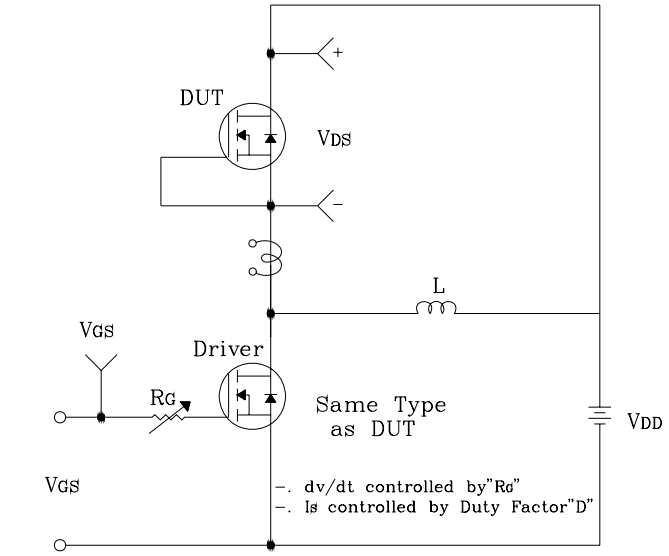
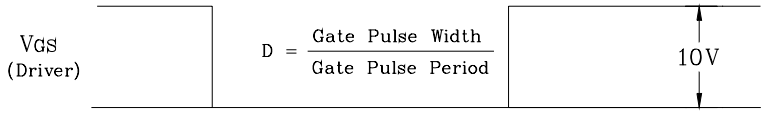
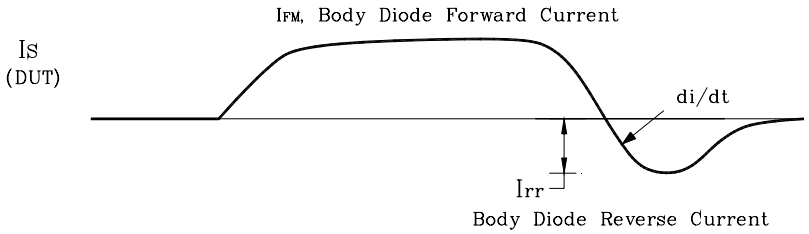
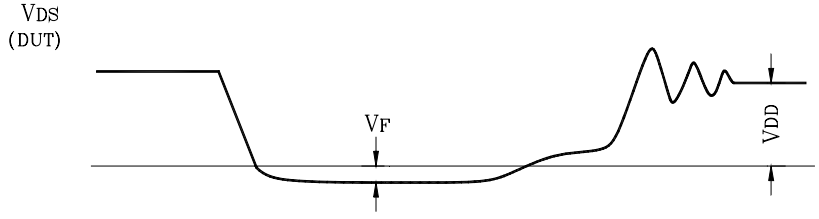


Fig. 13 Diode Reverse Recovery Time Test Circuit & Waveform

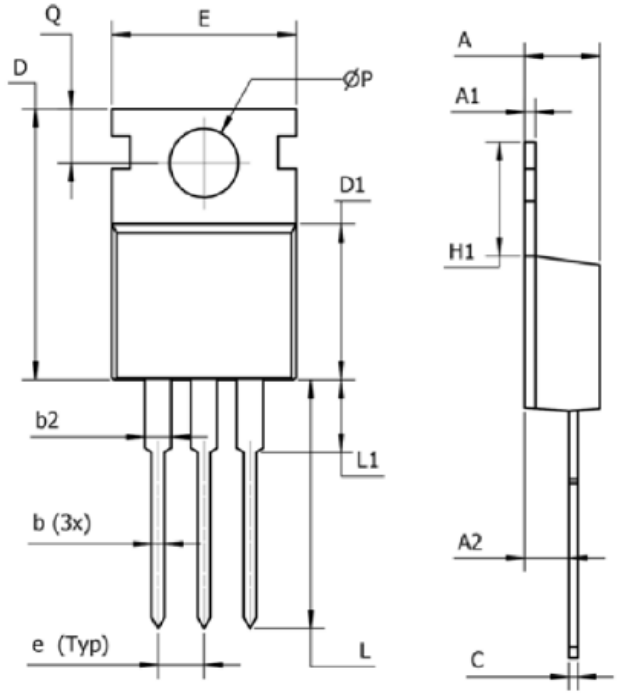








Outline Dimension



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

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