AUK Semiconductor

SMK0460P

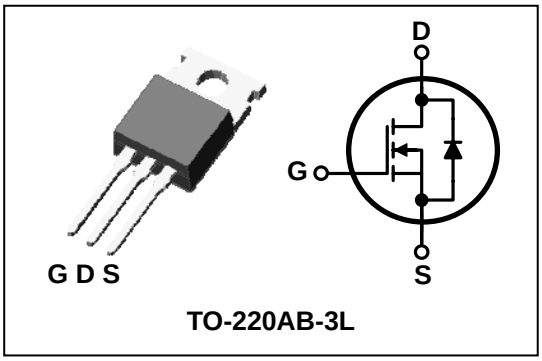
Advanced N-Ch Power MOSFET

SWITCHING REGULATOR APPLICATIONS

Features

- High Voltage: BV_{DSS}=600V(Min.)
- Low C_{rss} : C_{rss}=5.8pF(Typ.)
- Low gate charge : Qg=13nC(Typ.)
- Low $R_{DS(on)}$:$R_{DS(on)}$=2.5Ω(Max.)

PIN Connection



TO-220AB-3L

Ordering Information

Type No.	Marking	Package Code
SMK0460P	SMK0460	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℃)	4	A
		(Tc=100℃)	2.53	A
Drain current (Pulsed) *	I_{DM}		16	A
Drain Power dissipation	P_D		70	W
Avalanche current (Single) ②	I_{AS}		4	A
Single pulsed avalanche energy ②	E_{AS}		225	mJ
Avalanche current (Repetitive) ①	I_{AR}		4	A
Repetitive avalanche energy ①	E_{AR}		10	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	$R_{th(J-C)}$	-	1.78	℃/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 leakage current	I_{DSS}	V_{DS}=600V, V_{GS}=0V	-	-	1	μA
Gate-source leakage	I_{GSS}	V_{DS}=0V, V_{GS}=±30V	-	-	±100	nA
Drain-Source on-resistance ④	$R_{DS(ON)}$	V_{GS}=10V, I_D=2.0A	-	2.1	2.5	Ω
Forward transfer admittance ④	g_{fs}	V_{DS}=10V, I_D=2.0A	-	4.0	-	S
Input capacitance	Ciss	V_{GS}=0V, V_{DS}=25V, f=1MHz	-	592	789	pF
Output capacitance	Coss		-	54	72	
Reverse transfer capacitance	Crss		-	5.8	7.7	
Turn-on delay time	$t_{d(on)}$	V_{DD}=300V, I_D=4A R_G=25Ω ③④	-	10	-	ns
Rise time	t_r		-	42	-	
Turn-off delay time	$t_{d(off)}$		-	38	-	
Fall time	t_f		-	46	-	
Total gate charge	Q_g	V_{DS}=480V, V_{GS}=10V I_D=4A ③④	-	13	17	nC
Gate-source charge	Q_{gs}		-	4	-	
Gate-drain charge	Q_{gd}		-	3	-	

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

Characteristic	Symbol	Test Condition	Min	Typ	Max	Unit
Continuous source current	I_S	Integral reverse diode in the MOSFET	-	-	4	A
Source current (Pulsed) ①	I_{SM}		-	-	16	
Forward voltage ④	V_{SD}	V_{GS}=0V, I_S=4A	-	-	1.4	V
Reverse recovery time	t_{rr}	I_s=4A di_s/dt=100A/us	-	300	-	ns
Reverse recovery charge	Q_{rr}		-	2.2	-	uC

Note ;

① Repetitive Rating : Pulse Width Limited by Maximum Junction Temperature

② L=25.9mH, I_{AS}=4A, V_{DD}=50V, R_G=27Ω , 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}

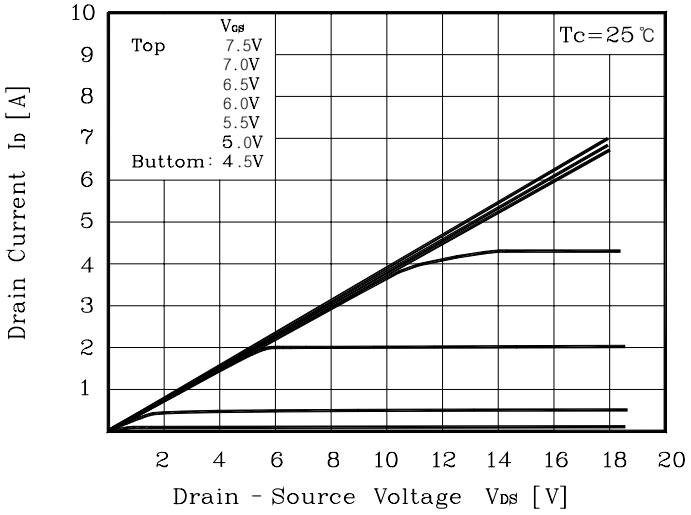


Fig. 2 I_D - V_{GS}

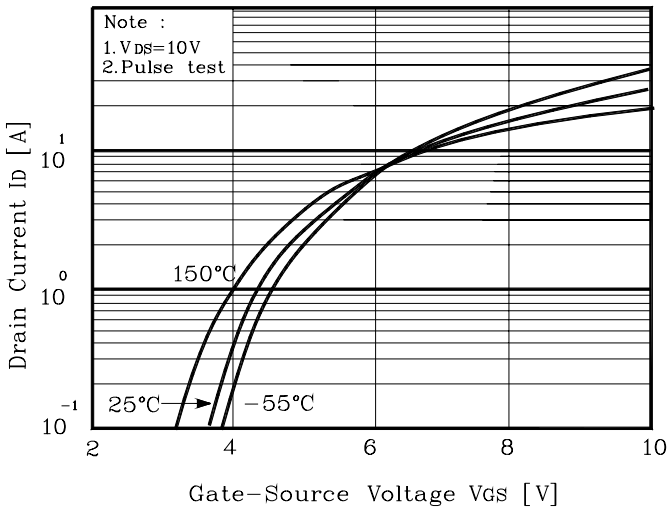


Fig. 3 $R_{DS(on)}$ - I_D

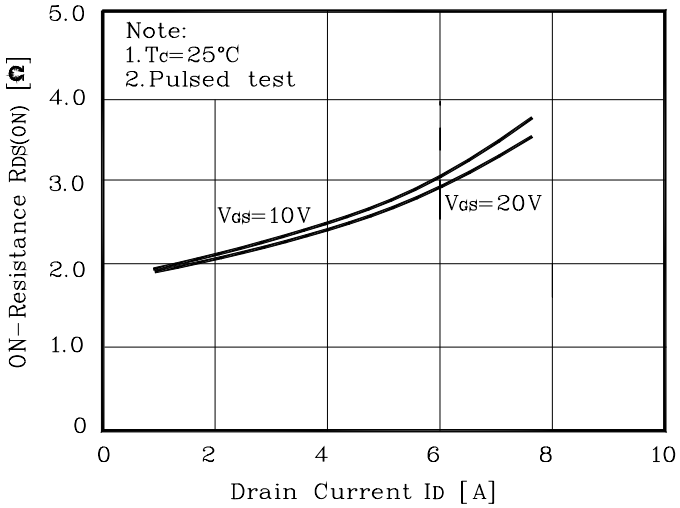


Fig. 4 I_S - V_{SD}

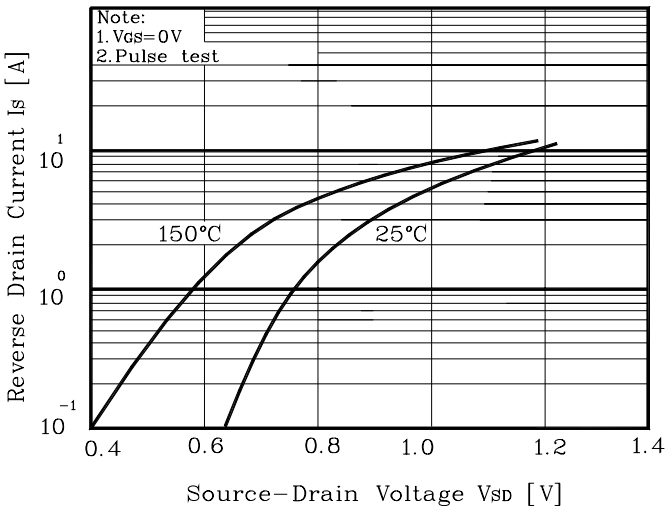


Fig. 5 Capacitance - V_{DS}

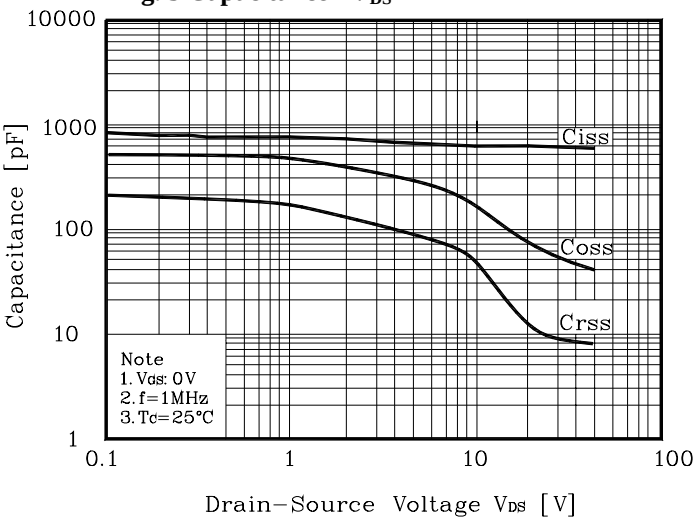
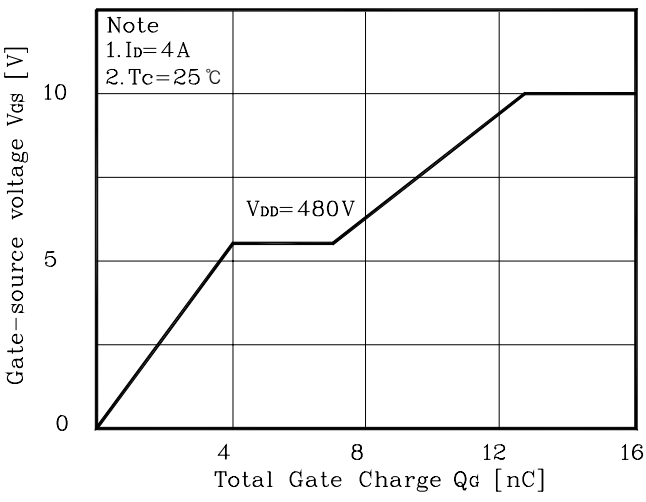


Fig. 6 V_{GS} - Q_G



Electrical Characteristic Curves

Fig. 7 V_{DSS} - T_J

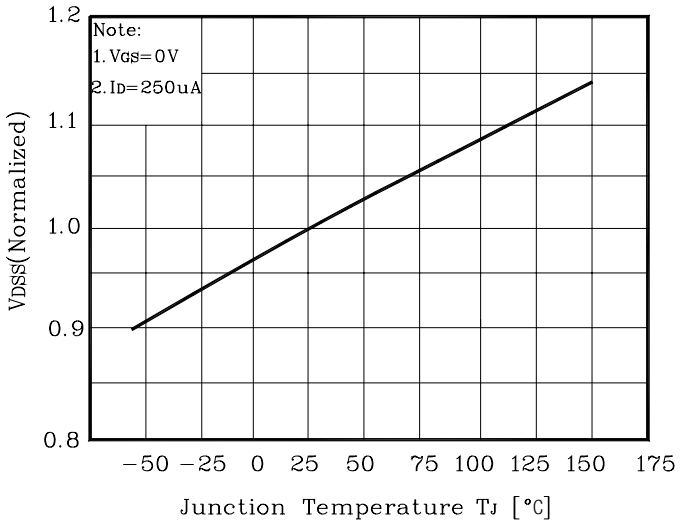


Fig. 8 $R_{DS(on)}$ - T_J

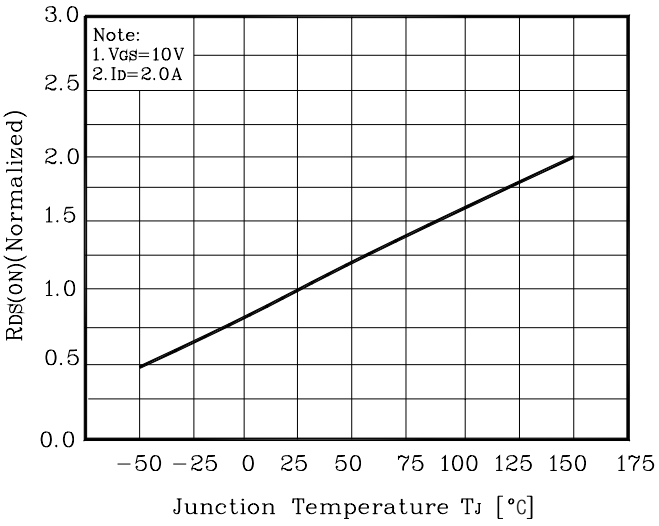


Fig. 9 I_D - T_C

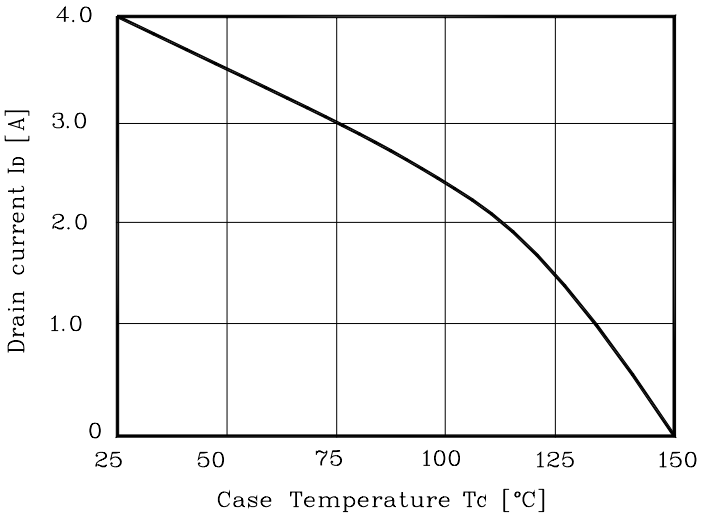


Fig. 10 Safe Operating Area

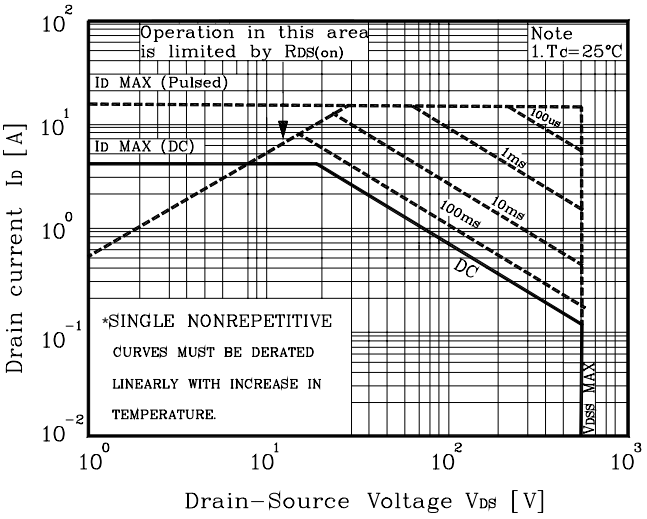


Fig. 11 Gate Charge Test Circuit & Waveform

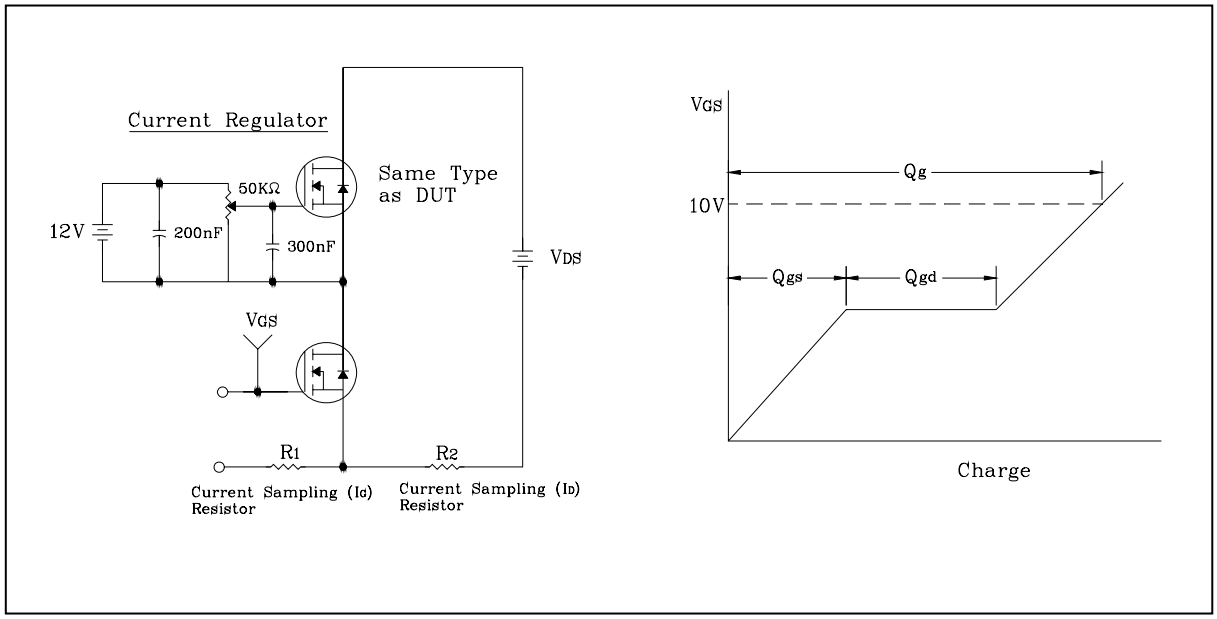


Fig. 12 Resistive Switching Test Circuit & Waveform

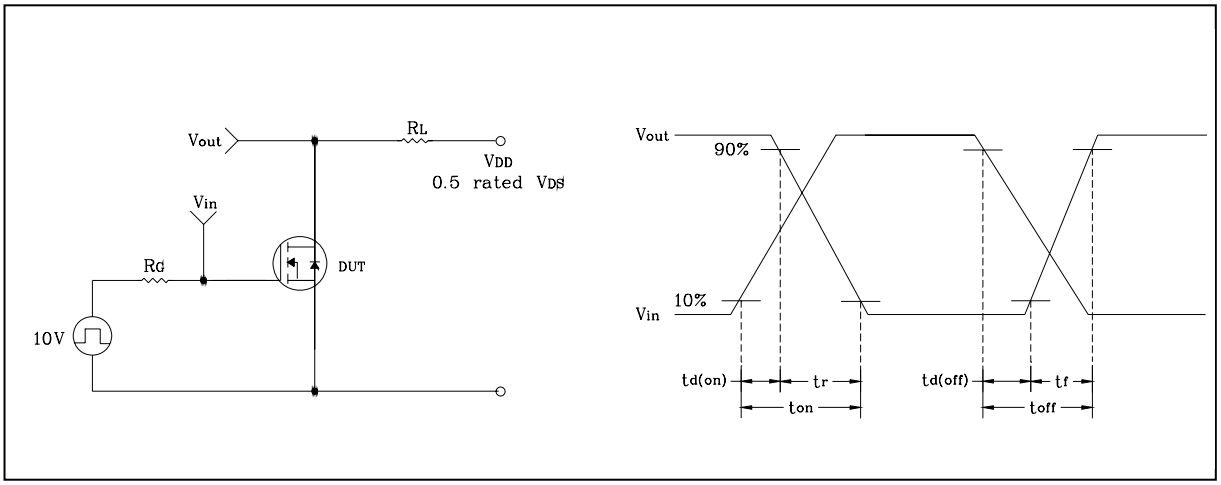


Fig. 13 E_{AS} Test Circuit & Waveform

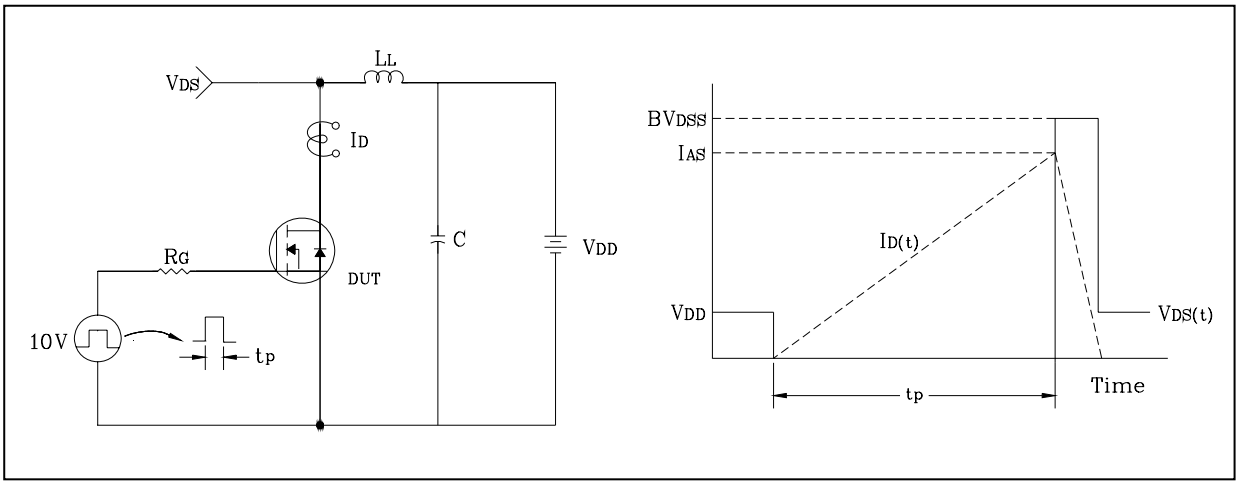
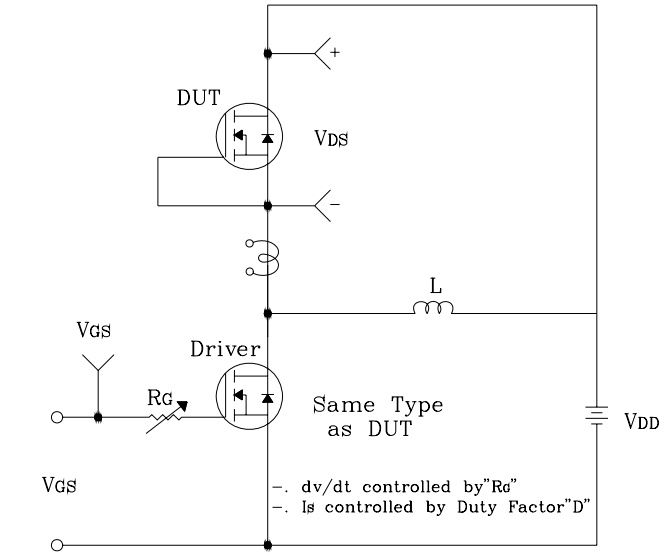
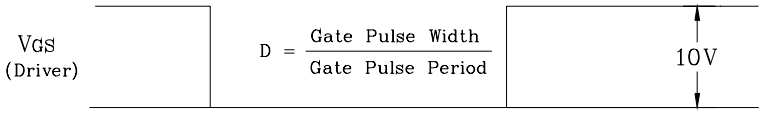
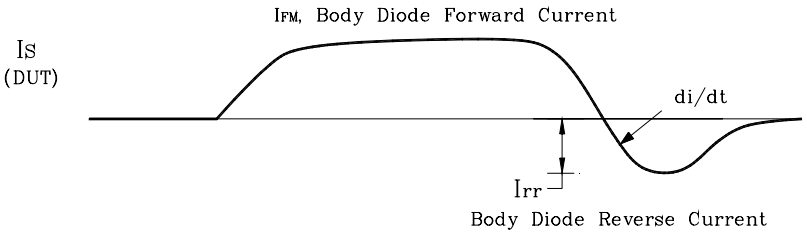
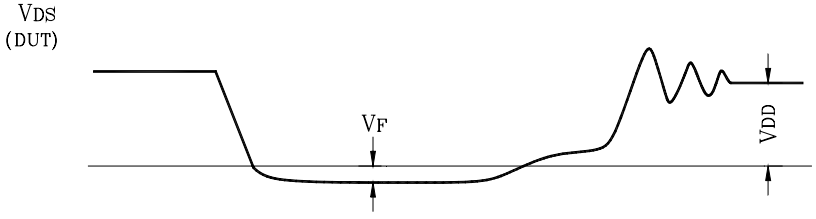


Fig. 14 Diode Reverse Recovery Time Test Circuit & Waveform

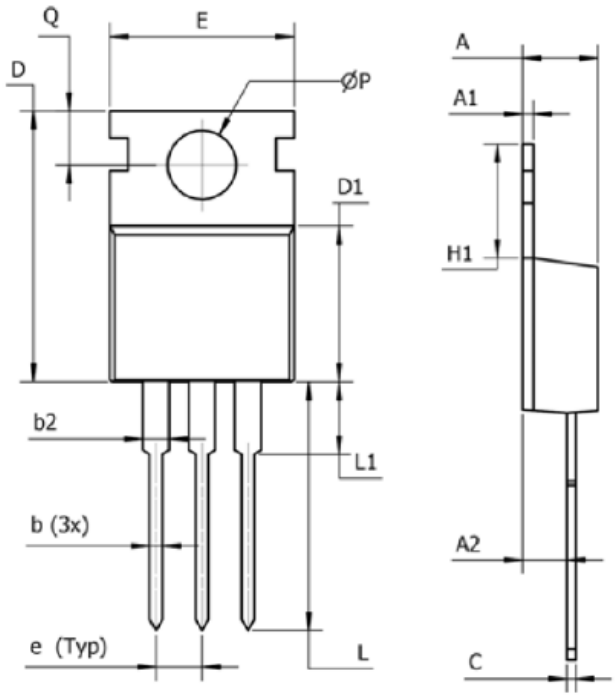








Outline Dimension



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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