AUK Semiconductor

SMK0270F

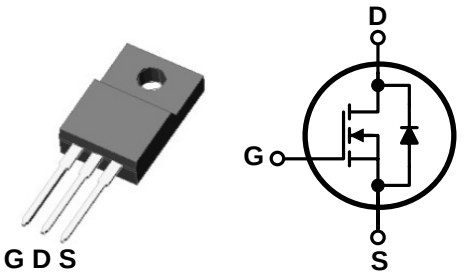
Advanced Power MOSFET

SWITCHING REGULATOR APPLICATIONS

Features

- High Voltage: BV_{DSS}=700V(Min.)
- Low C_{rss} : C_{rss}=6.0F(Typ.)
- Low gate charge : Qg=7.2nC(Typ.)
- Low $R_{DS(on)}$:$R_{DS(on)}$=6.3Ω(Max.)

PIN Connection



TO-220F-3L

Ordering Information

Type No.	Marking	Package Code
SMK0270F	SMK0270	TO-220F-3L

Absolute maximum ratings (T_C=25°C unless otherwise noted)

Characteristic	Symbol		Rating	Unit
Drain-source voltage	V_{DSS}		700	V
Gate-source voltage	V_{GSS}		±30	V
Drain current (DC) *	I_D	T_C=25℃	2.0	A
		T_C=100℃	1.3	A
Drain current (Pulsed) *	I_{DM}		8.0	A
Drain power dissipation	P_D		25	W
Avalanche current (Single) ②	I_{AS}		2.0	A
Single pulsed avalanche energy ②	E_{AS}		41	mJ
Avalanche current (Repetitive) ①	I_{AR}		2.0	A
Repetitive avalanche energy ①	E_{AR}		1.8	mJ
Junction temperature	T_J		150	°C
Storage temperature range	T_{stg}		-55~150	°C

* Limited by maximum junction temperature

Characteristic		Symbol	Typ.	Max	Unit
Thermal resistance	Junction-case	$R_{th(J-C)}$	-	4.46	℃/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	$V_{(BR)DSS}$	I_D=250 ㎂, V_{GS}=0V	700	-	-	V
Gate threshold voltage	$V_{GS(th)}$	I_D=250 ㎂, V_{GS}= V_{DS}	2.0	-	4.0	V
Drain-source cut-off current	I_{DSS}	V_{DS}=700V, V_{GS}=0V	-	-	1	㎂
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=1.0A	-	4.8	6.3	Ω
Forward transfer conductance ④	g_{fs}	V_{DS}=10V, I_D=1.0A	-	2.5	-	S
Input capacitance	C_{iss}	V_{GS}=0V, V_{DS}=25V f=1 MHz	-	395	494	pF
Output capacitance	C_{oss}		-	32	41	
Reverse transfer capacitance	C_{rss}		-	6.0	8.0	
Turn-on delay time	$t_{d(on)}$	V_{DD}=300V, I_D=2.0A R_G=25Ω ③④	-	22	-	ns
Rise time	t_r		-	10.5	-	
Turn-off delay time	$t_{d(off)}$		-	7	-	
Fall time	t_f		-	10.5	-	
Total gate charge	Q_g	V_{DS}=560V, V_{GS}=10V I_D=2.0A ③④	-	7.2	9.0	nC
Gate-source charge	Q_{gs}		-	2.5	-	
Gate-drain charge	Q_{gd}		-	1.5	-	

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	-	-	2.0	A
Source current (Pulsed) ①	I_{SP}		-	-	8.0	
Forward voltage ④	V_{SD}	V_{GS}=0V, I_S=2.0A	-	-	1.4	V
Reverse recovery time	t_{rr}	I_S=2.0A, V_{GS}=0V dI_S/dt=100A/㎲	-	260	-	ns
Reverse recovery charge	Q_{rr}		-	1.09	-	μC

Note ;

① Repetitive rating : Pulse width limited by maximum junction temperature

② L=19mH, I_{AS}=2.0A, V_{DD}=50V, R_G=25Ω

③ Pulse Test : Pulse width≤ 300 ㎲, Duty cycle≤ 2%

④ Essentially independent of operating temperature

Electrical Characteristic Curves

Fig. 1 I_D - V_{DS}

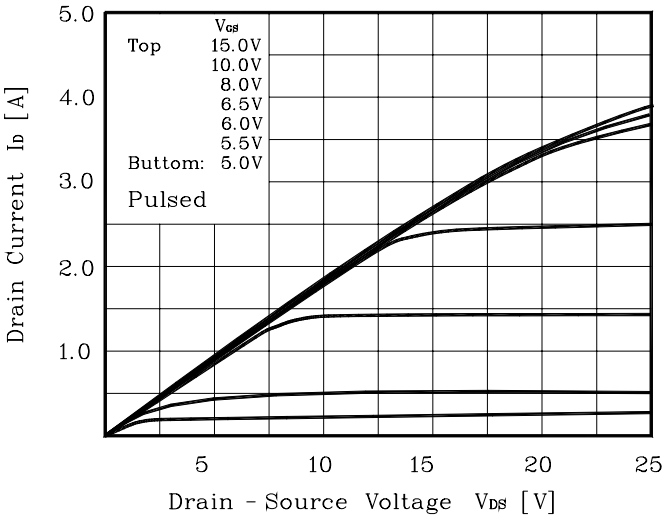


Fig. 2 I_D - V_{GS}

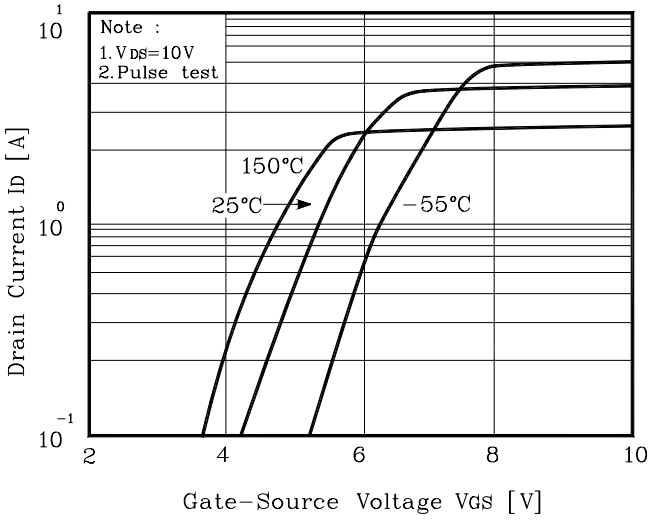


Fig. 3 $R_{DS(on)}$ - I_D

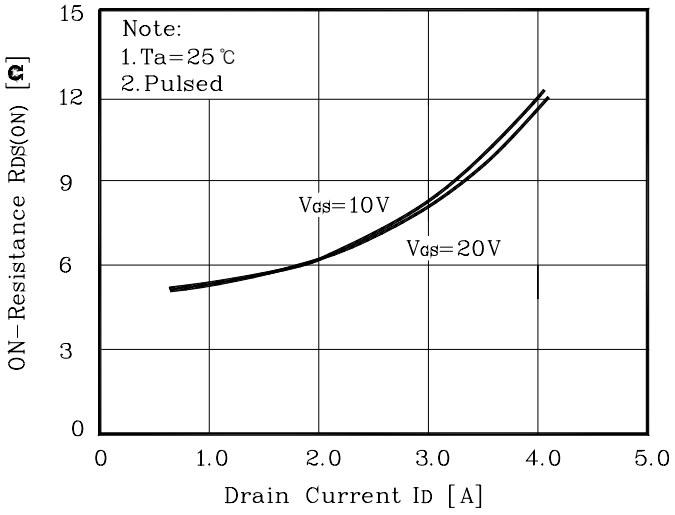


Fig. 4 I_S - V_{SD}

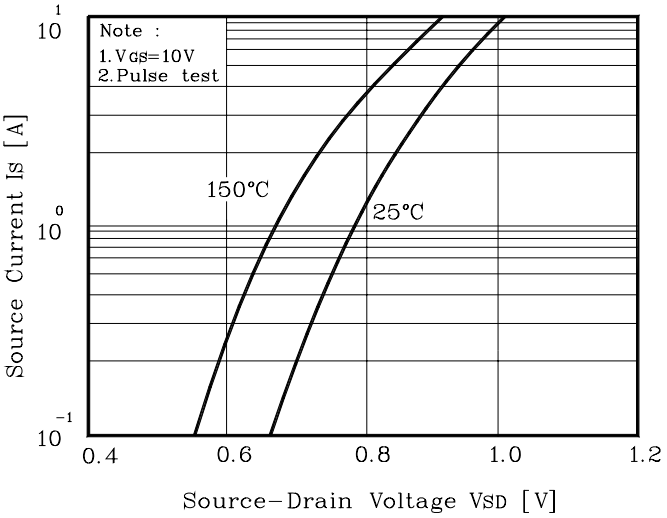


Fig. 5 Capacitance - V_{DS}

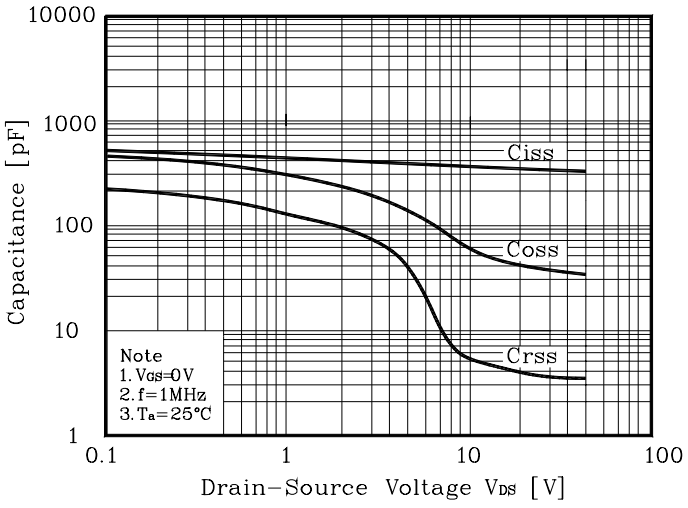


Fig. 6 V_{GS} - Q_G

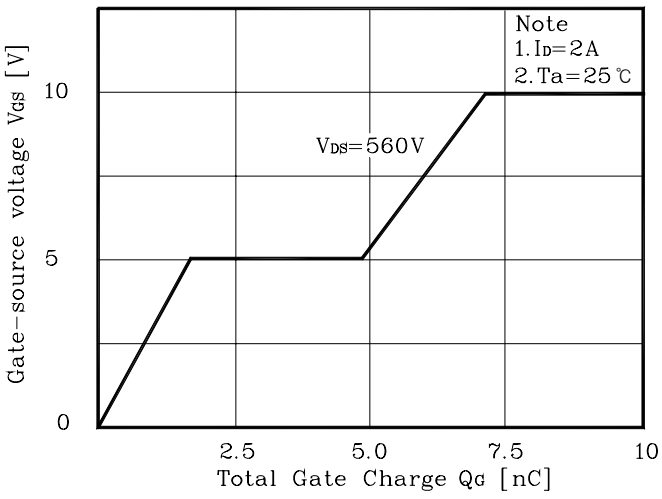


Fig. 7 V_{DSS} - T_J

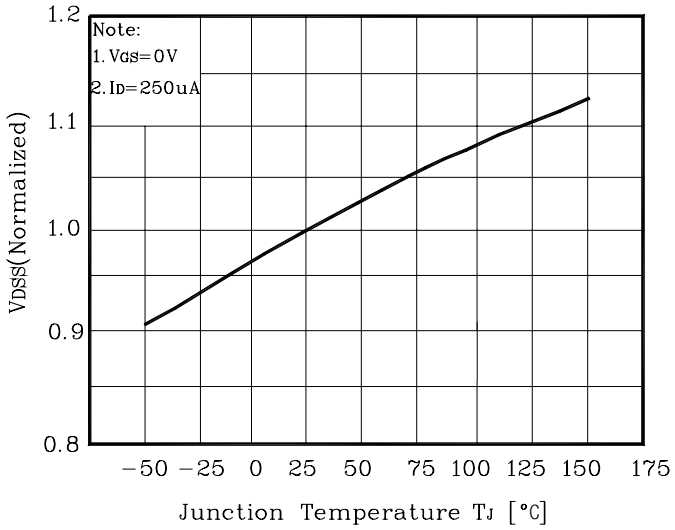


Fig. 8 $R_{DS(on)}$ - T_J

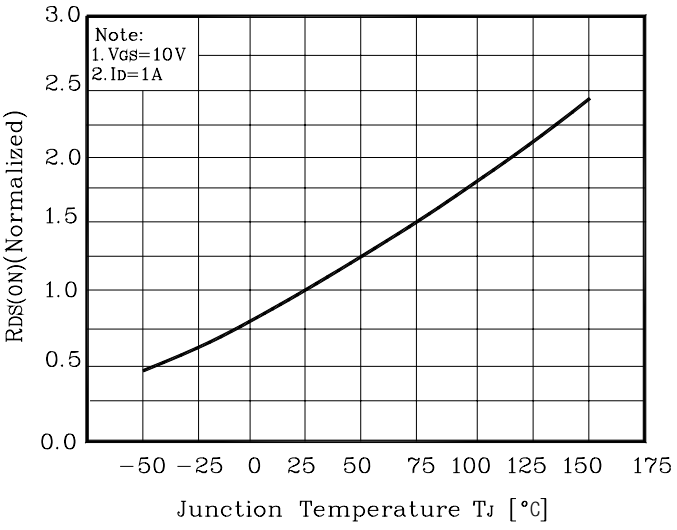


Fig. 9 I_D - T_C

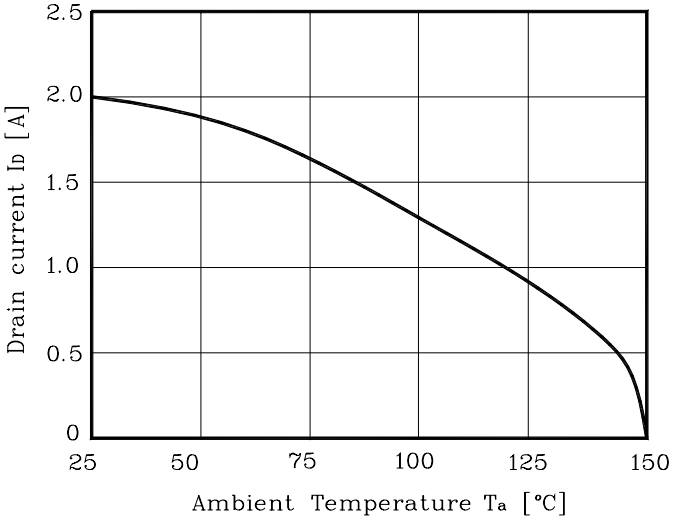


Fig. 10 Safe Operating Area

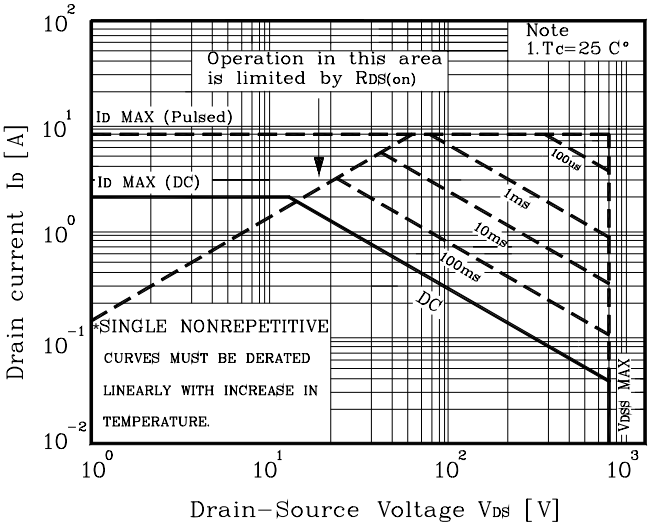


Fig. 11 Gate Charge Test Circuit & Waveform

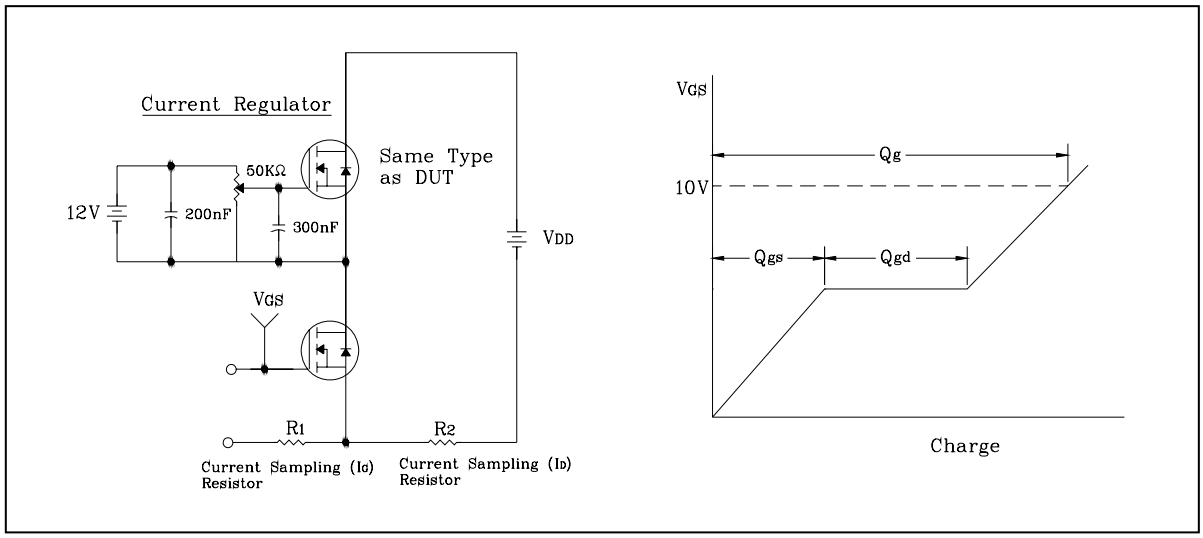


Fig. 12 Resistive Switching Test Circuit & Waveform

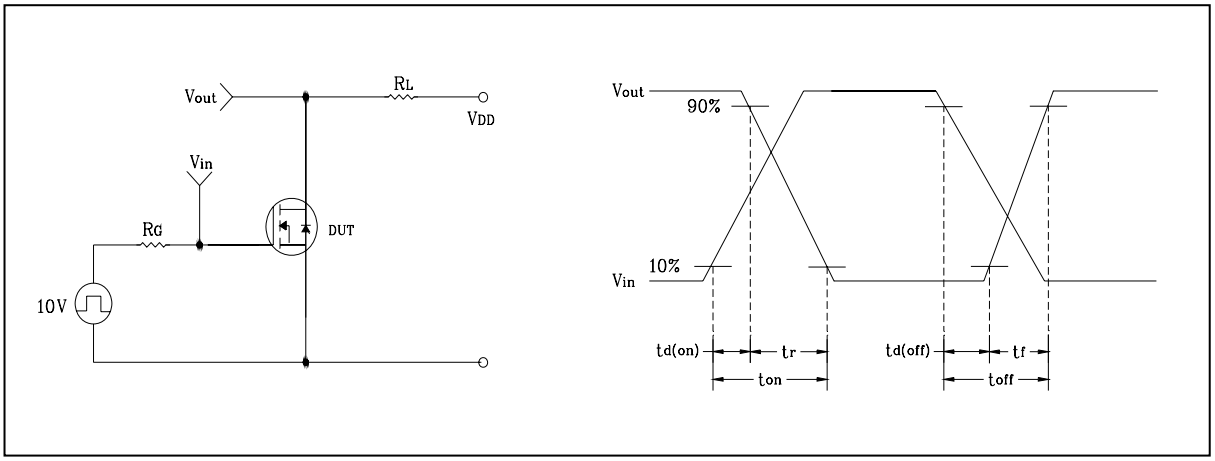


Fig. 13 E_{AS} Test Circuit & Waveform

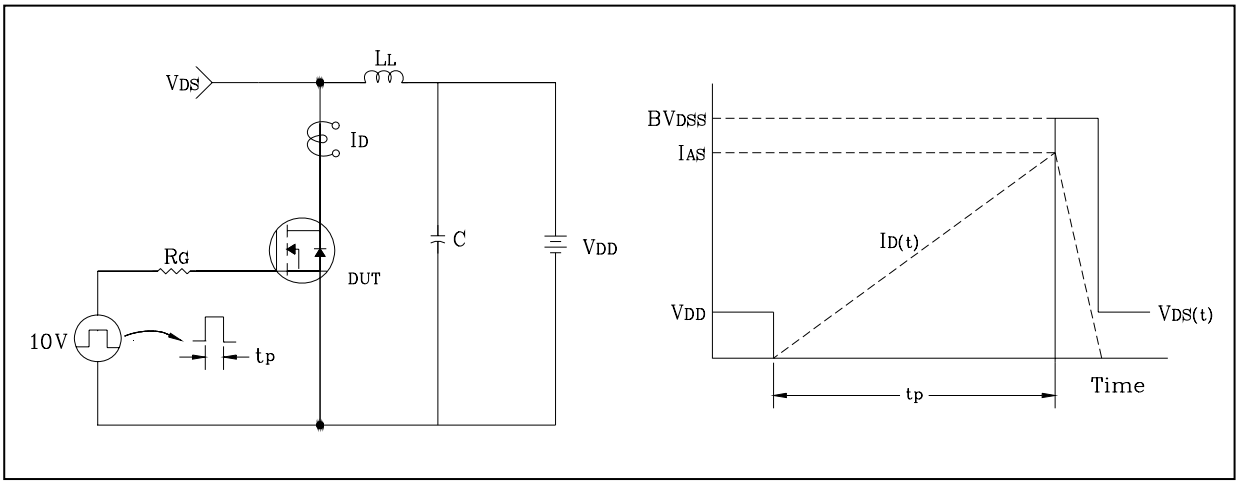
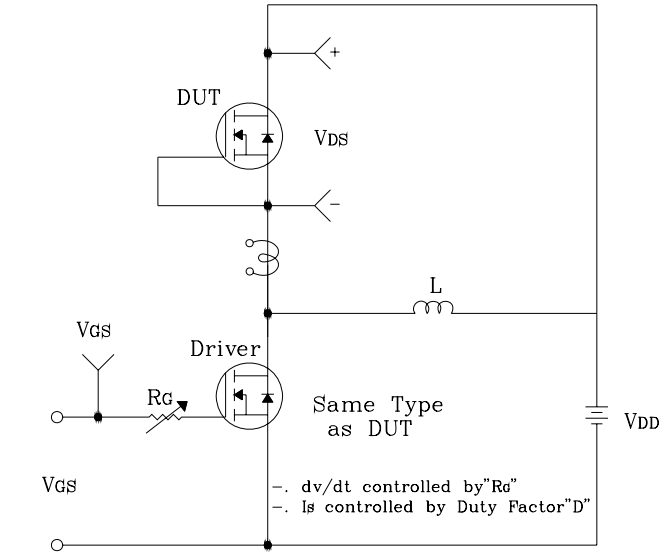
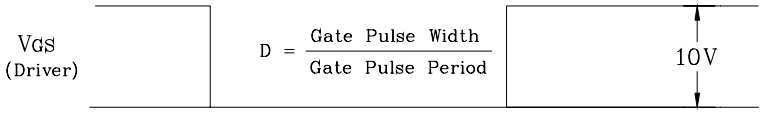
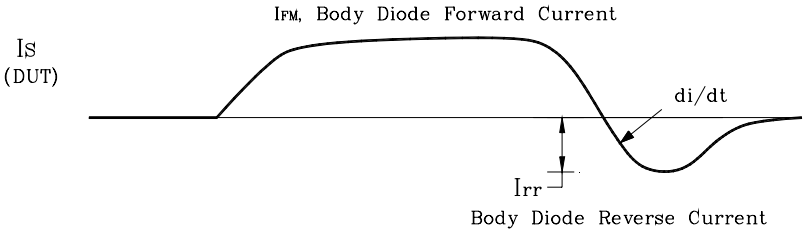
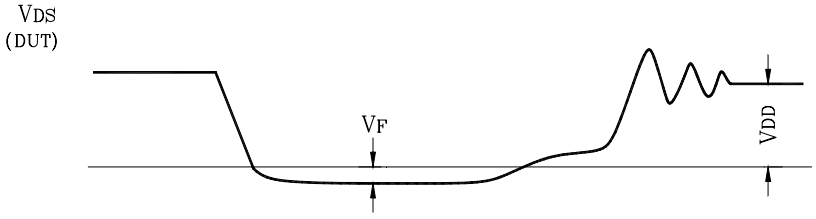


Fig. 14 Diode Reverse Recovery Time Test Circuit & Waveform

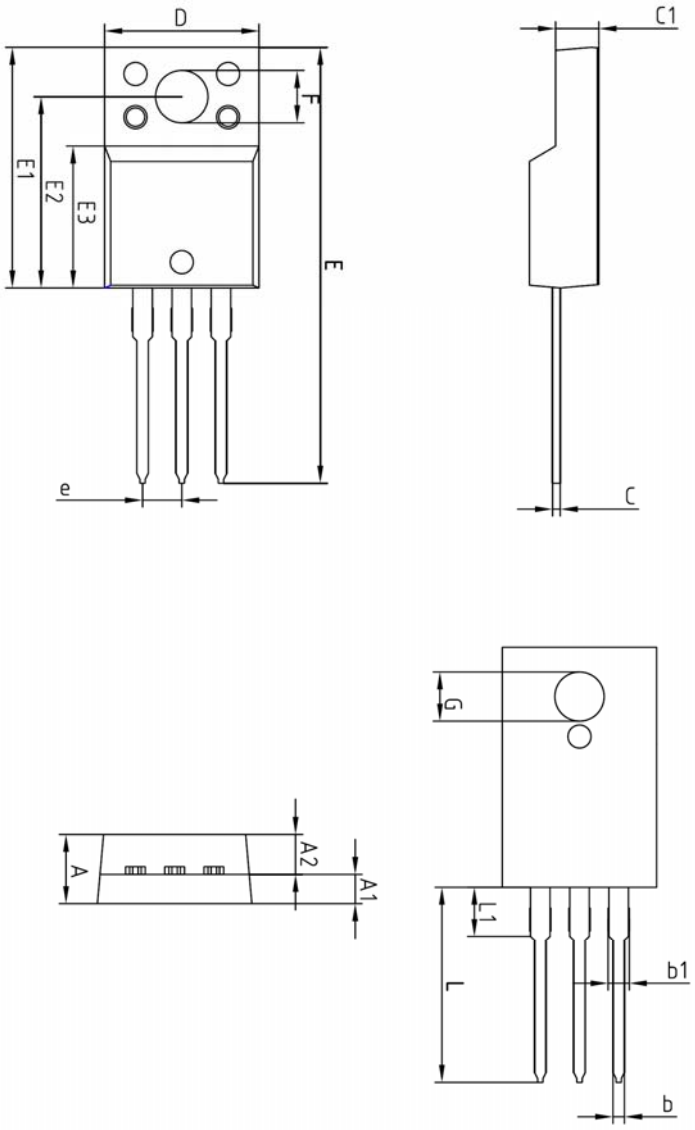








Outline Dimension



SYMBOL	MILLIMETERS			NOTE
	MINIMUM	NOMINAL	MAXIMUM	
A	–	–	4.60	
A1	2.45	2.50	2.55	
A2	1.95	2.00	2.05	
b	0.65	0.75	0.85	
b1	1.07	1.27	1.47	
C	0.40	0.50	0.60	
C1	2.70	2.80	2.90	
D	9.90	10.00	10.10	
E	28.00	–	28.60	
E1	15.50	15.60	15.70	
E2	12.30	12.40	12.50	
E3	9.15	9.20	9.25	
F	3.30	3.40	3.50	
G	3.10	3.20	3.30	
e	2.54 BSC			
L	12.40	–	13.00	
L1	3.46 BSC			

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