KODENSHI AUK

SMK0825F

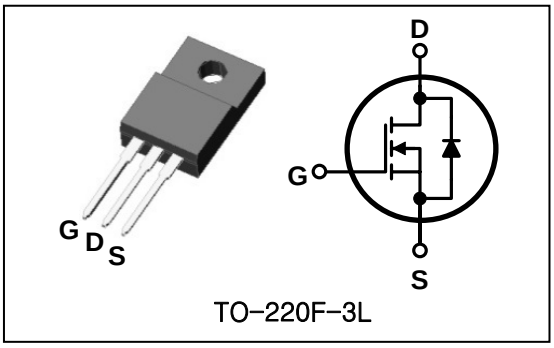
Advanced N-Ch Power MOSFET

SWITCHING REGULATOR APPLICATIONS

Features

- High Voltage : BV_{DSS}=250V(Min.)
- Low C_{rss} : C_{rss}=33pF(Typ.)
- Low gate charge : Qg=14.5nC(Typ.)
- Low $R_{DS(on)}$: $R_{DS(on)}$=0.43Ω(Max.)

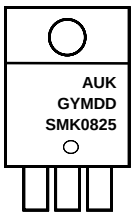
PIN Connection



Ordering Information

Type No.	Marking	Package Code
SMK0825F	SMK0825	TO-220F-3L

Marking Diagram



Column 1 : Manufacturer

Column 2 : Production Information
e.g.) GYMDD
-. G : Factory management code
-. YMDD : Date Code (year, month, date)

Column 3 : Device Code

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

Characteristic Symbol			Rating	Unit
Drain-source voltage	V_{DSS}		250	V
Gate-source voltage	V_{GSS}		±30	V
Drain current (DC) * I	D	T_C=25℃	8	A
		T_C=100℃	5.2	A
Drain current (Pulsed) *	I_{DM}		32	A
Power dissipation	P_D 29			W
Avalanche current (Single) ②	I_{AS} 8			A
Single pulsed avalanche energy ②	E_{AS} 356			mJ
Avalanche current (Repetitive) ①	I_{AR} 8			A
Repetitive avalanche energy ①	E_{AR} 7.4			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	$_{th(J-C)}$ -		4.31	℃/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	$_D$=250uA, V_{GS}=0V 250		-	-	V
Gate threshold voltage	$V_{GS(th)}$ I	$_D$=250uA, V_{DS}= V_{GS} 2.	0	-	4.0	V
Drain-source cut-off current	I_{DSS} V	$_{DS}$=250V, V_{GS}=0V -		-	1	uA
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=4.0A -		0.35	0.43	Ω
Forward transfer conductance ④	g_{fs} V	$_{DS}$=10V, I_D=4.0A -		7.0	-	S
Input capacitance	C_{iss} -	V_{GS}=0V, V_{DS}=25V f=1 MHz		619	773	pF
Output capacitance	C_{oss} -			141	176	
Reverse transfer capacitance	C_{rss}		- 33		41	
Turn-on delay time	$t_{d(on)}$ -	V_{DD}=125V, I_D=8A R_G=25Ω ③④		15	-	ns
Rise time	t_r -			85	-	
Turn-off delay time	$t_{d(off)}$ -			90	-	
Fall time	t_f		- 65		-	
Total gate charge	Q_g -	V_{DS}=200V, V_{GS}=10V I_D=8A ③④		14.5	18.2	nC
Gate-source charge	Q_{gs} -			4.0	-	
Gate-drain charge	Q_{gd}		- 4.	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		-	8	A
Source current (Pulsed) ①	I_{SM}		- -		32	
Forward voltage ④	V_{SD} V	$_{GS}$=0V, I_S=8A -		-	1.4	V
Reverse recovery time	t_{rr}	I_S=8A, V_{GS}=0V dI_F/dt=100A/us	- 178 -			ns
Reverse recovery charge	Q_{rr}		-	1.16	-	uC

Note ;

① Repetitive rating : Pulse width limited by maximum junction temperature

② L=8.9mH, I_{AS}=8A, 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}

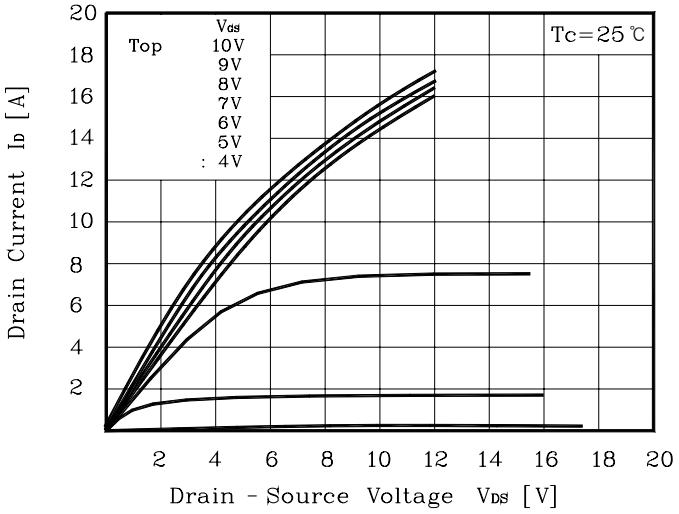


Fig. 2 I_D - V_{GS}

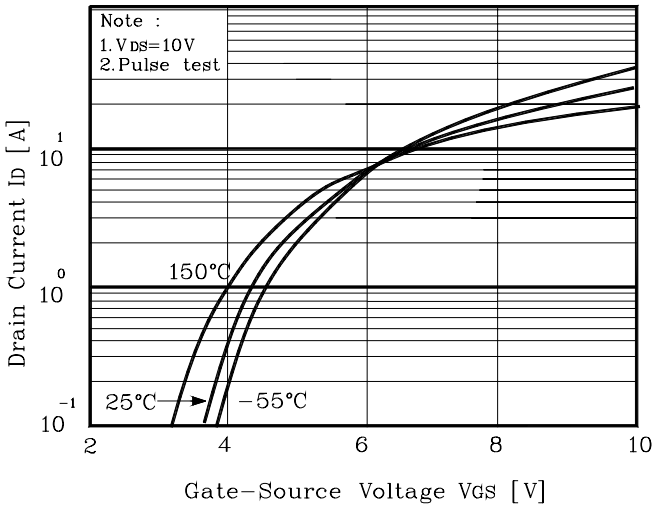


Fig. 3 $R_{DS(on)}$ - I_D

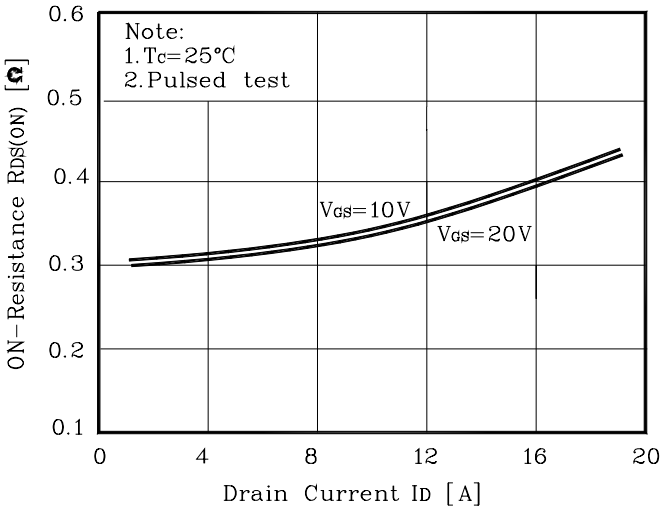


Fig. 4 I_S - V_{SD}

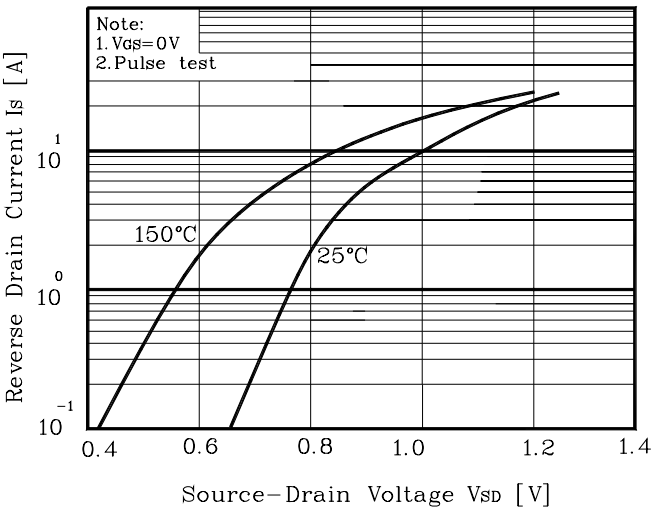


Fig. 5 Capacitance - V_{DS}

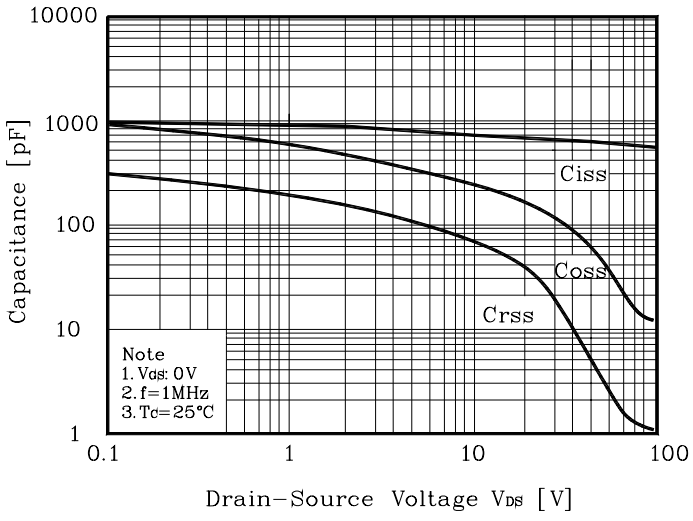


Fig. 6 V_{GS} - Q_G

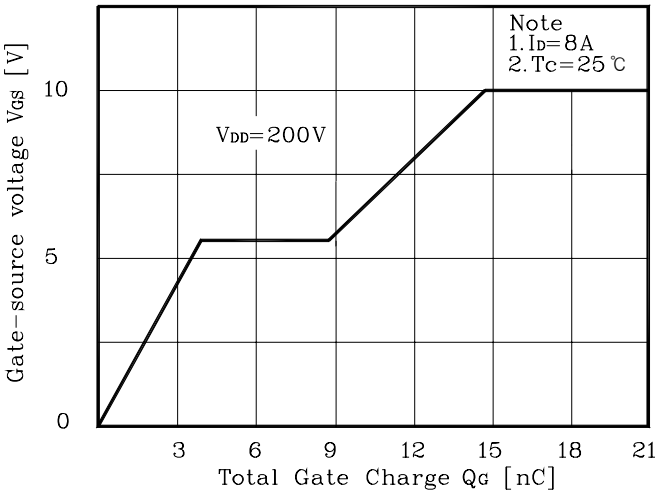


Fig. 7 V_{DSS} - T_J

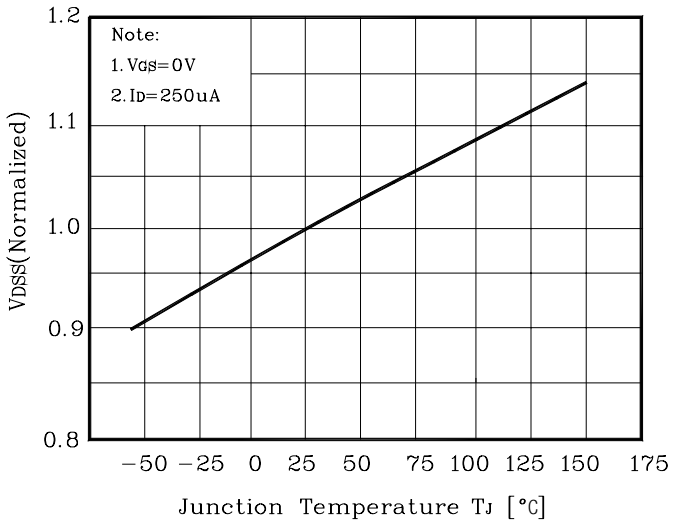
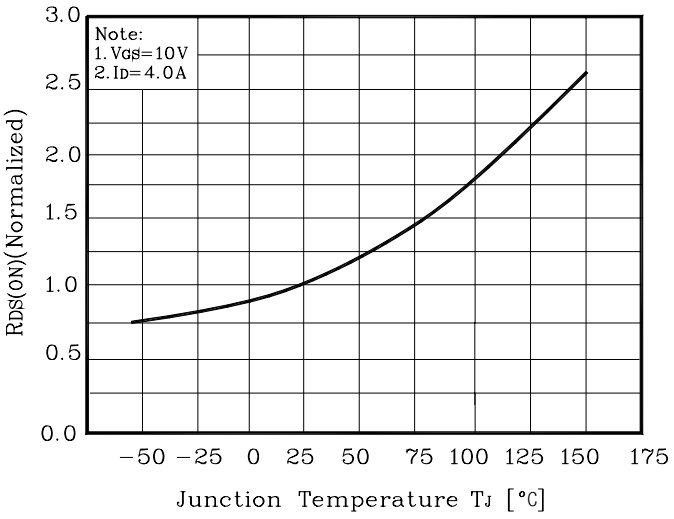


Fig. 8 $R_{DS(on)}$ - T_J



Fi g. 9 I_D - T_C

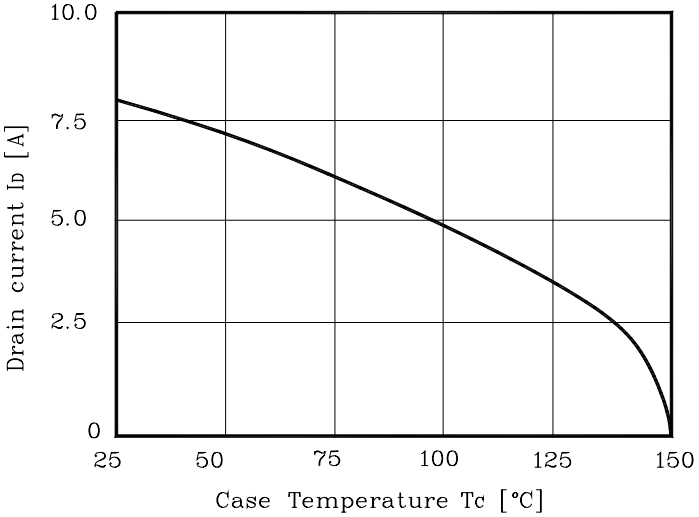


Fig. 10 Safe Operating Area

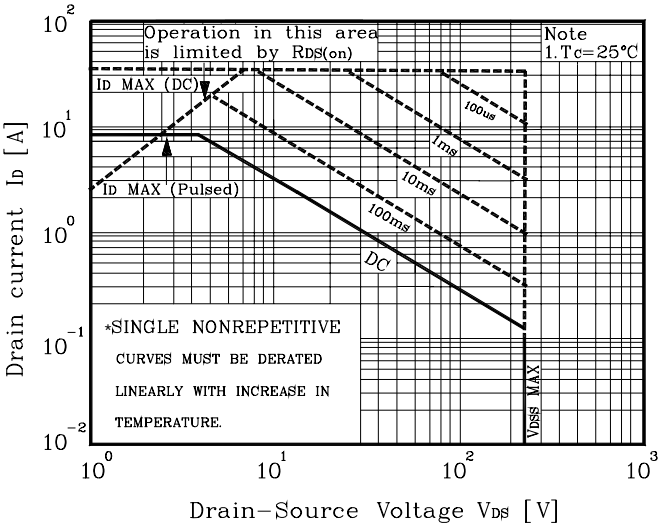


Fig. 11 Gate Charge Test Circuit & Waveform

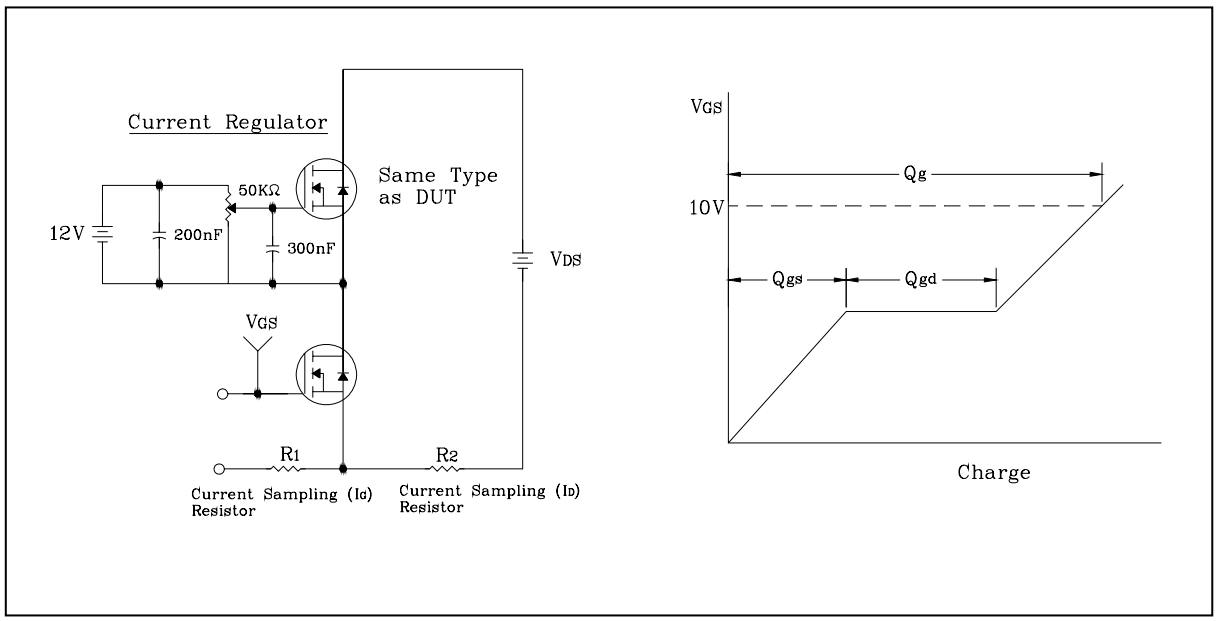


Fig. 12 Resistive Switching Test Circuit & Waveform

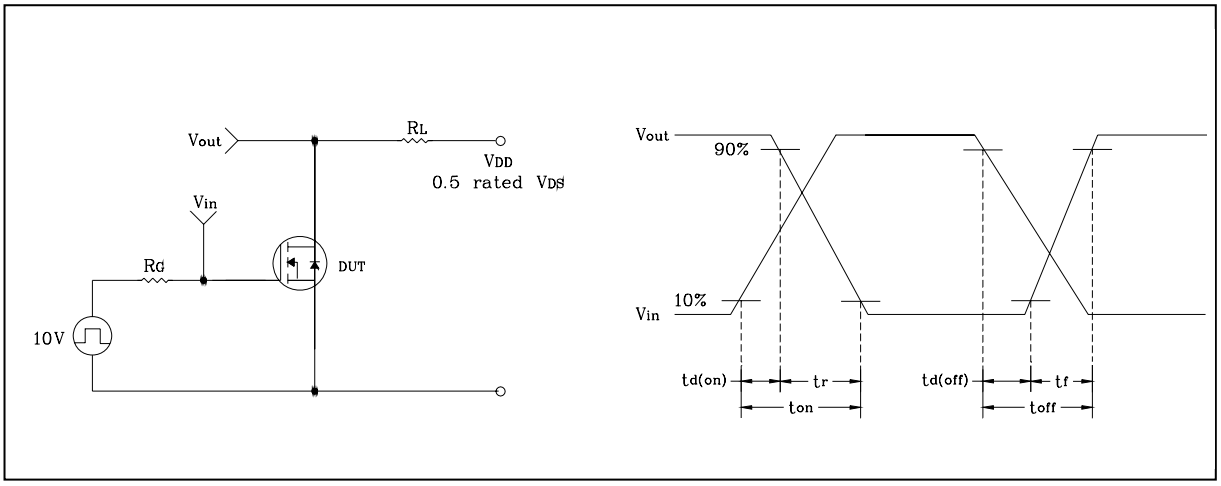


Fig. 13 E_{AS} Test Circuit & Waveform

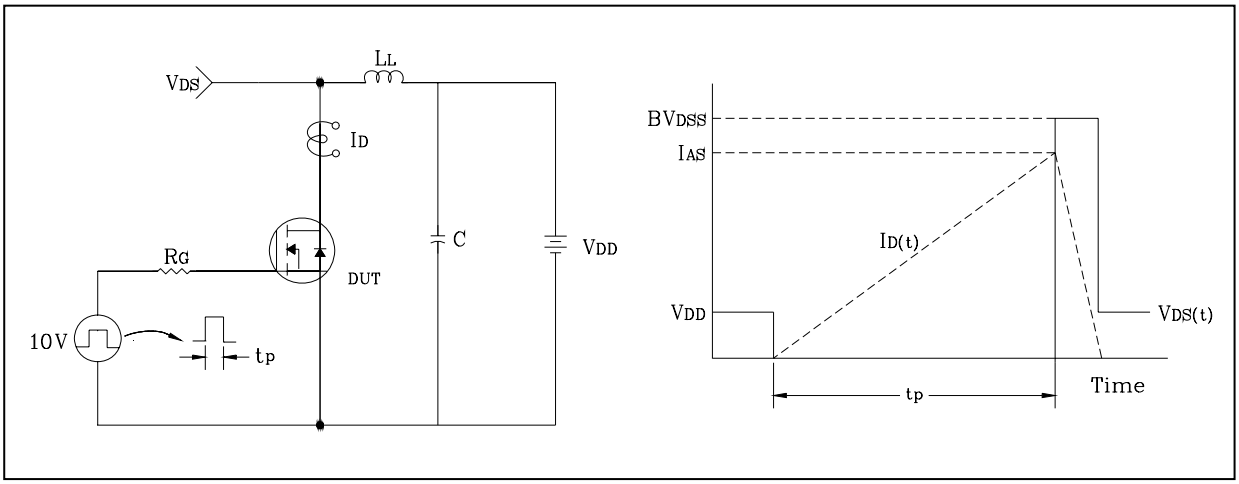
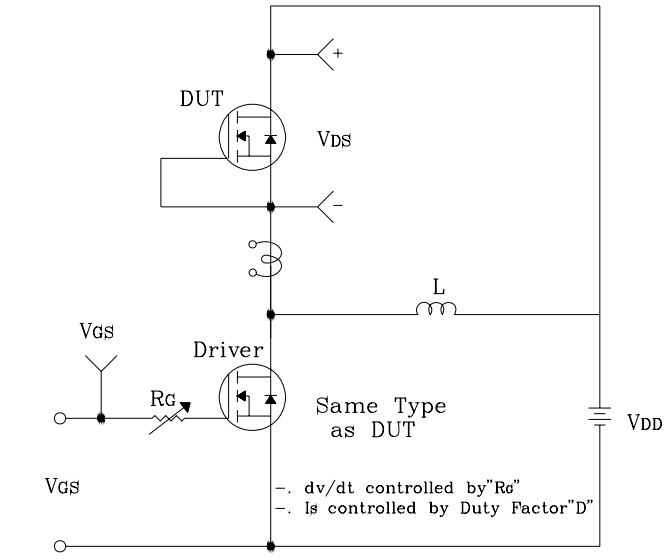
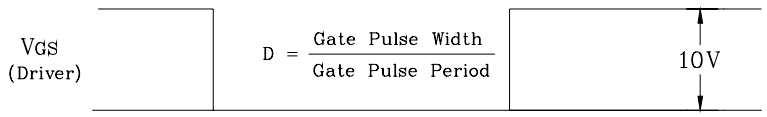
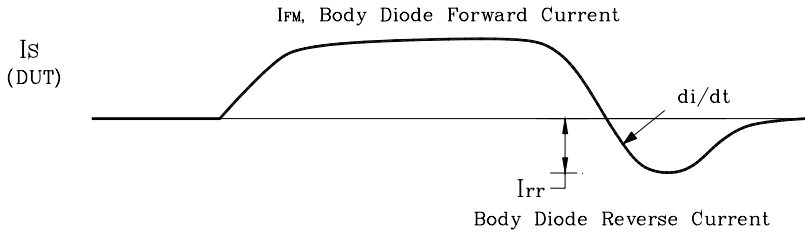
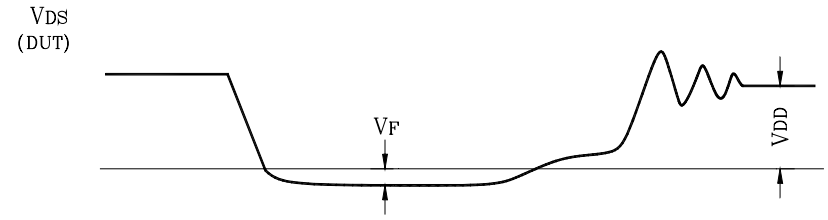


Fig. 14 Diode Reverse Recovery Time Test Circuit & Waveform



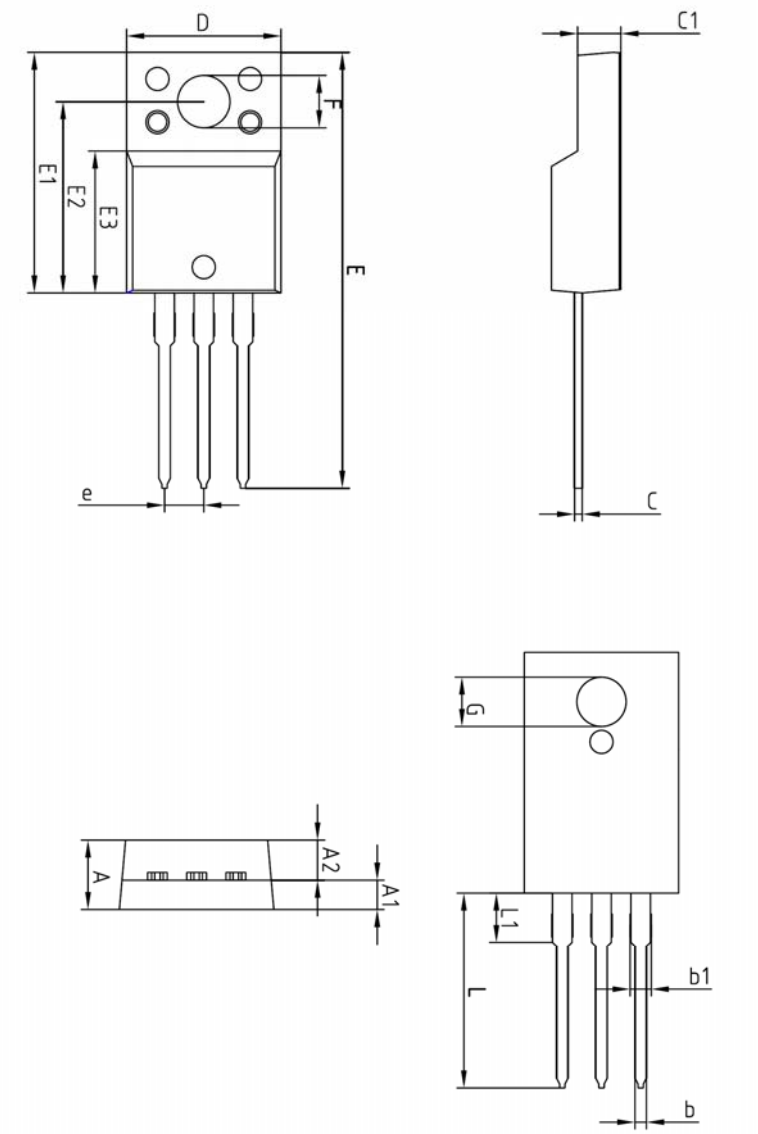






Outline Dimension

unit: mm



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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