KODENSHI AUK

SMK1265FD

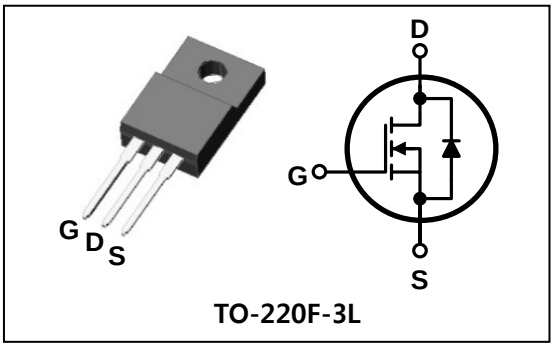
Advanced N-Ch Power MOSFET

SWITCHING REGULATOR APPLICATIONS

Features

- High Voltage : BV_{DSS}=650V(Min.)
- Low C_{rss} : C_{rss}=14.6pF(Typ.)
- Low gate charge : Qg=41nC(Typ.)
- Low $R_{DS(on)}$: $R_{DS(on)}$=0.8Ω(Max.)

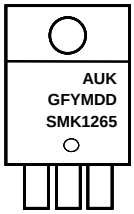
PIN Connection



Ordering Information

Type No.	Marking	Package Code
SMK1265FD	SMK1265	TO-220F-3L

Marking Diagram



Column 1 : Manufacturer

Column 2 : Production Information
e.g.) GFYMDD
-. G : Option Code (H : Halogen Free)
-. F : 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}		650	V
Gate-source voltage	V_{GSS}		±30	V
Drain current (DC) *	I_D	T_C=25℃	12	A
		T_C=100℃	7.58	A
Drain current (Pulsed) *	I_{DM}		48	A
Power dissipation	P_D		48	W
Avalanche current (Single) ②	I_{AS}		12	A
Single pulsed avalanche energy ②	E_{AS}		140	mJ
Avalanche current (Repetitive) ①	I_{AR}		12	A
Repetitive avalanche energy ①	E_{AR}		7.6	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	$R_{th(J-C)}$	-	2.6	℃/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	650	-	-	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}=650V, 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=6.0A	-	0.68	0.80	Ω
Forward transfer conductance ④	g_{fs}	V_{DS}=10V, I_D=6.0A	-	10	-	S
Input capacitance	C_{iss}	V_{GS}=0V, V_{DS}=25V f=1 MHz	-	2162	2882	pF
Output capacitance	C_{oss}		-	183	244	
Reverse transfer capacitance	C_{rss}		-	14.6	19.4	
Turn-on delay time	$t_{d(on)}$	V_{DD}=300V, I_D=12A R_G=25Ω ③④	-	30	-	ns
Rise time	t_r		-	85	-	
Turn-off delay time	$t_{d(off)}$		-	140	-	
Fall time	t_f		-	90	-	
Total gate charge	Q_g	V_{DS}=520V, V_{GS}=10V I_D=12A ③④	-	43	65	nC
Gate-source charge	Q_{gs}		-	13	-	
Gate-drain charge	Q_{gd}		-	10.5	-	

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	-	-	12	A
Source current (Pulsed) ①	I_{SM}		-	-	48	
Forward voltage ④	V_{SD}	V_{GS}=0V, I_S=12A	-	-	1.4	V
Reverse recovery time	t_{rr}	I_S=12A, V_{GS}=0V dI_F/dt=100A/us	-	500	-	ns
Reverse recovery charge	Q_{rr}		-	4.3	-	uC

Note ;

① Repetitive rating : Pulse width limited by maximum junction temperature

② L=1.8mH, I_{AS}=12A, 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}

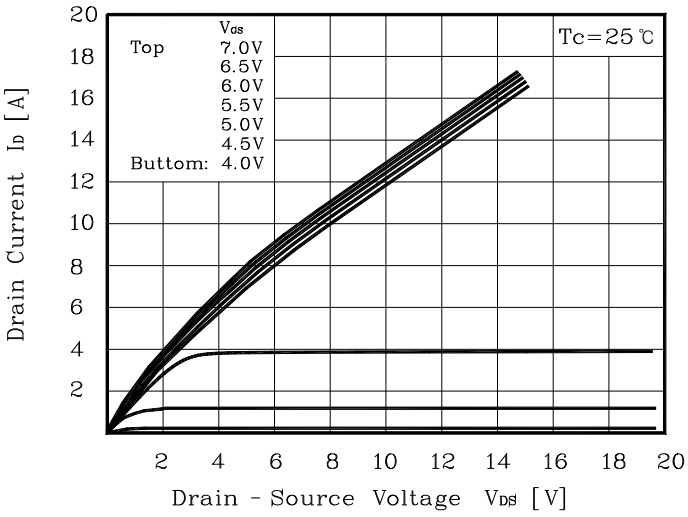


Fig. 2 I_D - V_{GS}

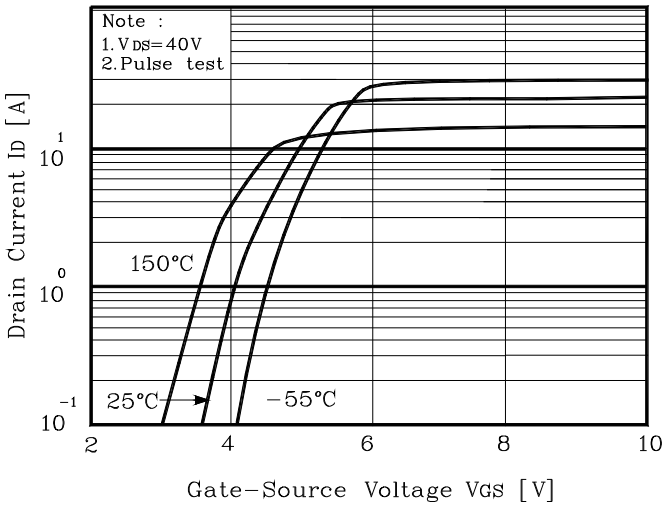


Fig. 3 $R_{DS(on)}$ - I_D

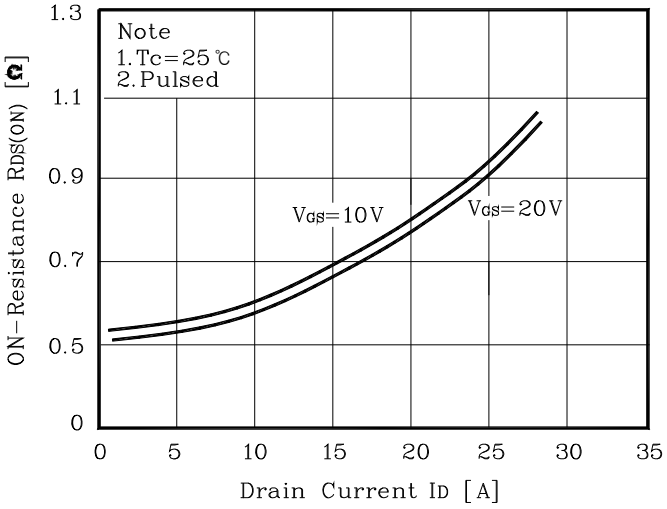


Fig. 4 I_S - V_{SD}

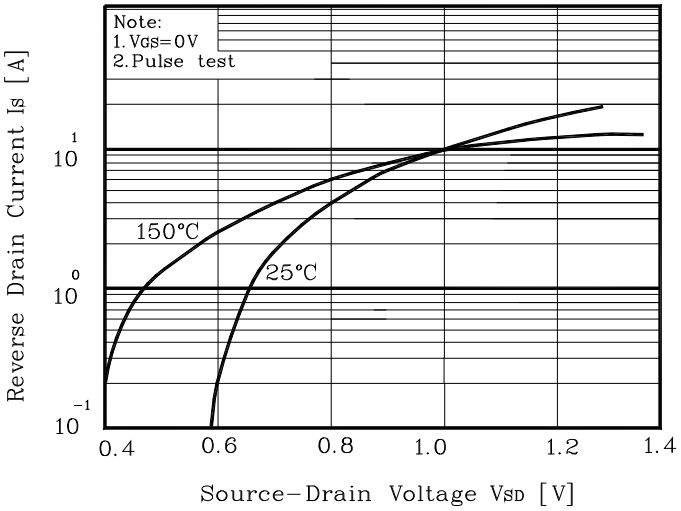


Fig. 5 Capacitance - V_{DS}

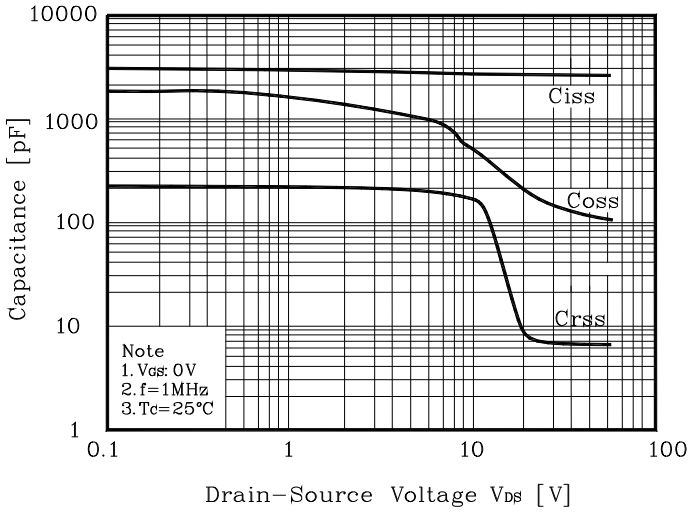
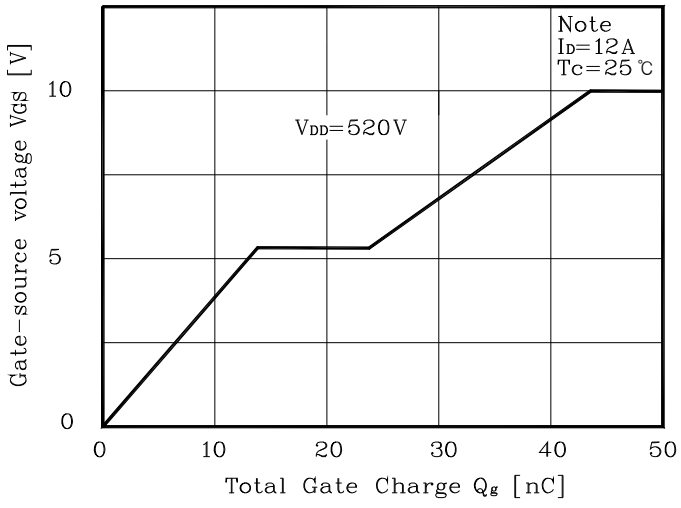


Fig.6 V_{GS} - Q_G



Electrical Characteristic Curves

Fig. 7 V_{DSS} - T_J

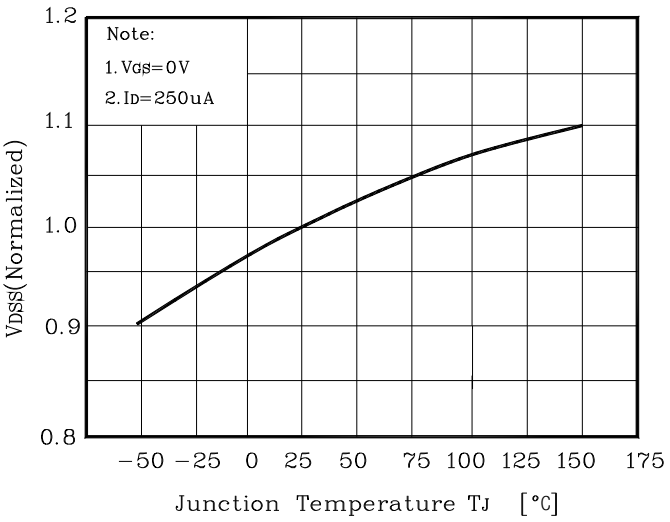


Fig.8 $R_{DS(on)}$ - T_J

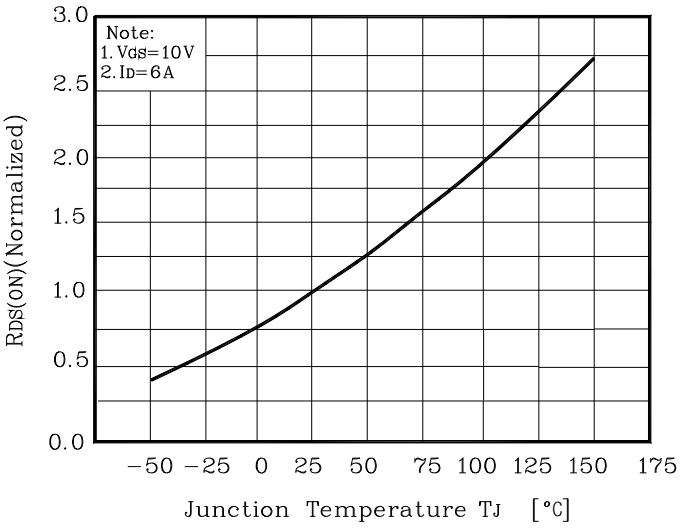


Fig. 9 I_D - T_C

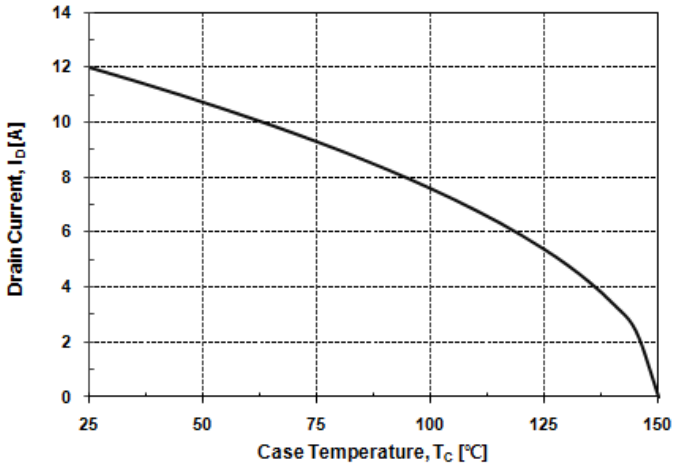


Fig. 10 Safe Operating Area

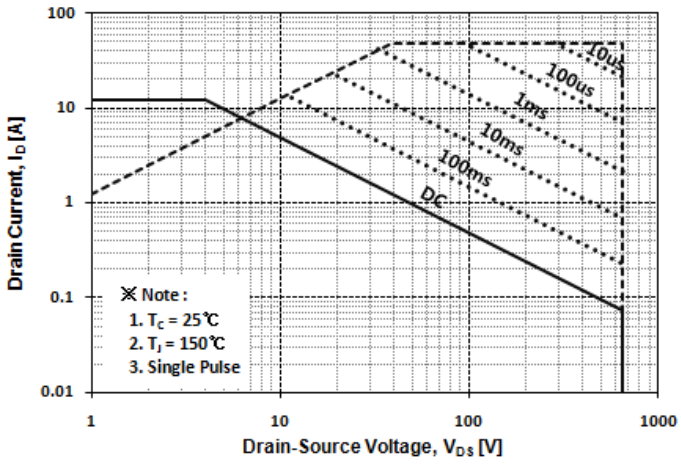


Fig. 11 Gate Charge Test Circuit & Waveform

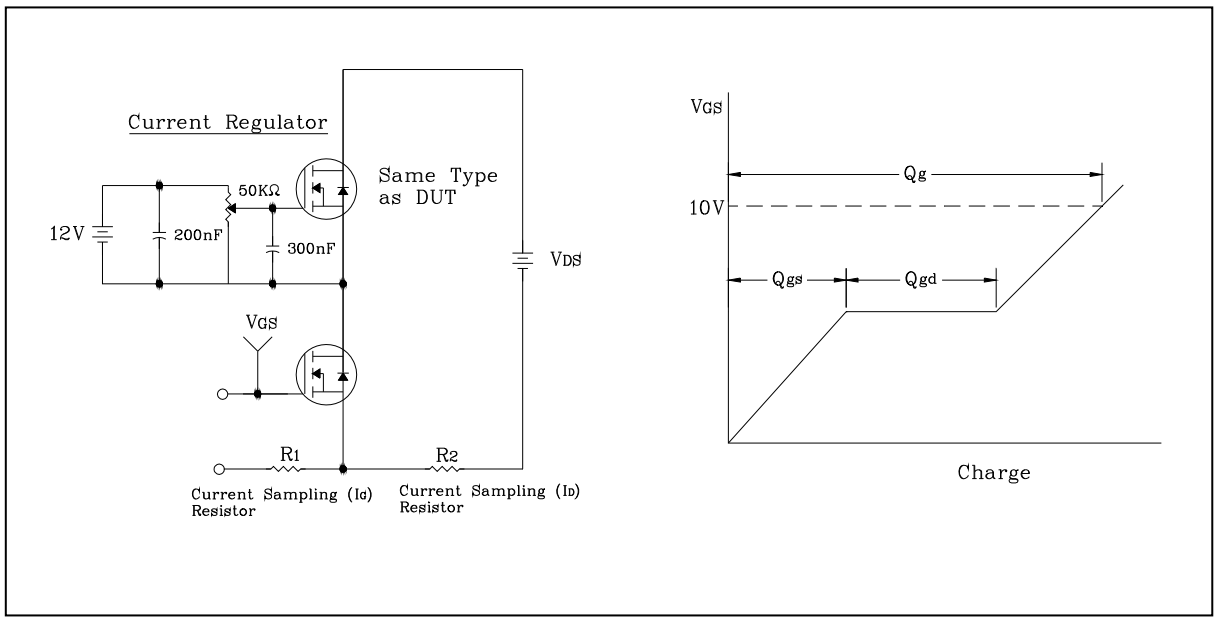


Fig. 12 Resistive Switching Test Circuit & Waveform

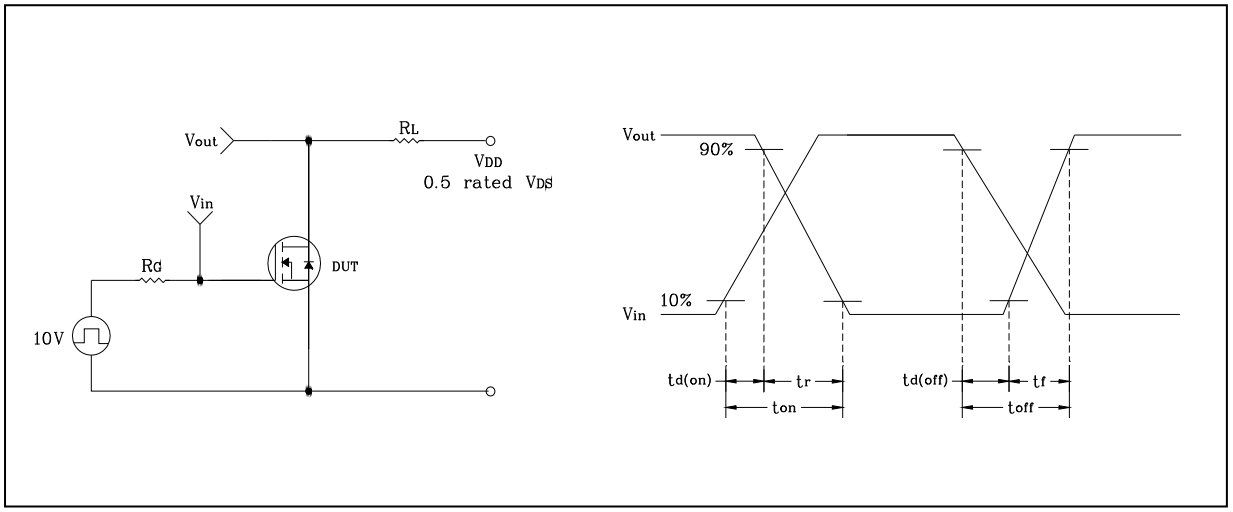


Fig. 13 E_{AS} Test Circuit & Waveform

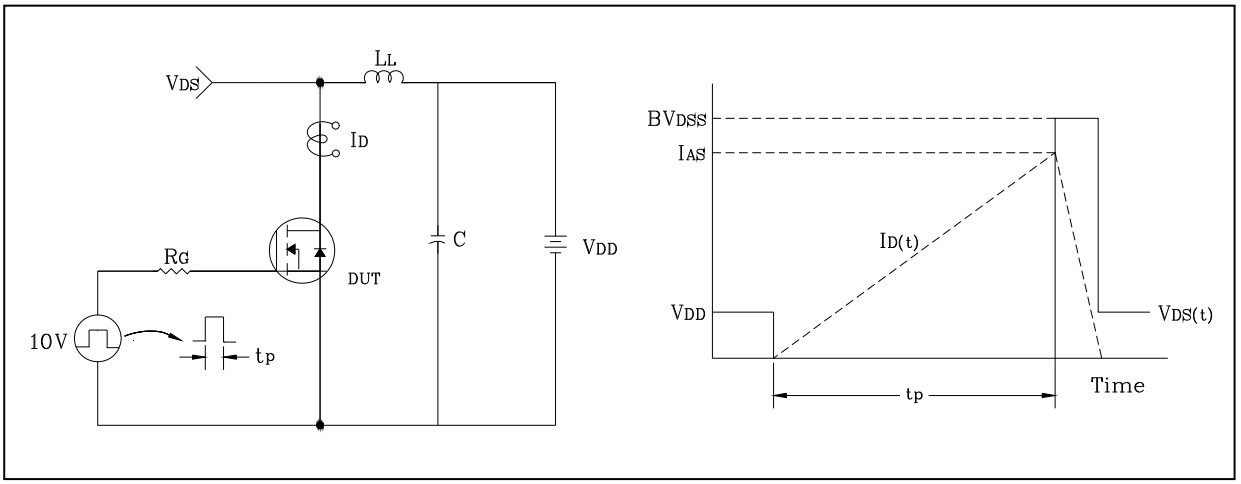
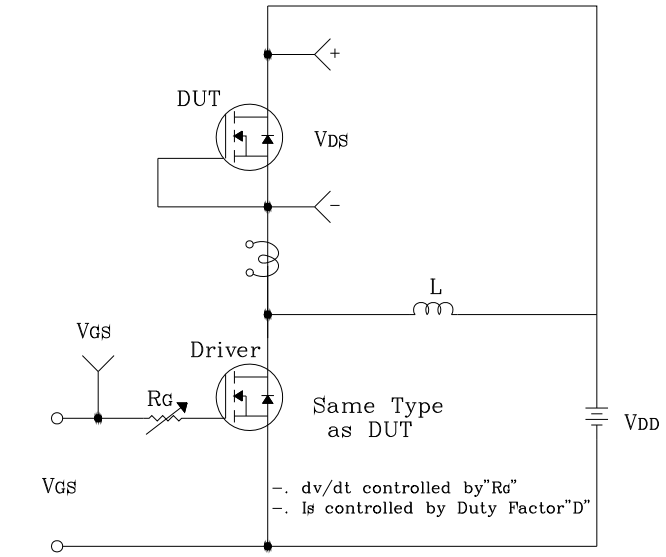
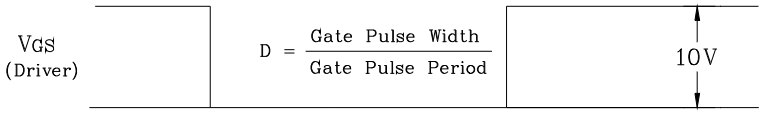
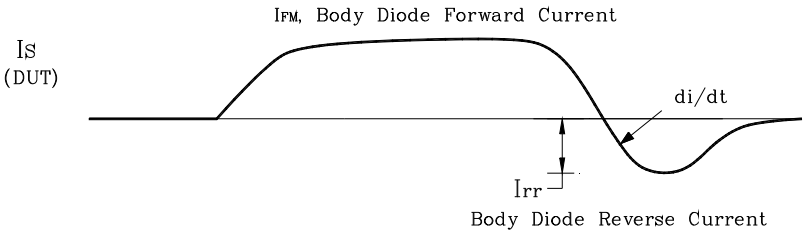
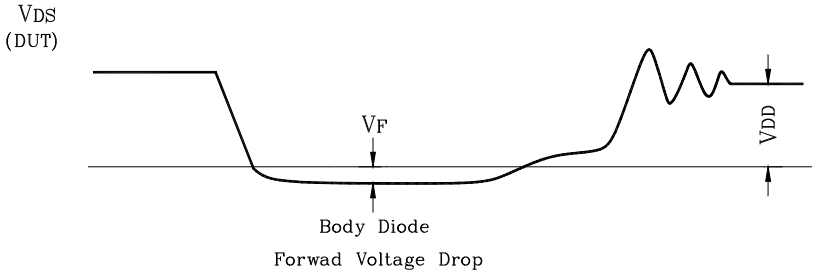


Fig. 14 Diode Reverse Recovery Time Test Circuit & Waveform



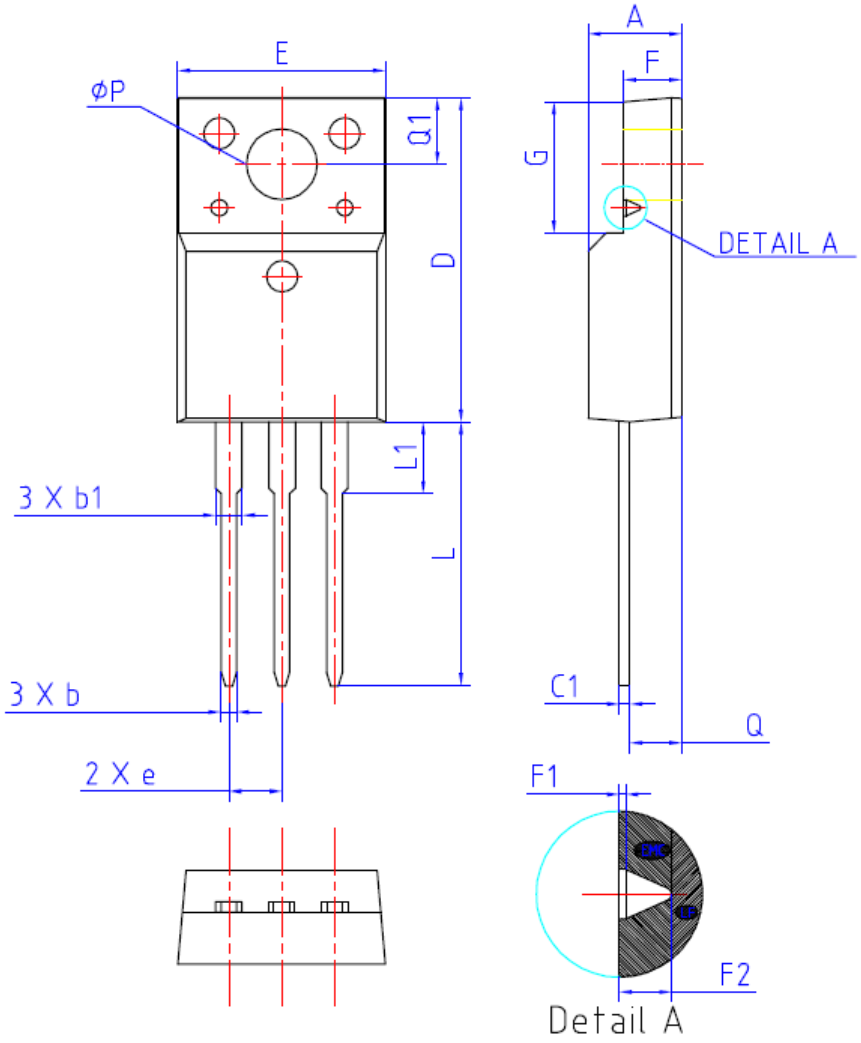






Outline Dimension

unit: mm



SYMBOL	MILLIMETERS			NOTE
	MINIMUM	NOMINAL	MAXIMUM	
A	4.50	4.70	4.90	
b	0.70	0.80	0.90	
b1	1.33	1.40	1.47	
C1	0.45	0.50	0.60	
D	15.67	15.87	16.07	
E	9.96	10.16	10.36	
e	2.54BSC			
F	2.34	2.54	2.74	
F1	(0.10 REF)			
F2	(0.84 REF)			
G	6.48	6.68	6.88	
L	12.78	12.98	13.18	
L1	3.03	3.23	3.43	
Q	2.56	2.76	2.96	
Q1	3.10	3.30	3.50	
ØP	3.08	3.18	3.28	

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