KODENSHI AUK

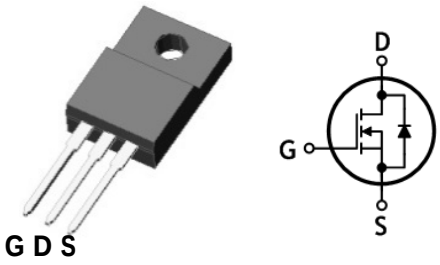
SMN0665FD

Advanced N-Ch Power MOSFET

SWITCHING REGULATOR APPLICATION

Features

- Drain-Source breakdown voltage: BV_{DSS}=650V (Min.)
- Low gate charge: Q_g=14nC (Typ.)
- Low drain-source On resistance: $R_{DS(on)}$=1.8Ω
- 100% avalanche tested
- RoHS compliant device

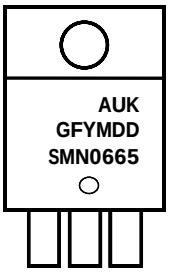


TO-220F-3L

Ordering Information

Part Number	Marking	Package
SMN0665FD	SMN0665	TO-220F-3L

Marking Information



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°C	5.5	A
		T_c=100°C	3.48	A
Drain current (Pulsed) *	I_{DM}		22	A
Single avalanche current (Note 2)	I_{AS}		5.5	A
Single pulsed avalanche energy (Note 2)	E_{AS}		245	mJ
Repetitive avalanche current (Note 1)	I_{AR}		5.5	A
Repetitive avalanche energy (Note 1)	E_{AR}		4.8	mJ
Power dissipation	P_D		48	W
Junction temperature	T_J		150	°C
Storage temperature range	T_{stg}		-55~150	°C

* Limited only maximum junction temperature

Thermal Characteristics

Characteristic	Symbol	Rating	Unit
Thermal resistance, junction to case	$R_{th(j-c)}$	Max. 2.6	°C/W
Thermal resistance, junction to ambient	$R_{th(j-a)}$	Max. 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}	3	4	5	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	$R_{DS(ON)}$	V_{GS}=10V, I_D=2.75A	-	1.8	2.2	Ω
Forward transfer conductance (Note 3)	g_{fs}	V_{DS}=10V, I_D=2.75A	-	4	-	S
Input capacitance	C_{iss}	V_{DS}=25V, V_{GS}=0V, f=1.0MHz	-	760	1046	pF
Output capacitance	C_{oss}		-	67	92	
Reverse transfer capacitance	C_{rss}		-	9	12	
Turn-on delay time (Note 3,4)	$t_{d(on)}$	V_{DD}=325V, I_D=5.5A, R_G=25Ω	-	55	128	ns
Rise time (Note 3,4)	t_r		-	79	174	
Turn-off delay time (Note 3,4)	$t_{d(off)}$		-	94	208	
Fall time (Note 3,4)	t_f		-	33	75	
Total gate charge (Note 3,4)	Q_g	V_{DS}=520V, V_{GS}=10V, I_D=5.5A	-	14	20	nC
Gate-source charge (Note 3,4)	Q_{gs}		-	6	-	
Gate-drain charge (Note 3,4)	Q_{gd}		-	4	-	

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	-	-	5.5	A
Source current (Pulsed)	I_{SM}		-	-	22	A
Forward voltage	V_{SD}	V_{GS}=0V, I_S=5.5A	-	-	1.4	V
Reverse recovery time (Note 3,4)	t_{rr}	I_S=5.5A, V_{GS}=0V dI_F/dt=100A/us	-	494	-	ns
Reverse recovery charge (Note 3,4)	Q_{rr}		-	2	-	uC

Note:
1. Repeated rating: Pulse width limited by safe operating area
2. L=15mH, I_{AS}=5.5A, V_{DD}=50V, R_G=25Ω, Starting T_J=25°C
3. Pulse test: Pulse width≤300us, Duty cycle≤2%
4. Essentially independent of operating temperature typical characteristics

Electrical Characteristics Curves

Fig. 1 I_D - V_{DS}

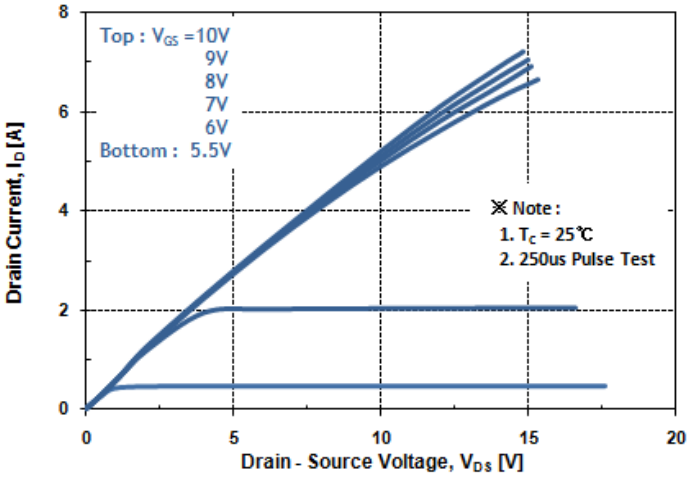


Fig. 2 I_D - V_{GS}

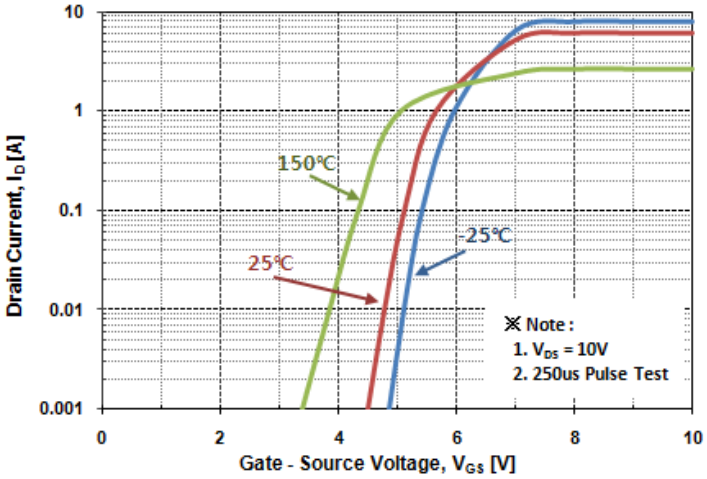


Fig. 3 $R_{DS(ON)}$ - I_D

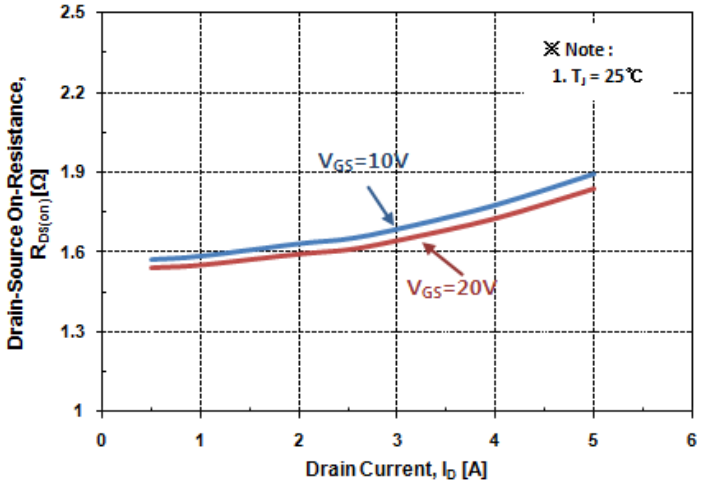


Fig. 4 I_S - V_{SD}

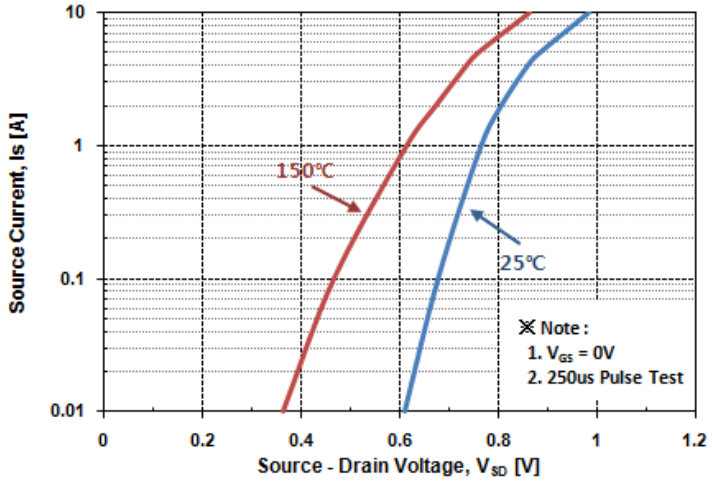


Fig. 5 Capacitance - V_{DS}

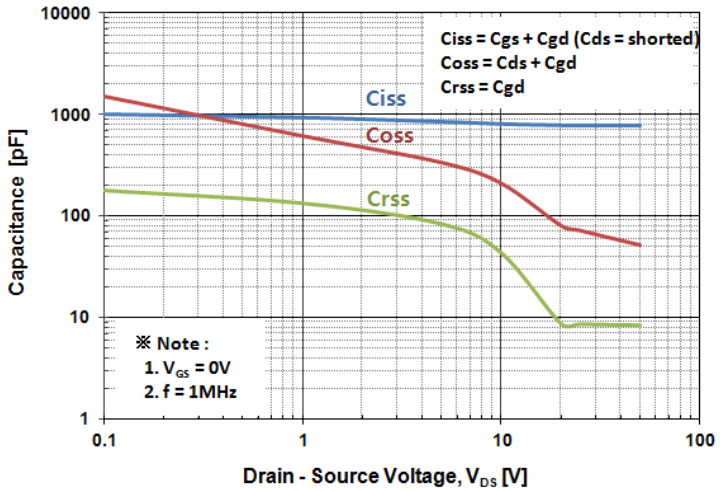


Fig. 6 V_{GS} - Q_G

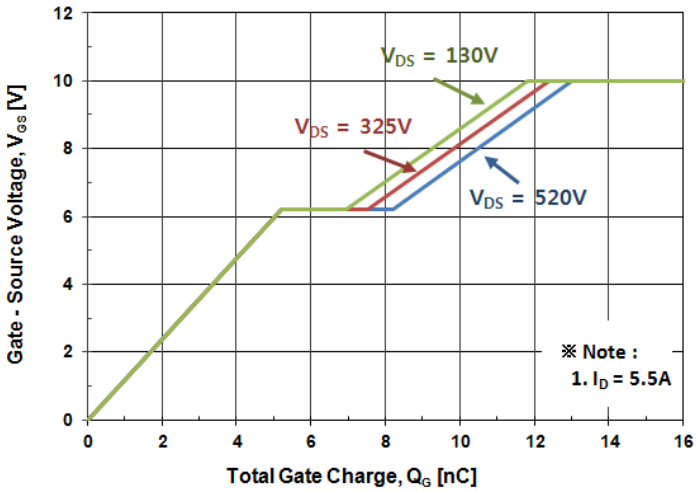


Fig. 7 BV_{DSS} - T_J

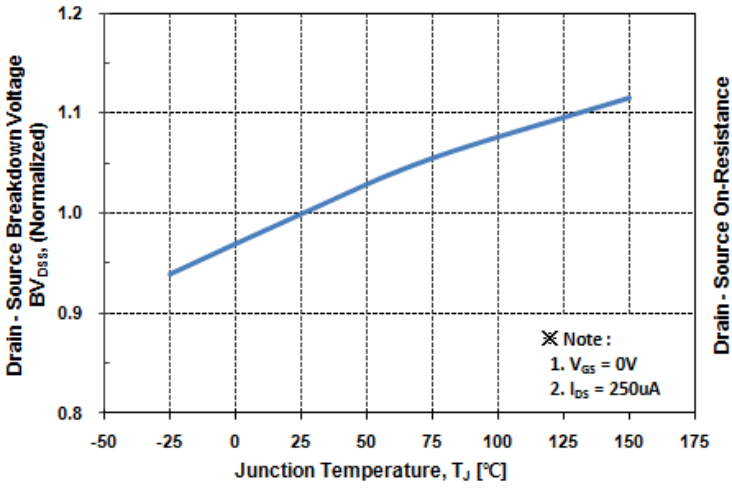


Fig. 8 $R_{DS(on)}$ - T_J

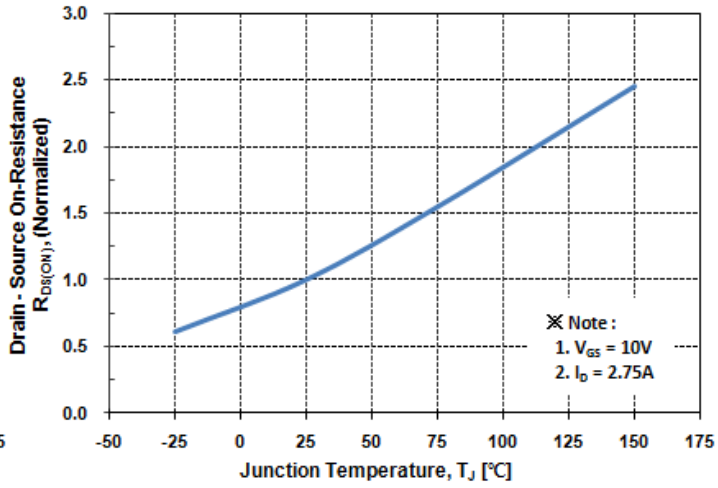


Fig. 9 I_D - T_C

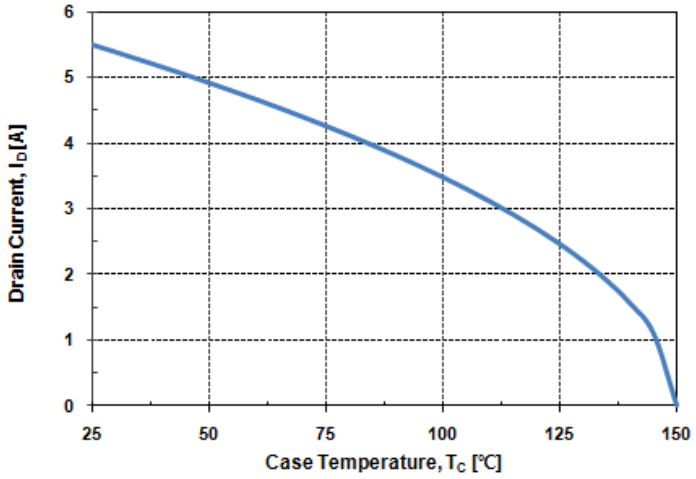


Fig. 10 Safe Operating Area

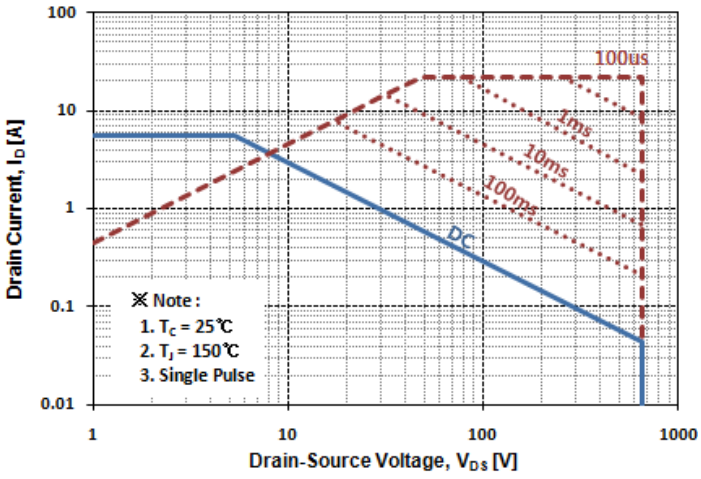


Fig. 11 Transient Thermal Impedance

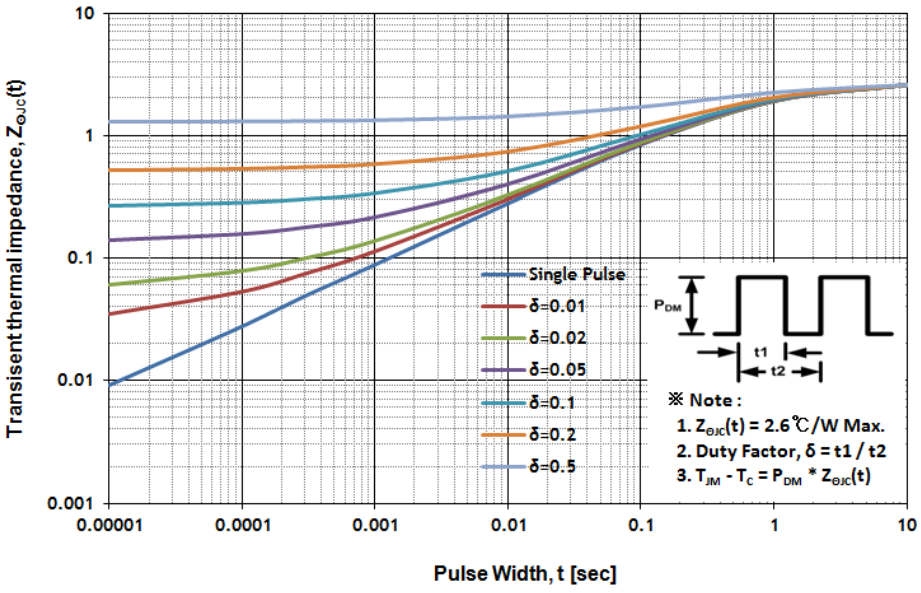
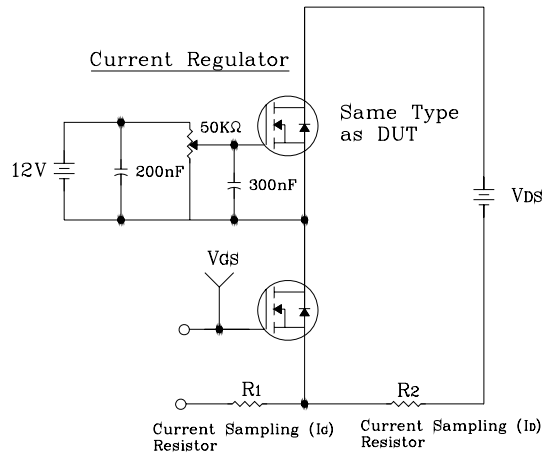


Fig. 12 Gate Charge Test Circuit & Waveform



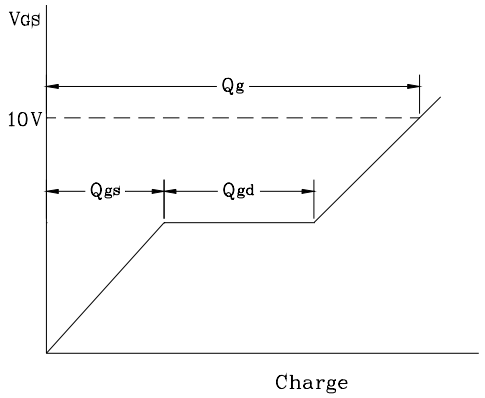
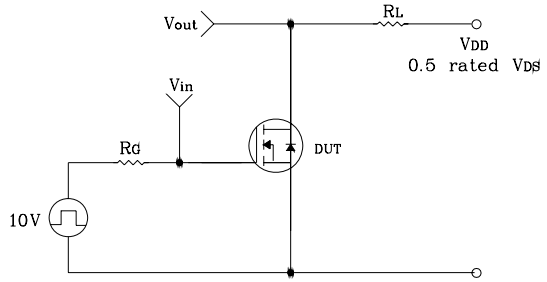


Fig. 13 Resistive Switching Test Circuit & Waveform



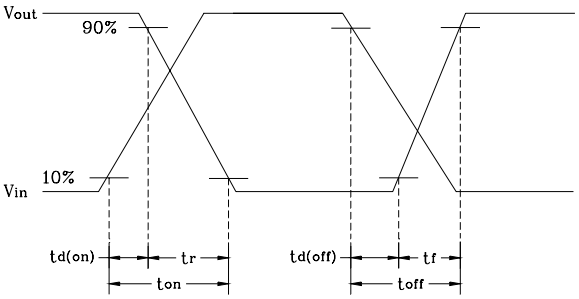
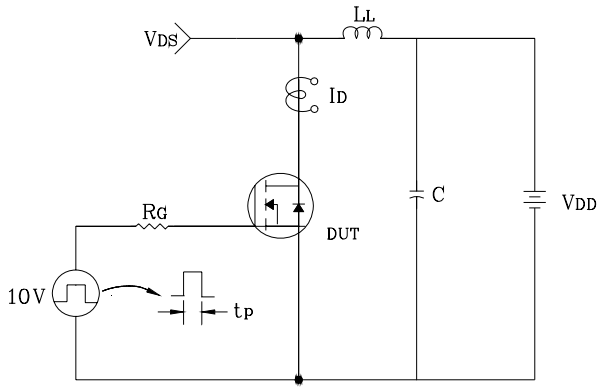


Fig. 14 E_{AS} Test Circuit & Waveform



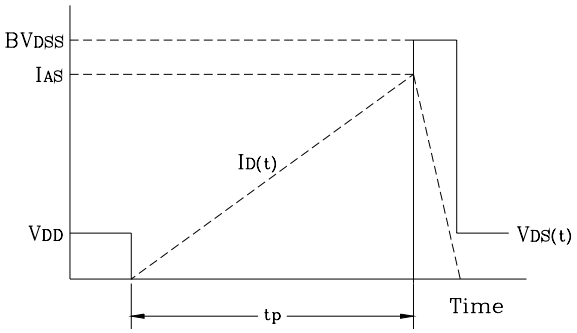
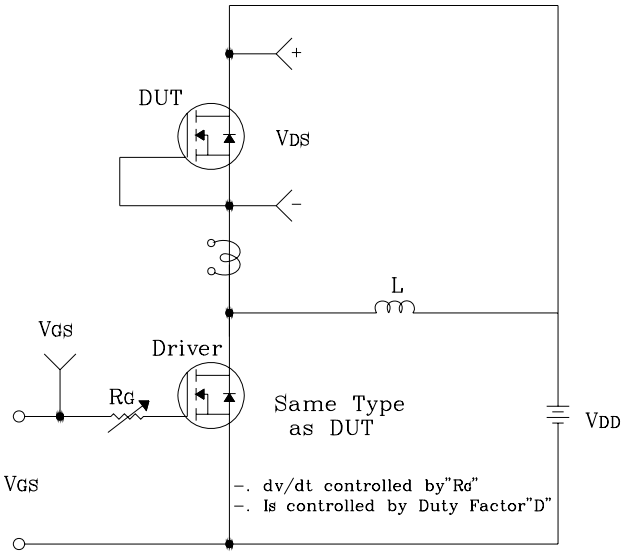
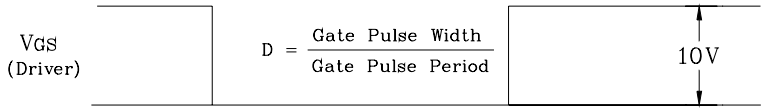
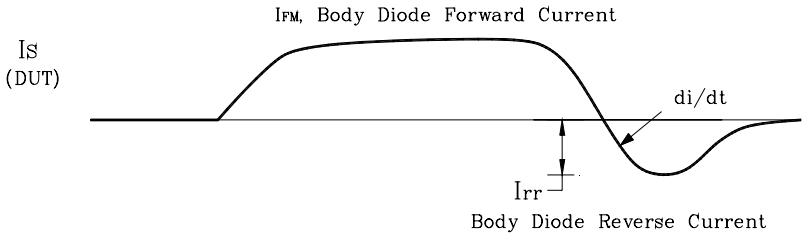
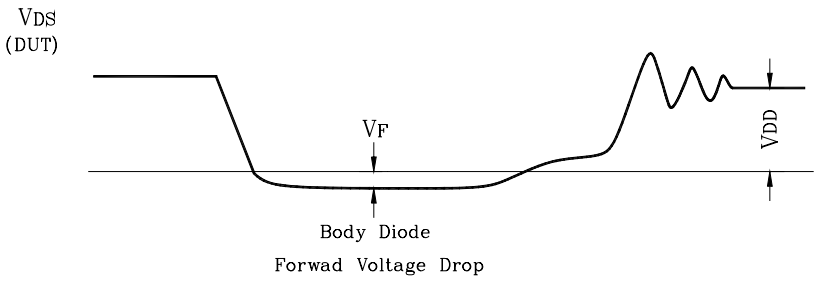


Fig. 15 Diode Reverse Recovery Time Test Circuit & Waveform

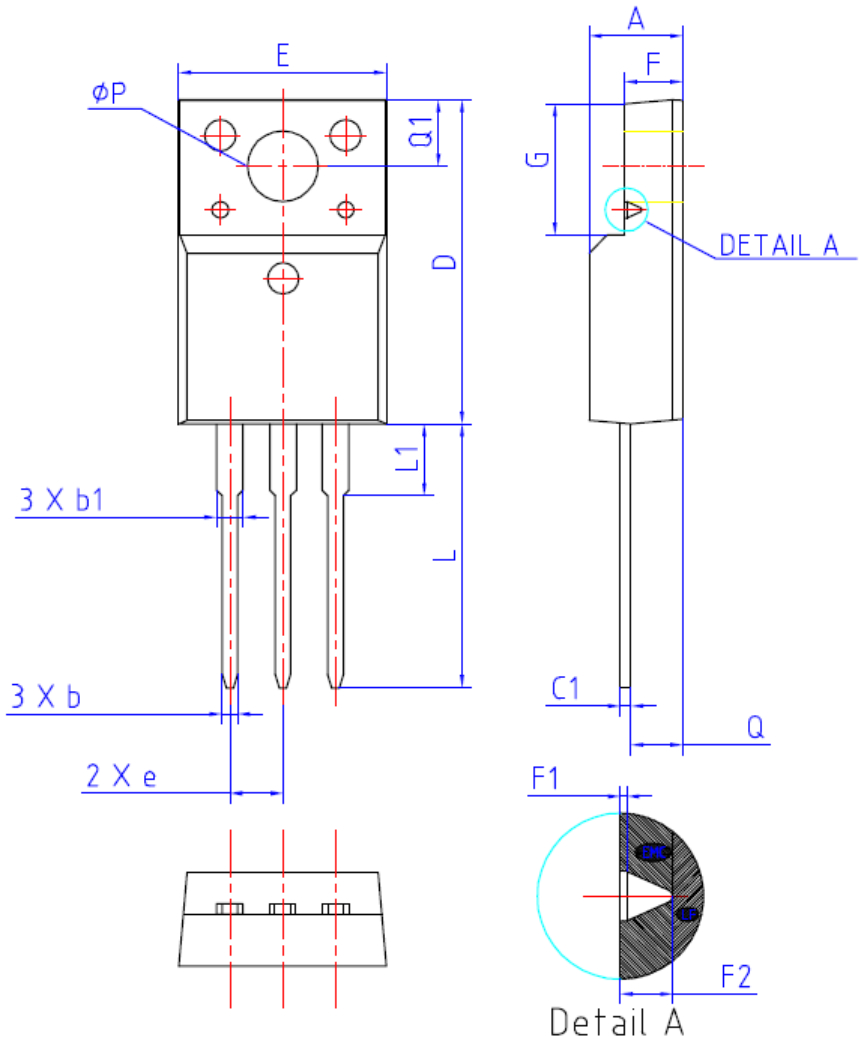








Package Outline Dimensions



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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