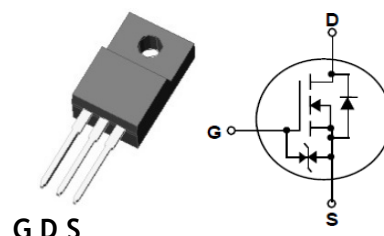


800V N-Channel Super Junction MOSFET

Features

- Very Low FOM ($R_{DS(on)} \times Q_g$)
- Extremely low switching loss
- Excellent stability and uniformity
- 100% avalanche tested
- Built-in ESD Diode



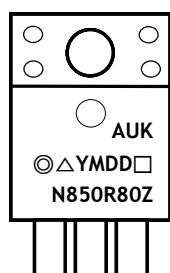
G D S

TO-220F-3L

Ordering Information

Part Number	Marking	Package
SJMN850R80ZF	N850R80Z	TO-220F-3L

Marking Information



Column 1: Manufacturer Logo
Column 2: Production Information
- . ◎: Management Code
- . △: Machine Code
- . YMDD: Date Code Marking (Year, Month, Day)
- . □: Factory Management Code
Column 3: Device Code

Absolute maximum ratings ($T_c=25^\circ\text{C}$ unless otherwise noted)

Characteristic	Symbol		Rating	Unit
Drain-source voltage	V _{DSS}		800	V
Gate-source voltage	V _{GSS}		±20	V
Drain current (DC) ^(Note 1)	I _D	T _C =25°C	6.6	A
		T _C =100°C	4.2	A
Drain current (Pulsed) ^(Note 1)	I _{DM}		19.8	A
Single pulsed avalanche energy ^(Note 2)	E _{AS}		90	mJ
Single avalanche current ^(Note 2)	I _{AS}		1.4	A
Diode dv/dt ruggedness ^(Note 3)	dv/dt		15	V/ns
MOSFET dv/dt ruggedness ^(Note 4)	dv/dt		50	V/ns
Power dissipation	P _D		29	W
Gate to source ESD (Human Body Model)	V _{ESD(G-S)}		2000	V
Junction temperature	T _J		150	°C
Storage temperature range	T _{stg}		-55~150	°C

Thermal Characteristics

Characteristic	Symbol	Rating	Unit
Thermal resistance, junction to case	$R_{th(j-c)}$	Max. 4.31	°C/W
Thermal resistance, junction to ambient	$R_{th(j-a)}$	Max. 62.5	

Electrical Characteristics ($T_C=25^{\circ}\text{C}$ unless otherwise noted)

Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Drain-source breakdown voltage	BV_{DSS}	$I_D=1\text{mA}$, $V_{GS}=0$	800	-	-	V
Gate threshold voltage	$V_{GS(th)}$	$I_D=220\mu\text{A}$, $V_{DS}=V_{GS}$	2	-	4	V
Drain-source cut-off current	I_{DSS}	$V_{DS}=800\text{V}$, $V_{GS}=0\text{V}$	-	-	1	μA
		$V_{DS}=800\text{V}$, $T_C=150^{\circ}\text{C}$	-	-	100	μA
Gate leakage current	I_{GSS}	$V_{DS}=0\text{V}$, $V_{GS}=\pm 20\text{V}$	-	-	± 1	μA
Drain-source on-resistance	$R_{DS(ON)}$	$V_{GS}=10\text{V}$, $I_D=1.6\text{A}$	-	0.71	0.85	Ω
Input capacitance	C_{iss}	$V_{DS}=200\text{V}$, $V_{GS}=0\text{V}$, $f=1.0\text{MHz}$	-	605	-	pF
Output capacitance	C_{oss}		-	16	-	
Reverse transfer capacitance	C_{rss}		-	1	-	
Turn-on delay time (Note 5)	$t_{d(on)}$	$V_{DD}=400\text{V}$, $I_D=2.8\text{A}$, $R_G=25\Omega$	-	40	-	ns
Rise time (Note 5)	t_r		-	48	-	
Turn-off delay time (Note 5)	$t_{d(off)}$		-	68	-	
Fall time (Note 5)	t_f		-	45	-	
Total gate charge (Note 6)	Q_g	$V_{DS}=640\text{V}$, $V_{GS}=10\text{V}$, $I_D=2.8\text{A}$	-	15	-	nC
Gate-source charge (Note 6)	Q_{gs}		-	6	-	
Gate-drain charge (Note 6)	Q_{gd}		-	2	-	

Source-Drain Diode Ratings and Characteristics ($T_C=25^{\circ}\text{C}$ unless otherwise noted)

Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Source current (DC)	I_S	Integral reverse diode in the MOSFET	-	-	6.6	A
Source current (Pulsed)	I_{SM}		-	-	19.8	A
Forward voltage	V_{SD}	$V_{GS}=0\text{V}$, $I_S=2.8\text{A}$	-	-	1.3	V
Reverse recovery time (Note 5,6)	t_{rr}	$I_S=2.8\text{A}$, $V_{GS}=0\text{V}$ $dI_F/dt=-100\text{A}/\mu\text{s}$	-	289	-	ns
Reverse recovery charge (Note 5,6)	Q_{rr}		-	1.7	-	μC

Note:

1. Calculated continuous current based on maximum allowable junction temperature
2. $L=86\text{mH}$, $I_{AS}=1.4\text{A}$, $V_{DD}=50\text{V}$, $R_G=25\Omega$, Starting $T_J=25^{\circ}\text{C}$
3. $I_S \leq 6.6\text{A}$, $V_{DS} \leq 400\text{V}$, $dI_S/dt \leq 100\text{A}/\mu\text{s}$, $T_J=25^{\circ}\text{C}$
4. $V_{DS} \leq 400\text{V}$, $I_S \leq 6.6\text{A}$
5. Guaranteed by design, not subject to production testing
6. Pulse test: Pulse width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$

Typical Characteristics Curve

Fig. 1 $I_D - V_{DS}$

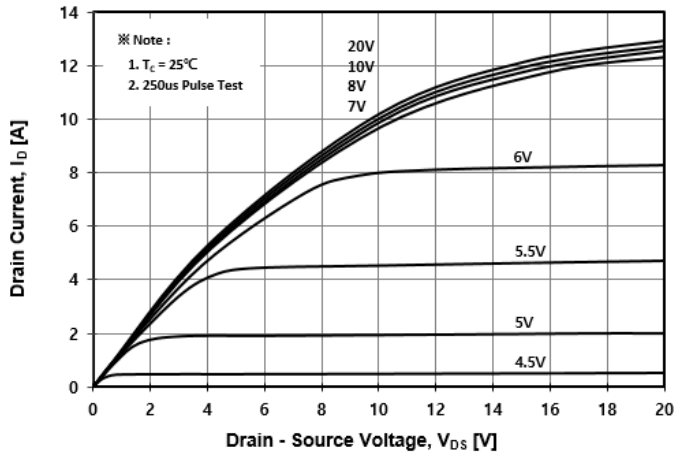


Fig. 2 $I_D - V_{GS}$

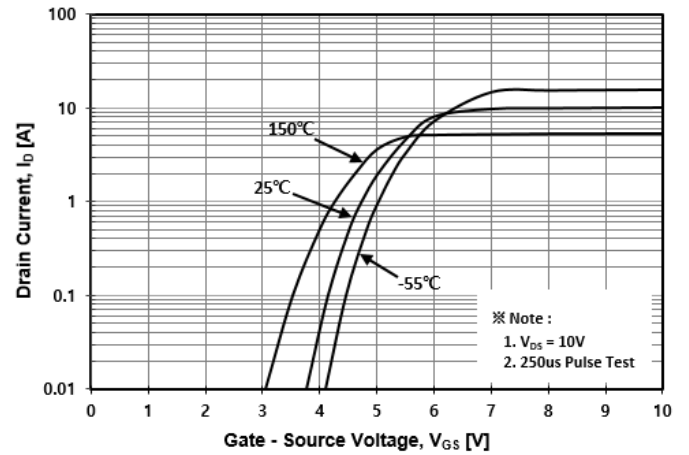


Fig. 3 $R_{DS(ON)} - I_D$

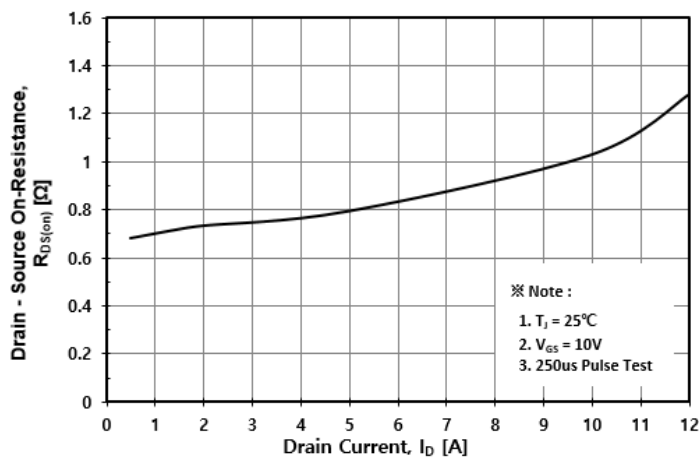


Fig. 4 $I_S - V_{SD}$

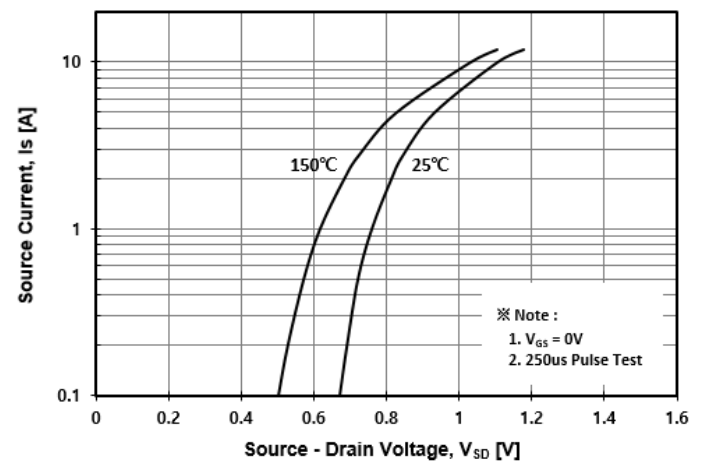


Fig. 5 Capacitance - V_{DS}

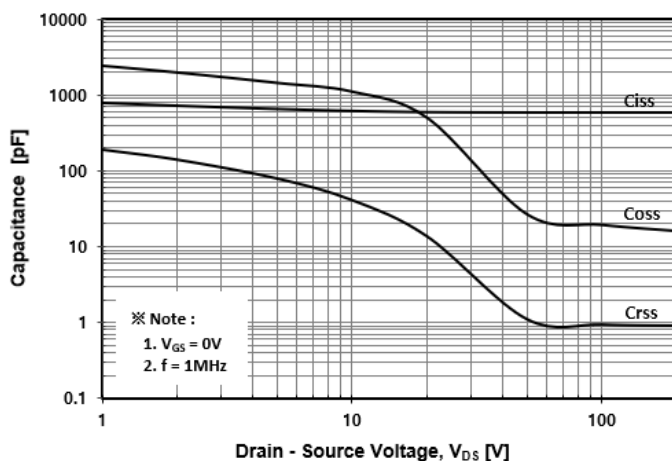
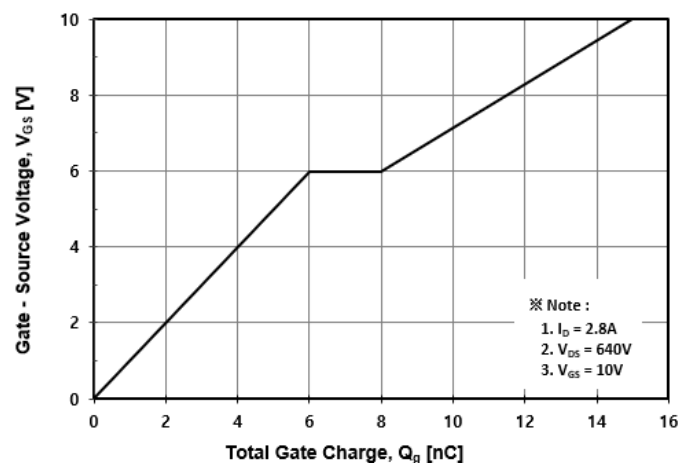


Fig. 6 $V_{GS} - Q_G$



Typical Characteristics Curve (Continue)

Fig. 7 $BV_{DSS} - T_J$

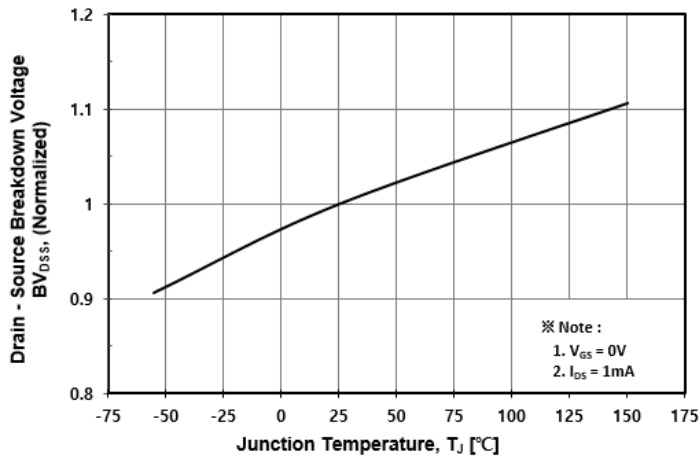


Fig. 8 $R_{DS(ON)} - T_J$

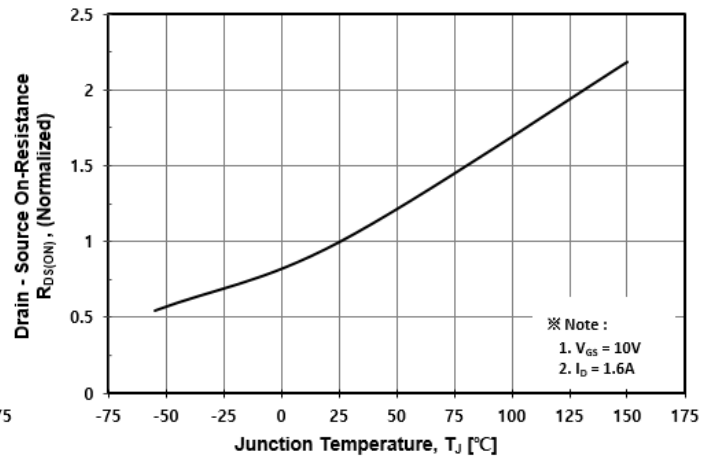


Fig. 9 $I_D - T_C$

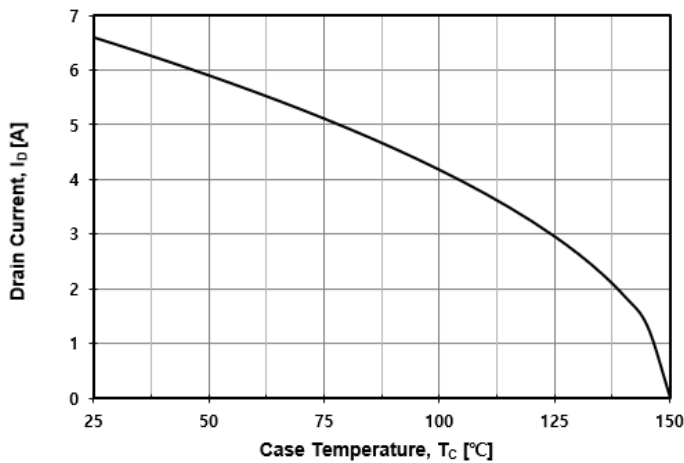


Fig. 10 Safe Operating Area

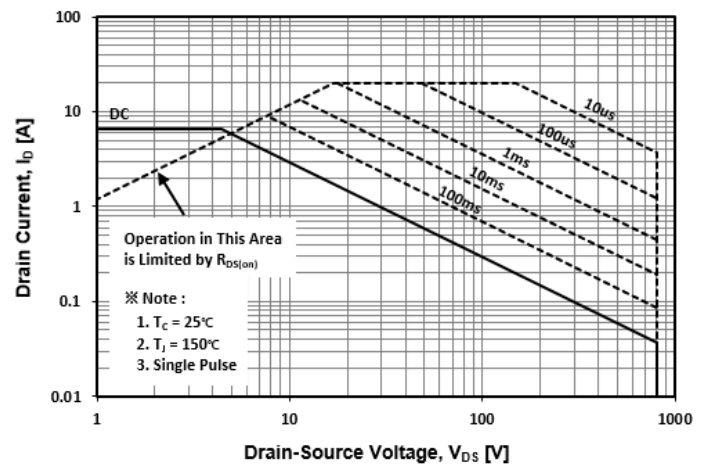


Fig. 11 Transient Thermal Impedance

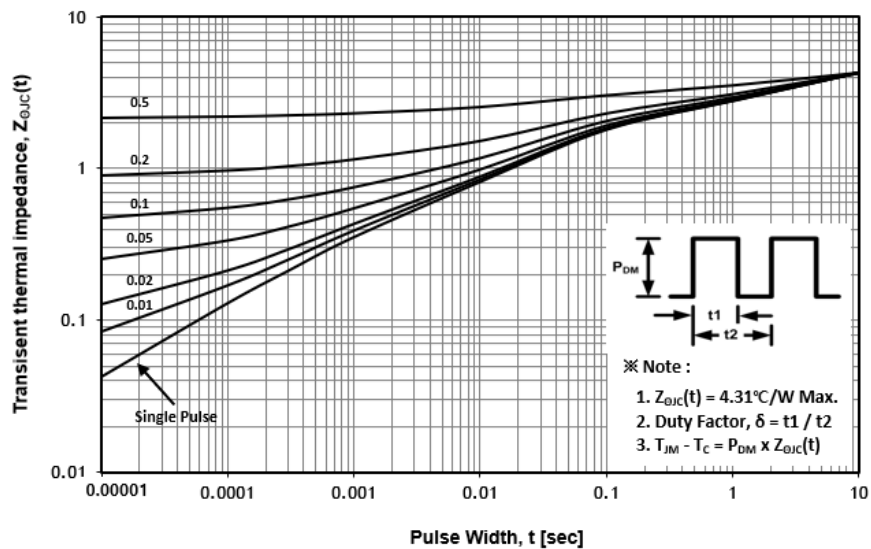


Fig. 12 Gate Charge Test Circuit & Waveform

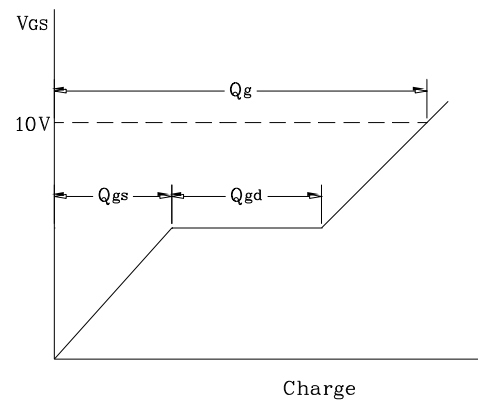
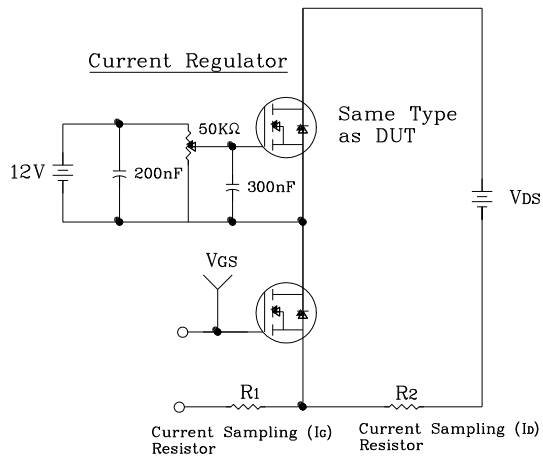


Fig. 13 Resistive Switching Test Circuit & Waveform

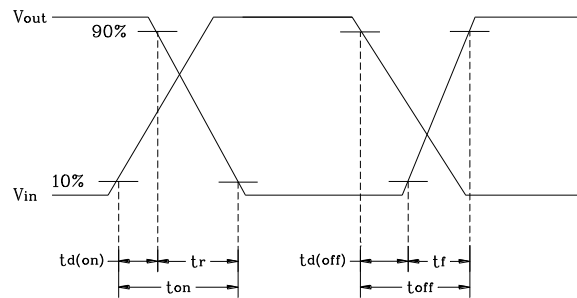
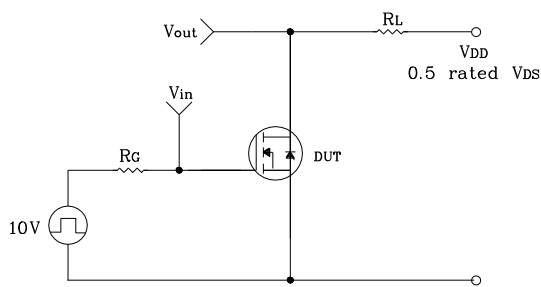


Fig. 14 E_{AS} Test Circuit & Waveform

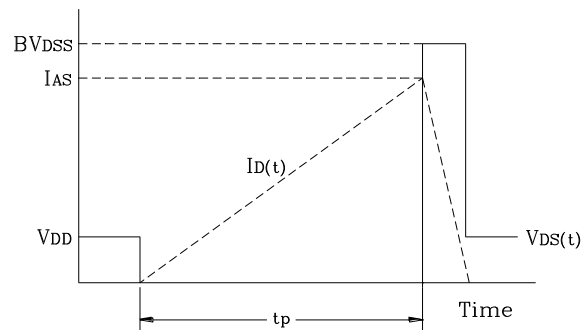
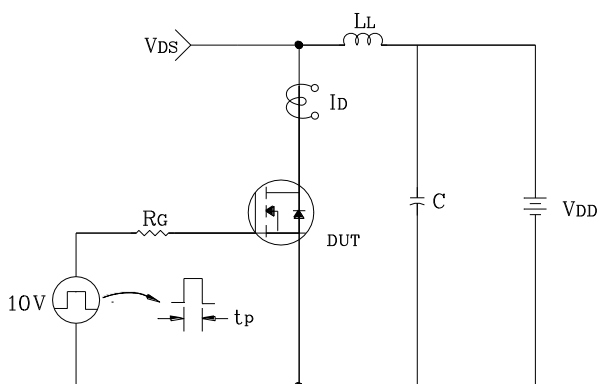
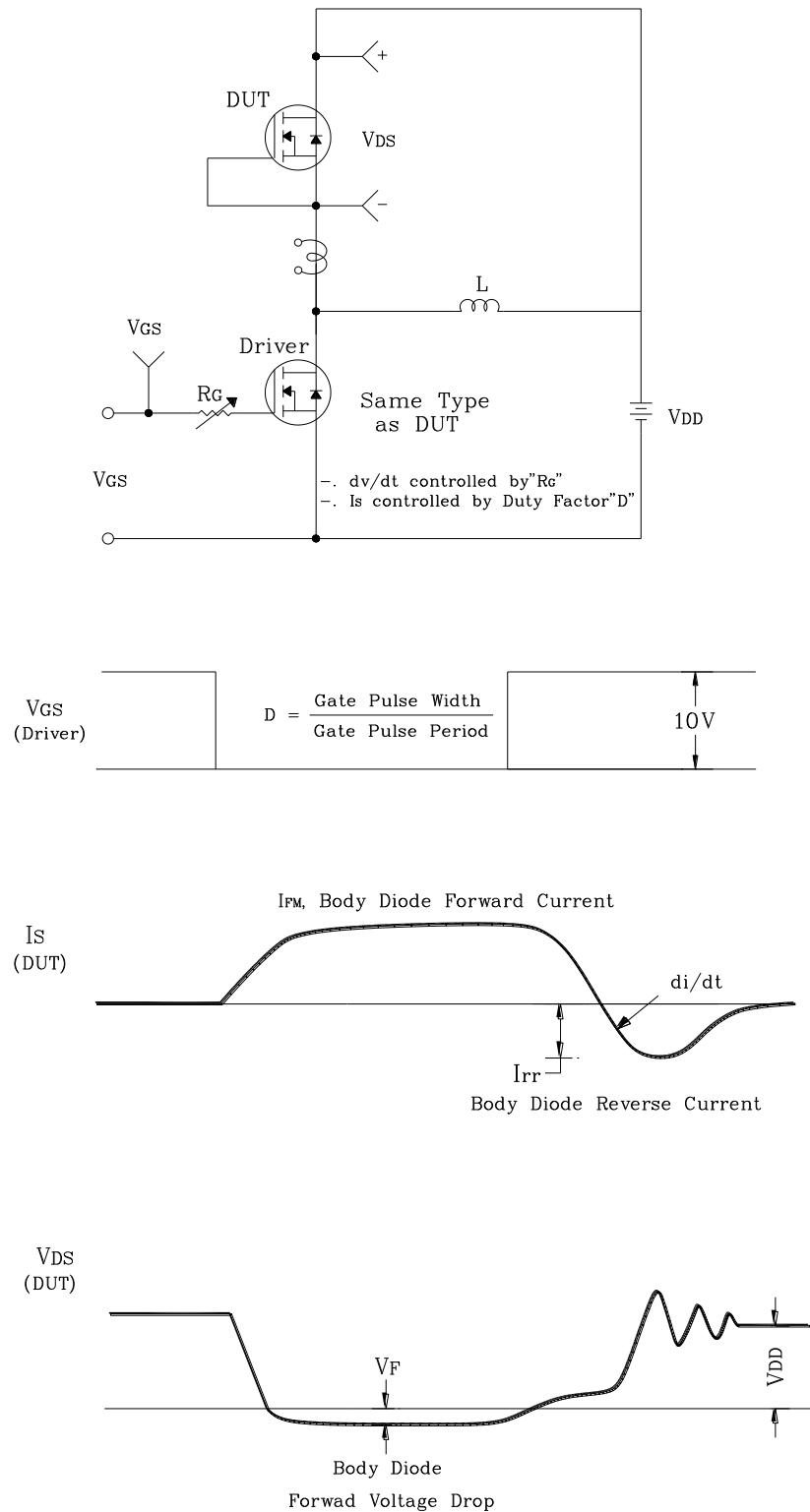
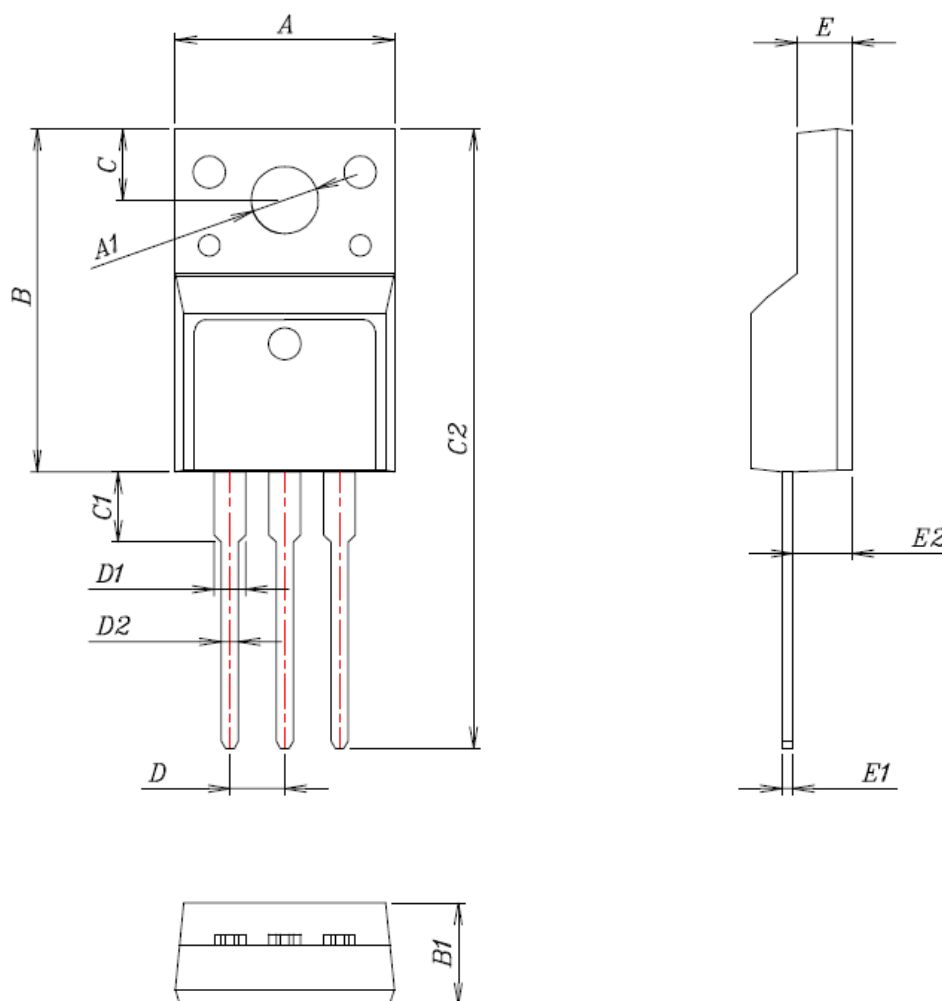


Fig. 15 Diode Reverse Recovery Time Test Circuit & Waveform



Package Outline Dimensions



SYMBOL	MILLIMETERS
A	10.16±0.30
A1	3.12±0.20
B	15.90±0.50
B1	4.70±0.30
C	3.30±0.25
C1	3.25±0.30
C2	28.70±0.50
D	Typical 2.54
D1	1.47(MAX)
D2	0.80±0.20
E	2.55±0.25
E1	0.50±0.20
E2	2.75±0.30

The AUK Corp. products are intended for the use as components in general electronic equipment (Office and communication equipment, measuring equipment, home appliance, etc.).

Please make sure that you consult with us before you use these AUK Corp. products in equipments which require high quality and / or reliability, and in equipments which could have major impact to the welfare of human life(atomic energy control, airplane, spaceship, transportation, combustion control, all types of safety device, etc.). AUK Corp. cannot accept liability to any damage which may occur in case these AUK Corp. products were used in the mentioned equipments without prior consultation with AUK Corp..

Specifications mentioned in this publication are subject to change without notice.