KODENSHI AUK

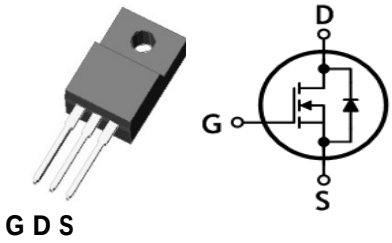
SJMN180R65CF

Super Junction MOSFET

N-Channel Super Junction MOSFET

Features

- Drain-Source voltage: V_{DS}=700V (@T_J=150°C)
- Low drain-source On resistance: $R_{DS(on)}$=0.18Ω (Max.)
- Ultra low gate charge: Qg=32nC(Typ.)
- RoHS compliant and Halogen free device
- 100% avalanche tested

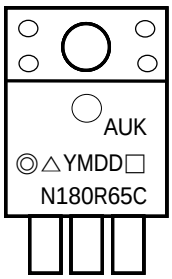


TO-220F-3L

Ordering Information

Part Number	Marking	Package
SJMN180R65CF	N180R65C	TO-220F-3L

Marking Information



Column 1: Manufacture Logo
Column 2: Production Information
e.g) ◎△YMDD□
-. ◎ = Management Code
-. △ = Machine Code
-. YMDD = Date Code (year, monthly, daily)
-. □ = Factory Management Code
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) (Note 1)	I_D	T_c=25°C	22	A
		T_c=100°C	13.9	A
Drain current (Pulsed) (Note 1)	I_{DM}		88	A
Single pulsed avalanche energy (Note 2)	E_{AS}		160	mJ
Single avalanche current (Note 2)	I_{AS}		8	A
MOSFET dv/dt ruggedness (V_{DS}≤400V)	dv/dt		50	V/ns
Diode dv/dt ruggedness (I_{SD}≤I_D, V_{DS}≤400V)	dv/dt		15	V/ns
Power dissipation	P_D		35	W
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. 3.57	°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=1mA, V_{GS}=0	650	-	-	V
Gate threshold voltage	$V_{GS(th)}$	I_D=1.2mA, V_{DS}=V_{GS}	2.5	-	4.5	V
Drain-source cut-off current	I_{DSS}	V_{DS}=650V, V_{GS}=0V	-	-	1	uA
		V_{DS}=650V, T_J=125°C	-	-	100	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=8A	-	0.15	0.18	Ω
Internal gate resistance	R_g	f=1MHz, Open drain	-	1.5	-	Ω
Input capacitance (Note 3, 4)	C_{iss}	V_{DS}=25V, V_{GS}=0V, f=1MHz	-	1302	-	pF
Output capacitance (Note 3, 4)	C_{oss}		-	1203	-	
Reverse transfer capacitance (Note 3, 4)	C_{rss}		-	50	-	
Turn-on delay time (Note 3, 4)	$t_{d(on)}$	V_{DS}=350V, I_D=22A, R_G=25Ω	-	35	-	ns
Rise time (Note 3, 4)	t_r		-	35	-	
Turn-off delay time (Note 3, 4)	$t_{d(off)}$		-	77	-	
Fall time (Note 3, 4)	t_f		-	38	-	
Total gate charge (Note 3, 4)	Q_g	V_{DS}=400V, V_{GS}=10V, I_D=10A	-	32	-	nC
Gate-source charge (Note 3, 4)	Q_{gs}		-	10	-	
Gate-drain charge (Note 3, 4)	Q_{gd}		-	12	-	

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	-	-	22	A
Source current (Pulsed)	I_{SM}		-	-	88	A
Forward voltage	V_{SD}	V_{GS}=0V, I_S=8A	-	-	1.2	V
Reverse recovery time (Note 3,4)	t_{rr}	I_S=22A, V_{GS}=0V, dI_S/dt=100A/us	-	418	-	ns
Reverse recovery charge (Note 3,4)	Q_{rr}		-	7.9	-	uC

Note:
1. Calculated continuous current based on maximum allowable junction temperature
2. L=5mH, V_{DD}=50V, Starting T_J=25°C
3. Guaranteed by design, not subject to production testing
4. Pulse test: Pulse width≤300us, Duty cycle≤2%

Typical Electrical Characteristics Curves

Fig. 1 Typical Output Characteristics

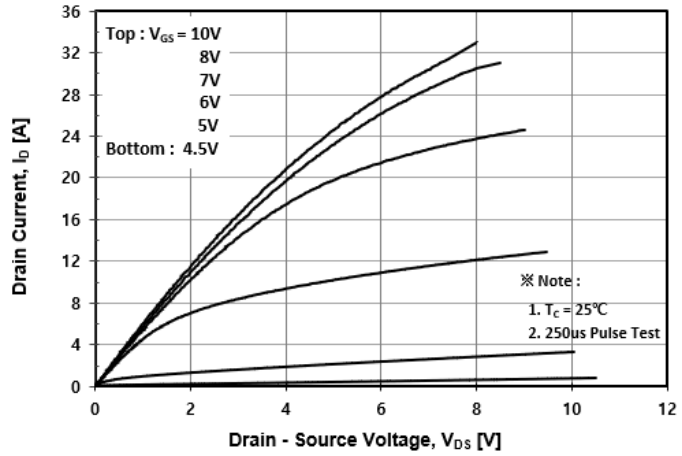


Fig. 2 Typical Transfer Characteristics

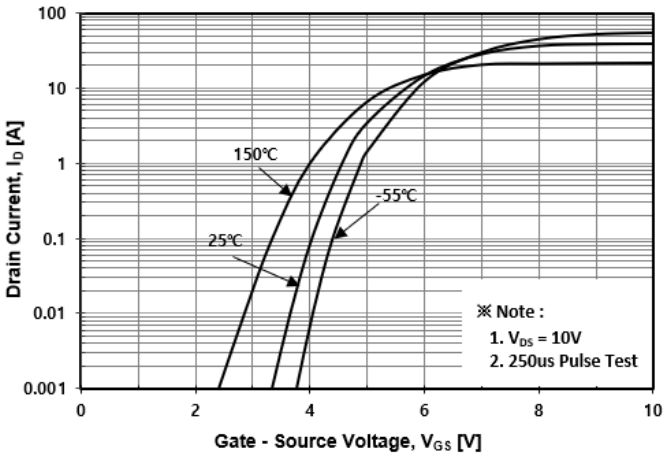


Fig. 3 On-Resistance Variation with Drain Current and Gate Voltage

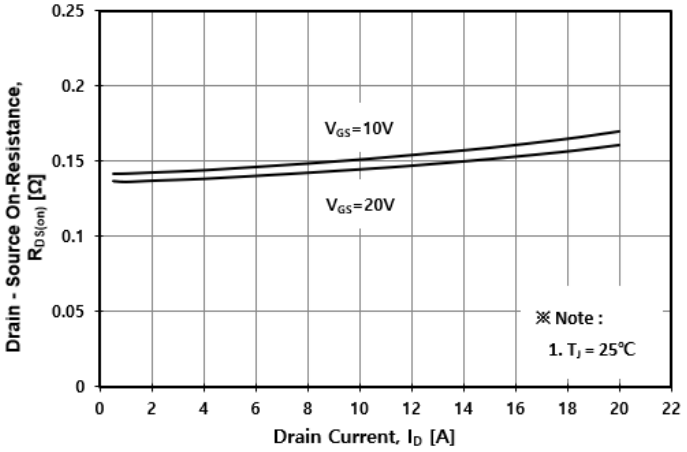


Fig. 4 Body Diode Forward Voltage Variation with Source Current

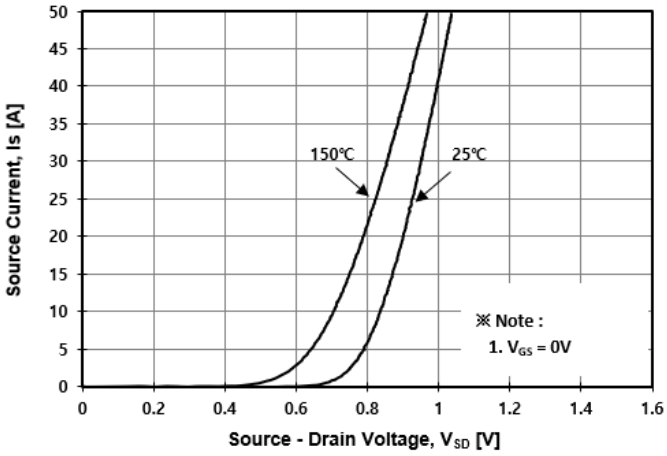


Fig. 5 Typical Capacitance Characteristics

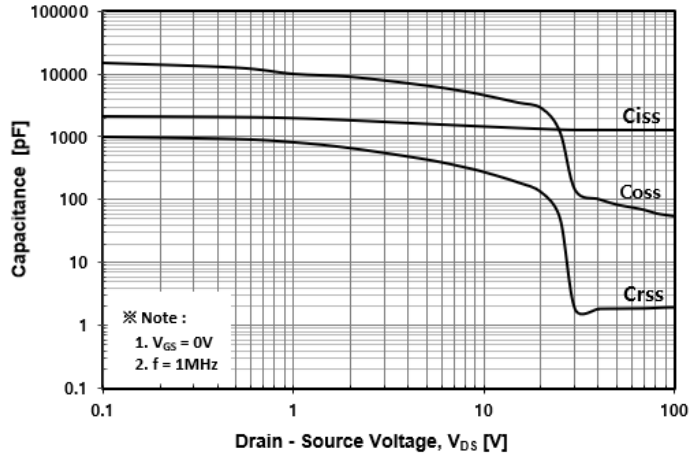
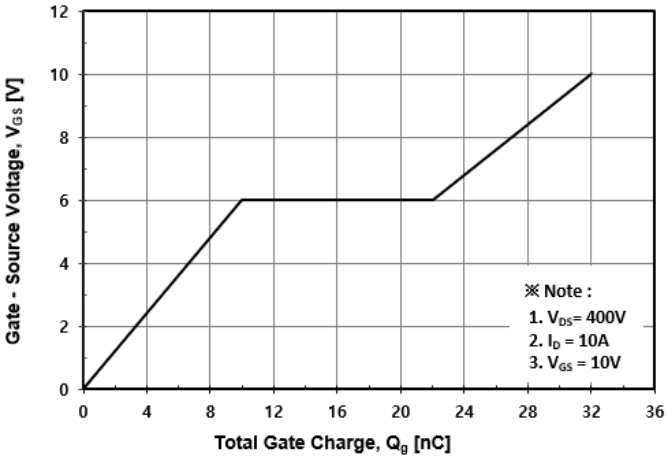


Fig. 6 Typical Total Gate Charge Characteristics



Typical Electrical Characteristics Curves

Fig. 7 Breakdown Voltage Variation vs. Temperature

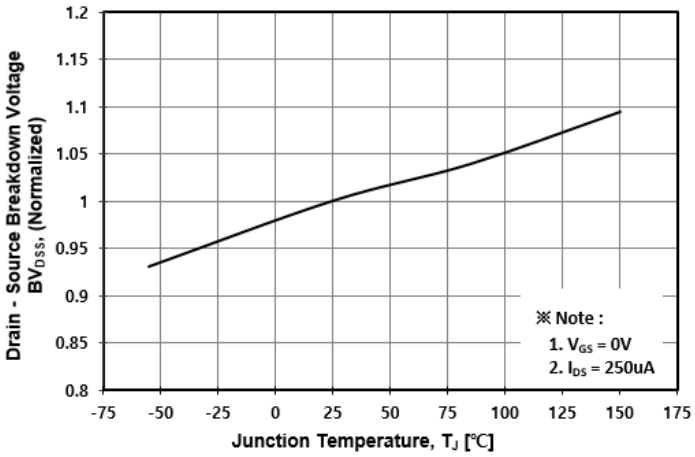


Fig. 8 On-Resistance Variation vs. Temperature

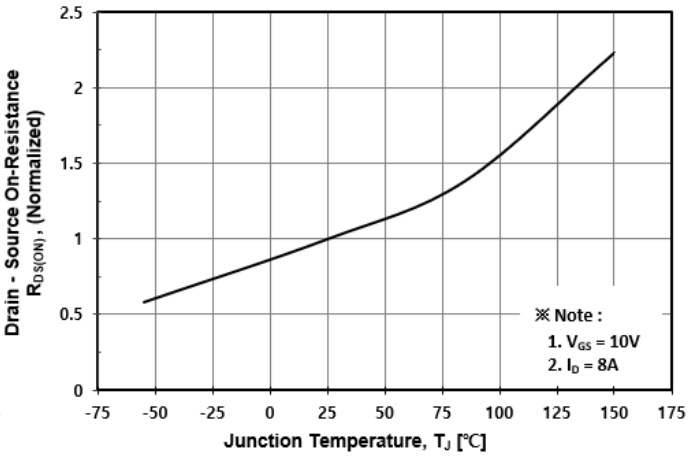


Fig. 9 Maximum Drain Current vs. Case Temperature

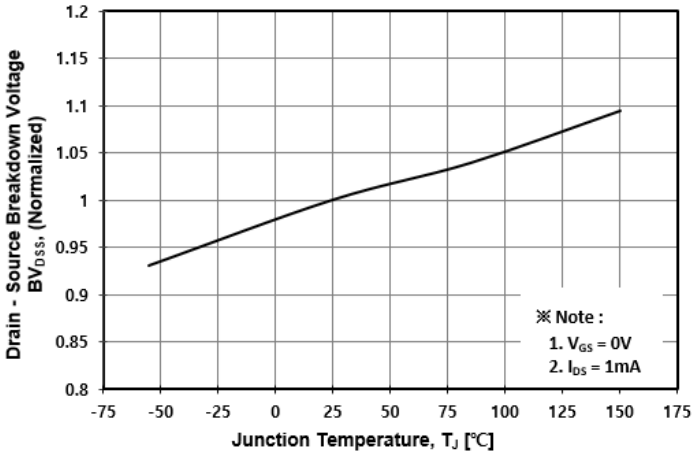


Fig. 10 Maximum Safe Operating Area

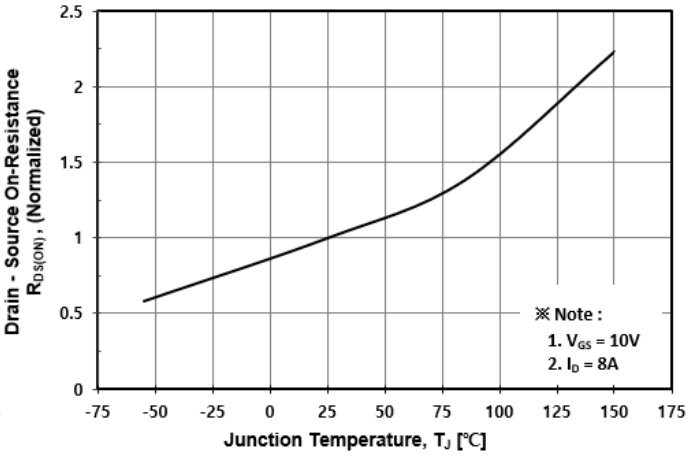


Fig. 11 Transient Thermal Impedance

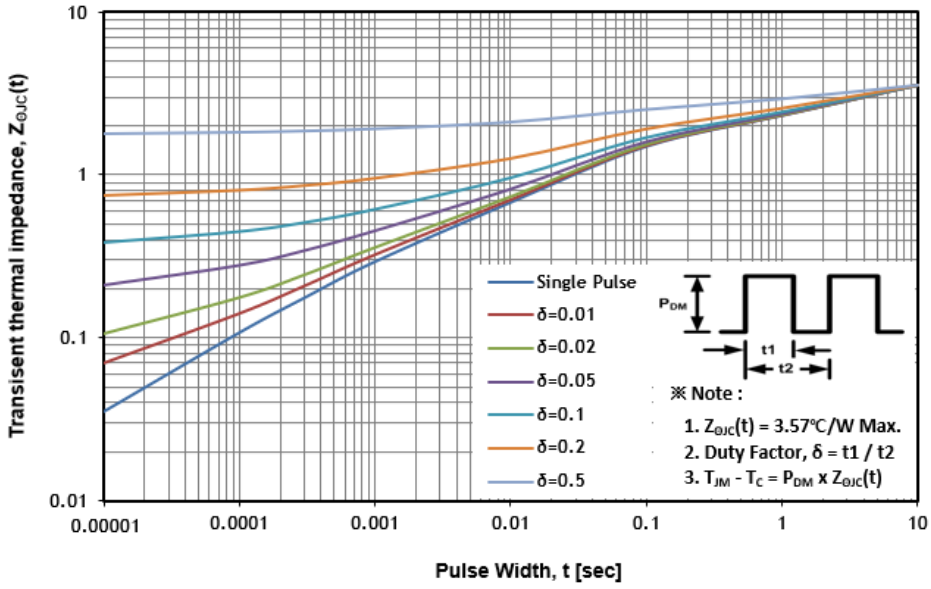
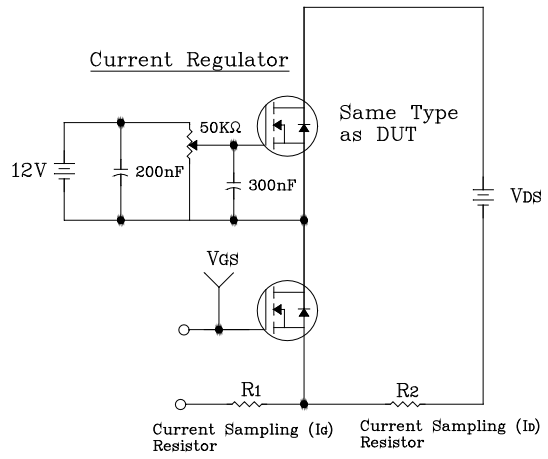


Fig. 12 Gate Charge Test Circuit & Waveform



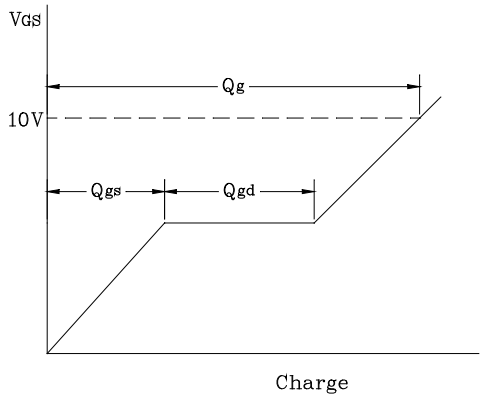
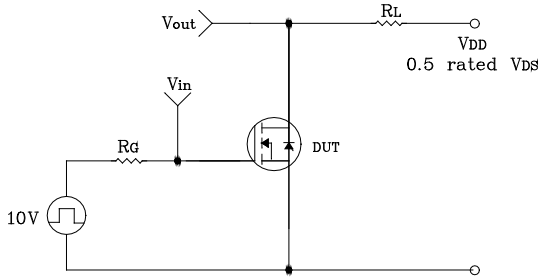


Fig. 13 Resistive Switching Test Circuit & Waveform



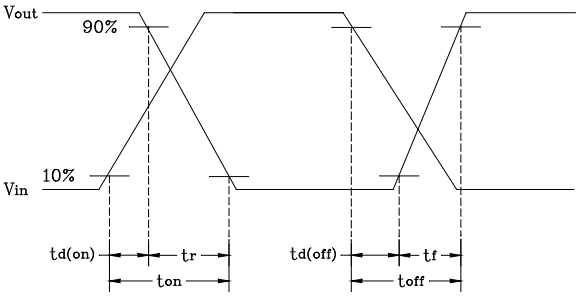
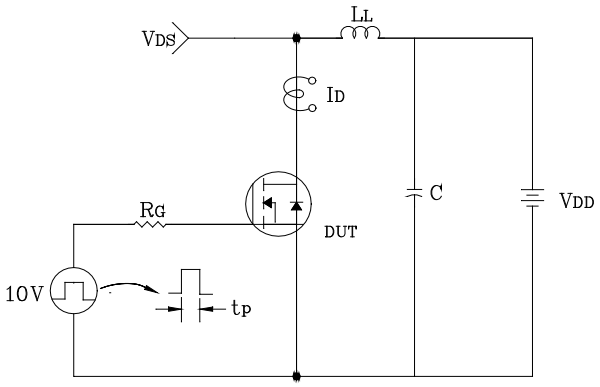


Fig. 14 E_{AS} Test Circuit & Waveform



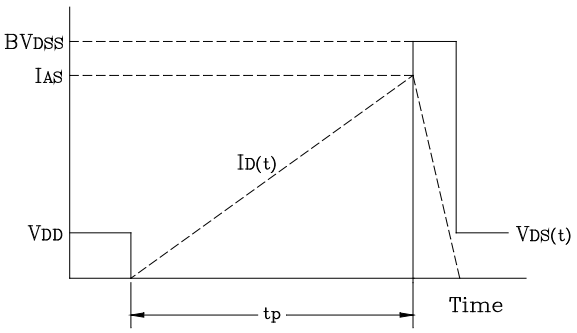
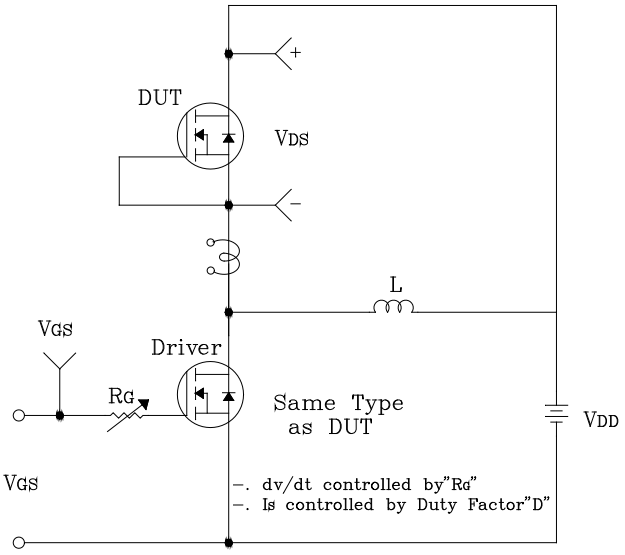
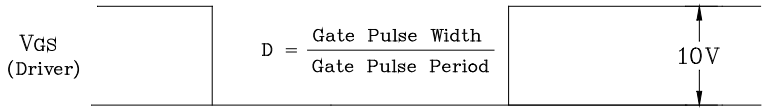
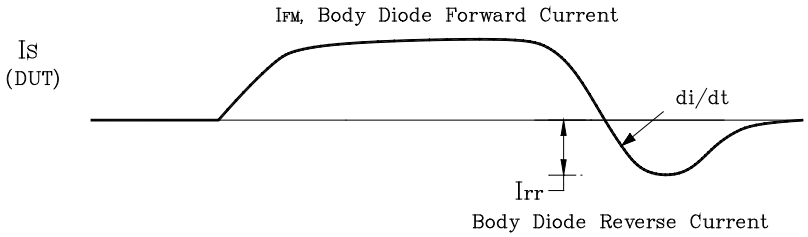
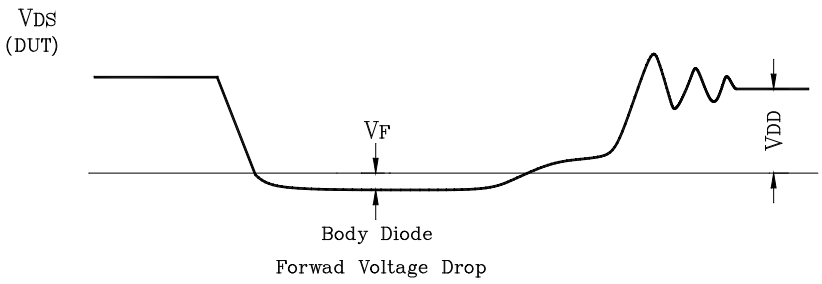


Fig. 15 Diode Reverse Recovery Time Test Circuit & Waveform

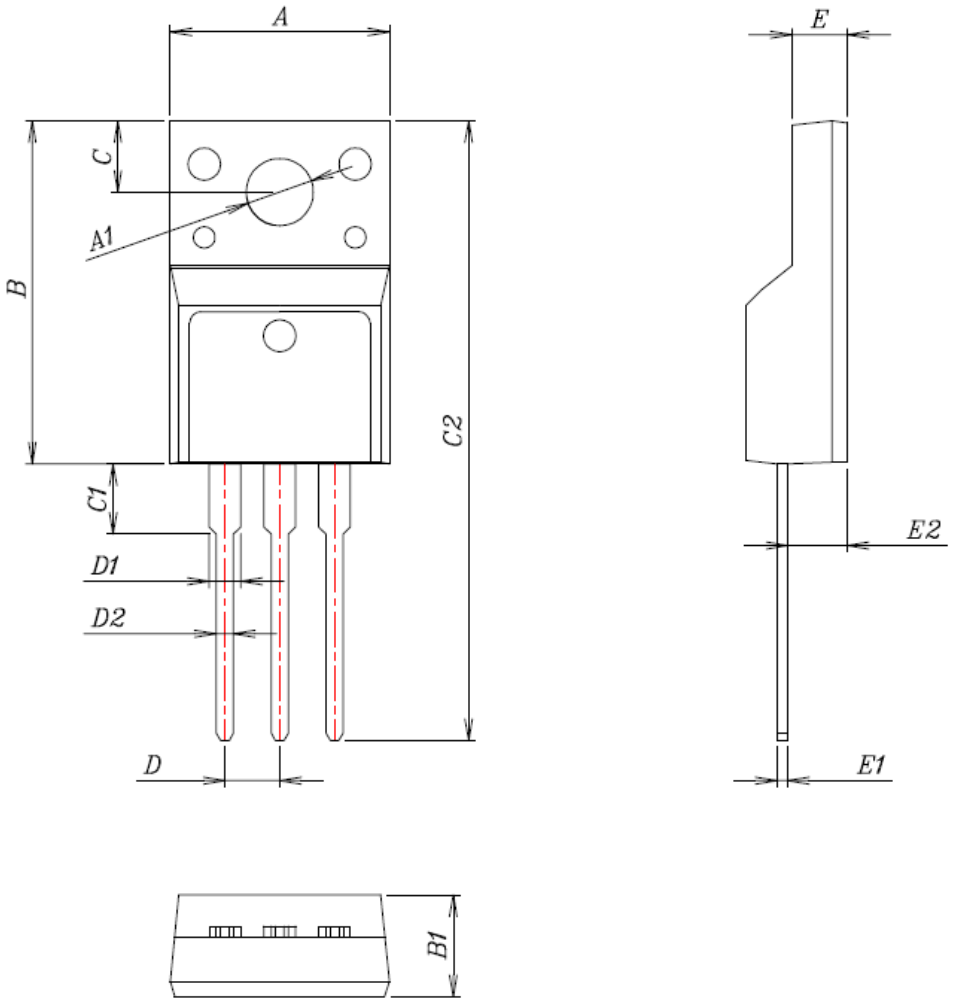








Package Outline Dimensions



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

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