KODENSHI AUK

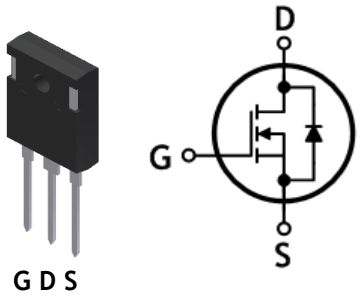
SJMN065R65W

N-Channel Super-junction MOSFET

SWITCHING REGULATOR APPLICATION

Features

- 650V Super-junction MOSFET
- Low FOM $R_{DS(on)}$ * Q_g
- Low drain-source On-resistance: $R_{DS(on)}$=0.065Ω (Max.)
- 100% avalanche tested
- RoHS compliant device

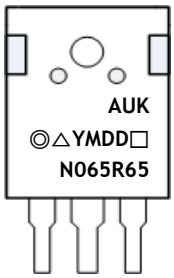


TO-247

Ordering Information

Part Number	Marking	Package
SJMN065R65W	N065R65	TO-247

Marking Information



Column 1: Manufacturer
Column 2: Production Information
e.g.) ◎△YMDD□
-. ◎: Management code
-. △: Machine Code
-. YMDD: Date Code (Year, Month, 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	51	A
		T_c=100°C	32	A
Drain current (Pulsed) (Note 1)	I_{DM}		204	A
Single pulsed avalanche energy (Note 2)	E_{AS}		650	mJ
Repetitive avalanche current (Note 1)	I_{AR}		10	A
Repetitive avalanche energy (Note 1)	E_{AR}		43.1	mJ
Power dissipation	P_D		431	W
Diode dv/dt ruggedness (Note 3)	dv/dt		15	V/ns
MOSFET dv/dt ruggedness (Note 4)	dv/dt		50	V/ns
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. 0.29	°C/W
Thermal resistance, junction to ambient	$R_{th(j-a)}$	Max. 50	

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	-	4	V
Drain-source cut-off current	I_{DSS}	V_{DS}=650V, V_{GS}=0V	-	-	1	uA
	I_{GSS}	V_{DS}=0V, V_{GS}=±30V	-	-	±100	nA
Gate leakage current	$R_{DS(ON)}$	V_{GS}=10V, I_D=19.4A	-	0.055	0.065	Ω
Drain-source on-resistance	R_g	f=1MHz, Open drain	-	0.5	-	Ω
Internal gate resistance	C_{iss}	V_{DS}=100V, V_{GS}=0V, f=1.0MHz	-	4510	-	pF
Input capacitance	C_{oss}		-	120	-	
Output capacitance	C_{rss}		-	5.4	-	
Reverse transfer capacitance	$t_{d(on)}$	V_{DD}=300V, I_D=19.4A, R_G=10Ω, V_{GS}=10V	-	85	-	ns
Turn-on delay time (Note 5)	t_r		-	55	-	
Rise time (Note 5)	$t_{d(off)}$		-	210	-	
Turn-off delay time (Note 5)	t_f		-	15	-	
Fall time (Note 5)	Q_g	V_{DS}=400V, V_{GS}=10V, I_D=38.8A	-	94	-	nC
Total gate charge (Note 6)	Q_{gs}		-	22	-	
Gate-source charge (Note 6)	Q_{gd}		-	30	-	

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	-	-	51	A
Source current (Pulsed)	I_{SM}		-	-	204	A
Forward voltage	V_{SD}	V_{GS}=0V, I_S=51A	-	-	1.7	V
Reverse recovery time (Note 5, 6)	t_{rr}	I_S=19.4A, V_{GS}=0V, dI_S/dt=50A/us	-	460	-	ns
Reverse recovery charge (Note 5, 6)	Q_{rr}		-	7.4	-	uC

Note:
1. Calculated continuous current based on maximum allowable junction temperature
2. L=10mH, I_{AS}=10A, V_{DD}=150V, Starting T_J=25°C
3. I_S≤9.7A, V_{DS}≤400V, dIs/dt≤100A/us, T_J=25°C
4. V_{DS}≤400V, I_S≤9.7A
5. Guaranteed by design, not subject to production testing
6. Pulse test: Pulse width≤300us, Duty cycle≤2%

Typical Electrical Characteristics Curves

Fig. 1 Typical Output Characteristics

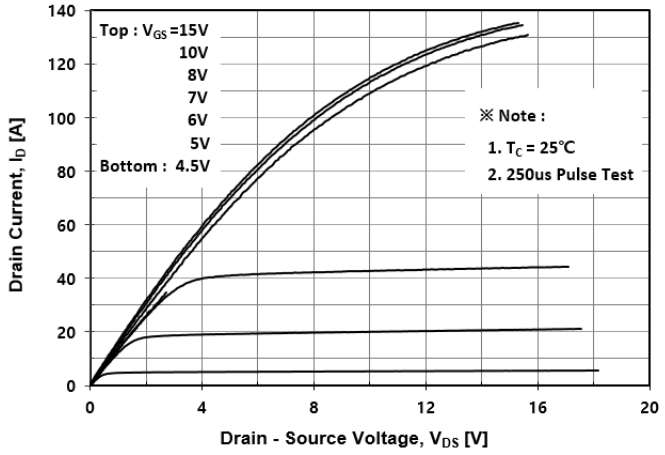


Fig. 2 Typical Transfer Characteristics

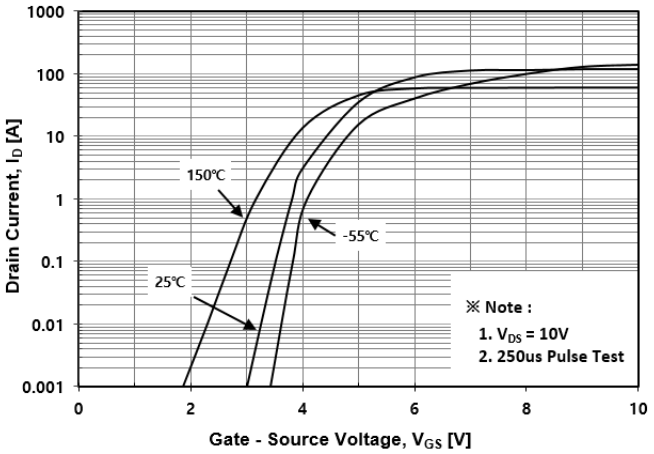


Fig.3 On-Resistance Variation with Drain Current and Gate Voltage

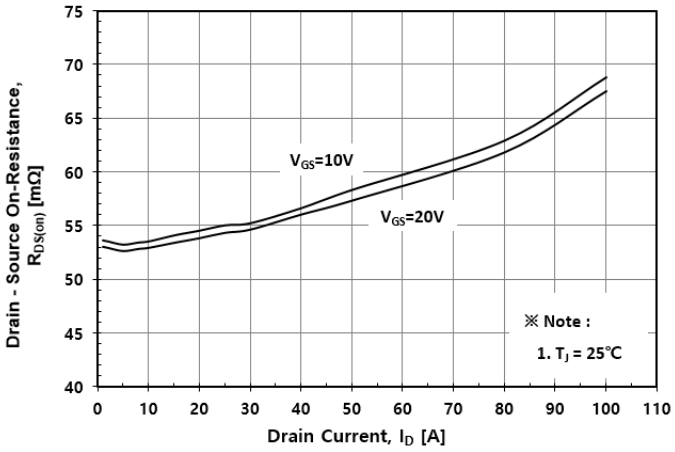


Fig. 4 Body Diode Forward Voltage Variation with Source Current

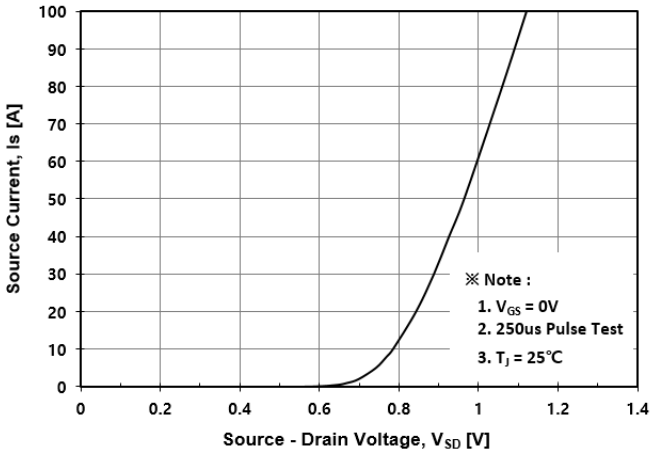


Fig. 5 Typical Capacitance Characteristics

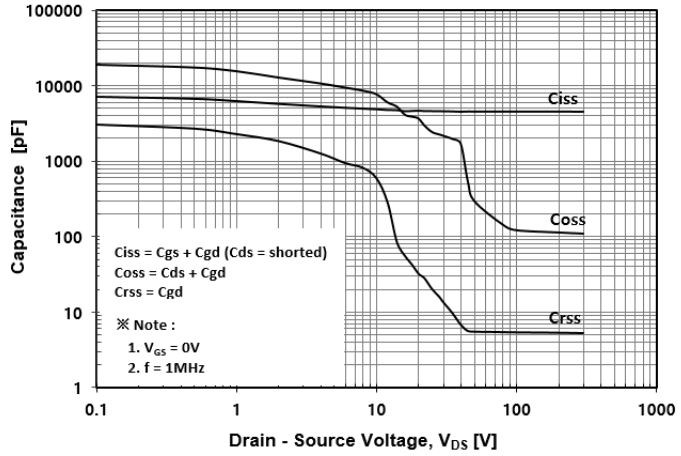
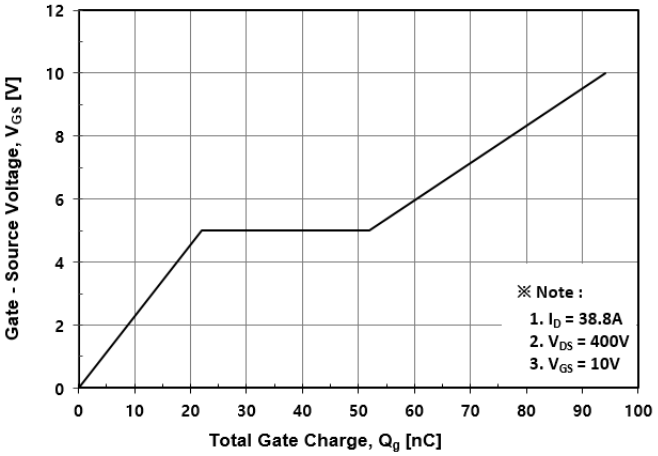


Fig. 6 Typical Total Gate Charge Characteristics



Typical Electrical Characteristics Curves

Fig. 7 Breakdown Voltage Variation vs. Temperature

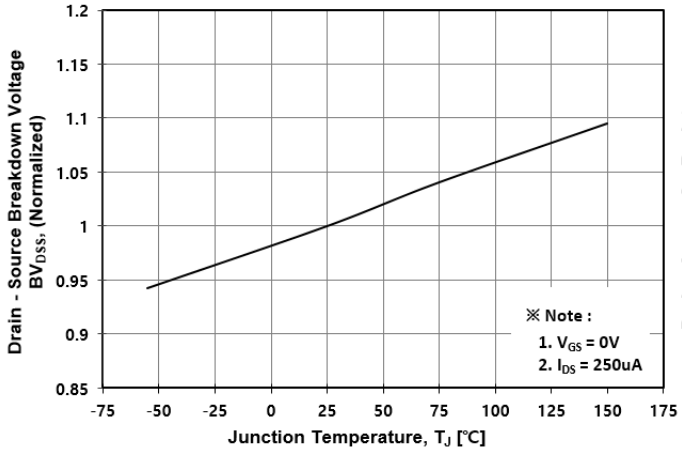


Fig. 8 On-Resistance Variation vs. Temperature

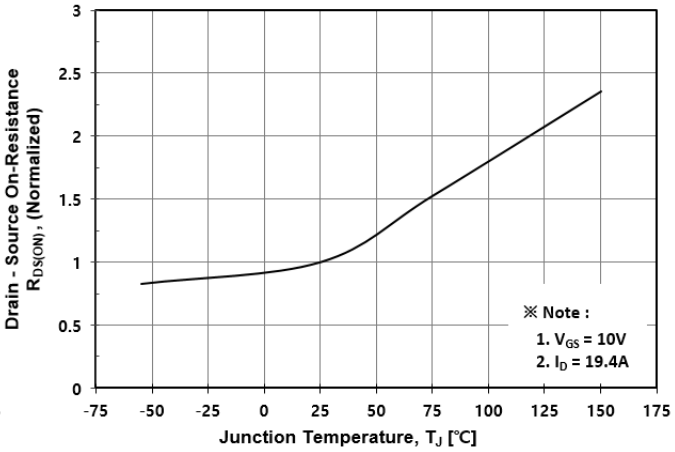


Fig. 9 Maximum Drain Current vs. Case Temperature

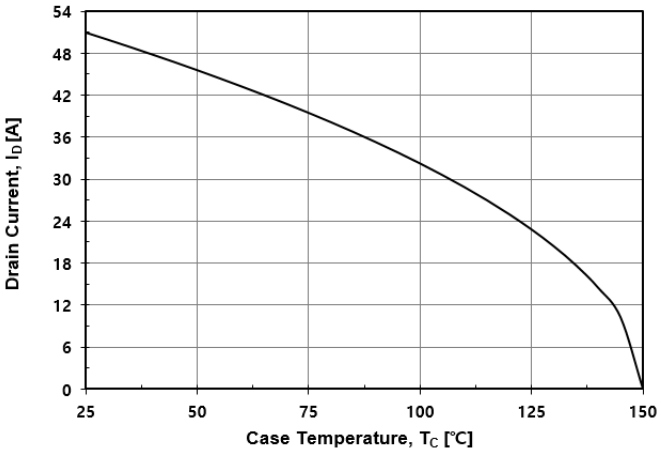


Fig. 10 Maximum Safe Operating Area

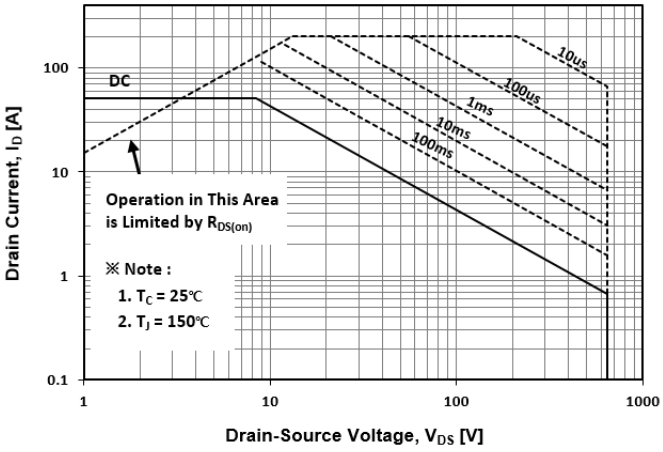


Fig. 11 Transient Thermal Impedance

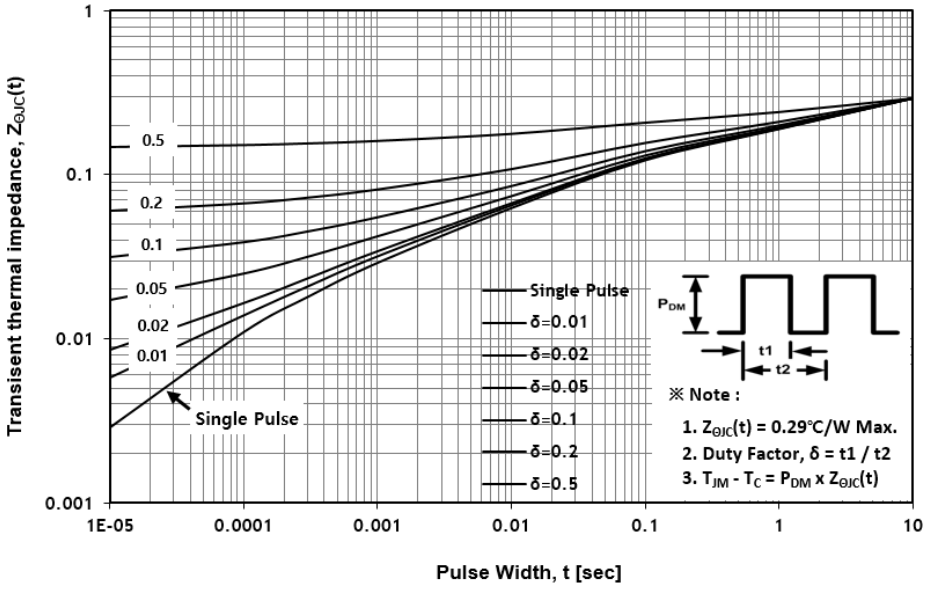
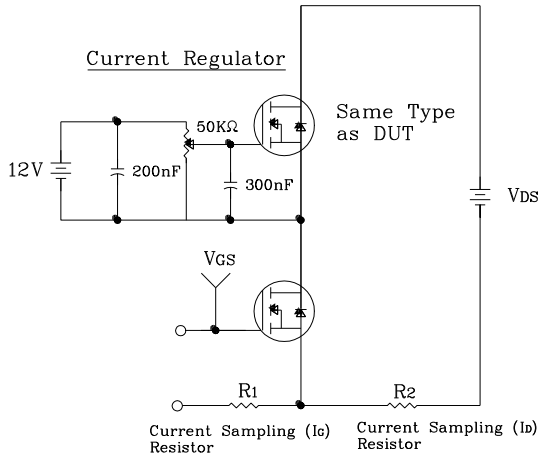


Fig. 12 Gate Charge Test Circuit & Waveform



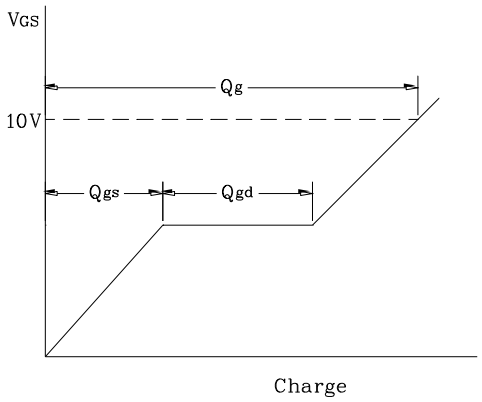
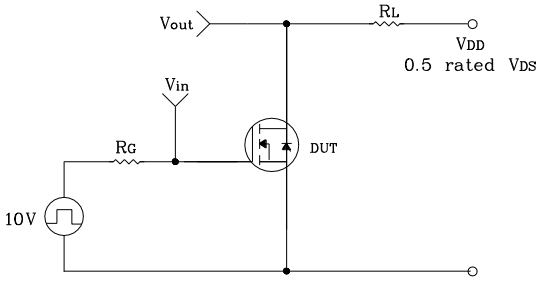


Fig. 13 Resistive Switching Test Circuit & Waveform



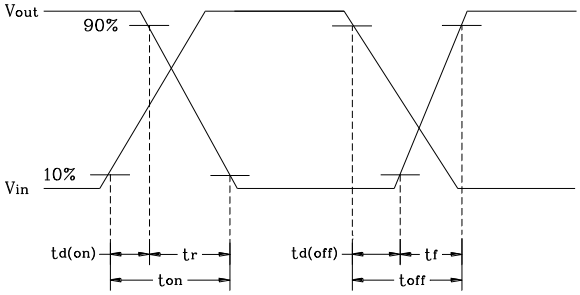
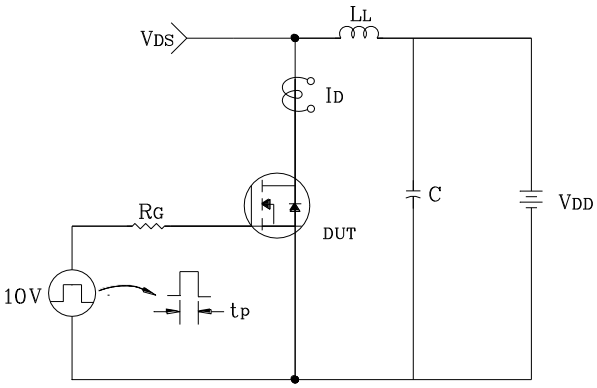


Fig. 14 E_{AS} Test Circuit & Waveform



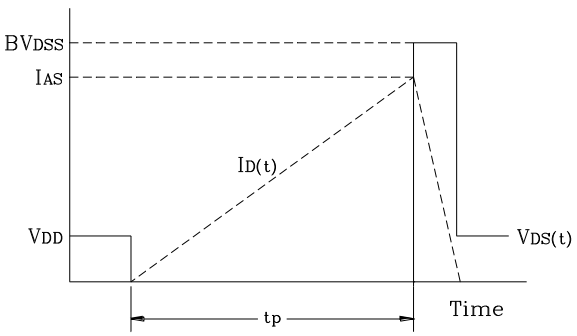
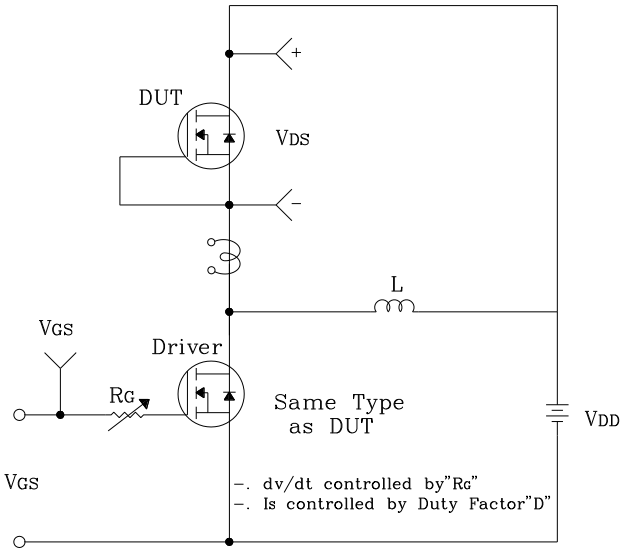
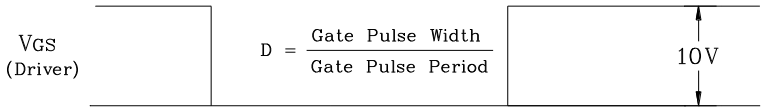
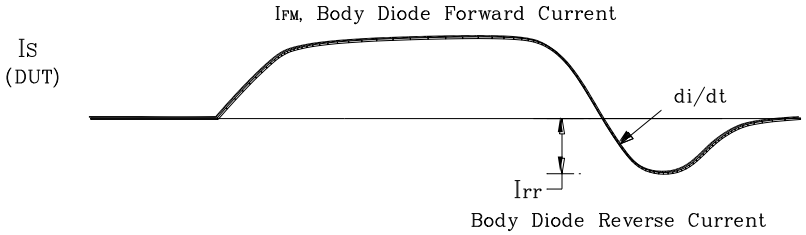
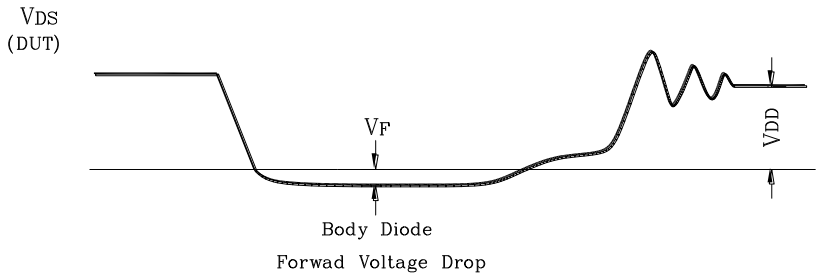


Fig. 15 Diode Reverse Recovery Time Test Circuit & Waveform

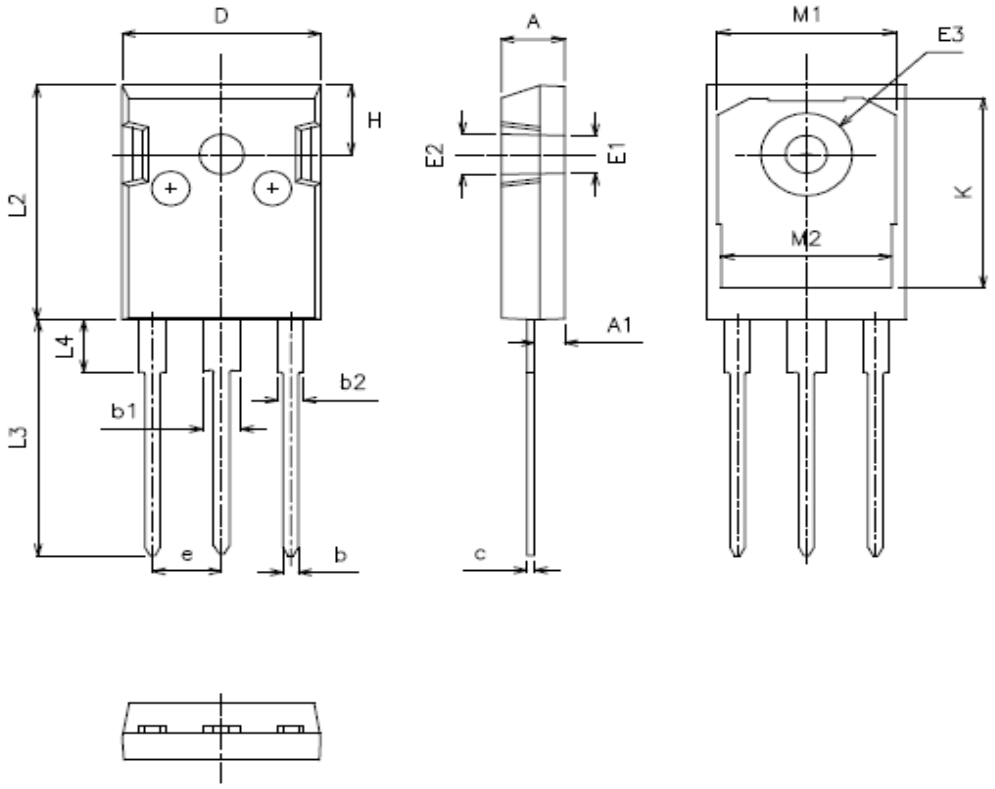








Package Outline Dimensions (Unit: mm)



SYMBOL	MILLIMETERS		
	MIN	NOM	MAX
A	4.80	5.00	5.20
A1	2.26	2.41	2.56
b	1.10	1.20	1.30
b1	3.00	3.10	3.20
b2	2.00	2.10	2.20
c	0.50	0.60	0.70
D	15.60	15.80	16.00
E1	3.45	3.60	3.75
E2	3.55	3.70	3.85
E3	7.04	7.19	7.34
L2	20.80	21.00	21.20
L3	19.72	19.92	20.12
L4	3.95	4.10	4.25
e	5.29	5.44	5.59
H	6.00	6.15	6.30
K	16.25	16.45	16.65
M1	13.80	14.00	14.20
M2	13.10	13.30	13.50

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