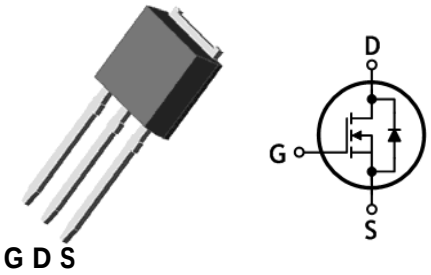
N-Channel Super Junction MOSFET

Features

- Drain-Source voltage: V_{DS}=750V (@T_J=150°C)
- Low drain-source On resistance: $R_{DS(on)}$=0.81Ω (Typ.)
- Ultra low gate charge: Qg=10nC (Typ.)
- RoHS compliant device
- 100% avalanche tested

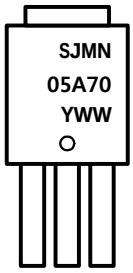


I-PAK

Ordering Information

Part Number	Marking	Package
SJMN05A70I	SJMN05A70	I-PAK

Marking Information



Column 1, 2: Device Code
Column 3: Production Information
e.g.) YWW
-. Y: Year Code
-. WW : Week Code

Absolute maximum ratings (T_C=25°C unless otherwise noted)

Characteristic	Symbol		Rating	Unit
Drain-source voltage	V_{DSS}		700	V
Gate-source voltage	V_{GSS}		±30	V
Drain current (DC) (Note 1)	I_D	T_C=25°C	5	A
		T_C=100°C	3.2	A
Drain current (Pulsed) (Note 1)	I_{DM}		15	A
Single pulsed avalanche energy (Note 2)	E_{AS}		130	mJ
Repetitive avalanche current (Note 1)	I_{AR}		5	A
Repetitive avalanche energy (Note 1)	E_{AR}		0.4	mJ
Power dissipation	P_D		50	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. 2.5	°C/W
Thermal resistance, junction to ambient	$R_{th(j-a)}$	Max. 62	

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	700	-	-	V
Gate threshold voltage	$V_{GS(th)}$	I_D=250uA, V_{DS}=V_{GS}	2.5	3.5	4.5	V
Drain-source cut-off current	I_{DSS}	V_{DS}=700V, V_{GS}=0V	-	-	1	uA
		V_{DS}=560V, T_J=125°C	-	-	10	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=1.5A	-	0.81	0.92	Ω
Gate resistance	R_G	f=1MHz, Open drain	-	2.0	-	Ω
Input capacitance	C_{iss}	V_{DS}=25V, V_{GS}=0V, f=1MHz	-	450	-	pF
Output capacitance	C_{oss}		-	320	-	
Reverse transfer capacitance	C_{rss}		-	9	-	
Turn-on delay time (Note 3)	$t_{d(on)}$	V_{DD}=300V, I_D=2A, R_G=12Ω, V_{GS}=10V	-	13	-	ns
Rise time (Note 3)	t_r		-	12	-	
Turn-off delay time (Note 3)	$t_{d(off)}$		-	31	-	
Fall time (Note 3)	t_f		-	9	-	
Total gate charge (Note 4)	Q_g	V_{DS}=480V, V_{GS}=10V, I_D=2A	-	10	-	nC
Gate-source charge (Note 4)	Q_{gs}		-	3.5	-	
Gate-drain charge (Note 4)	Q_{gd}		-	3	-	

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	A
Source current (Pulsed)	I_{SM}		-	-	15	A
Forward voltage	V_{SD}	V_{GS}=0V, I_S=2A	-	-	1.2	V
Reverse recovery time (Note 3,4)	t_{rr}	I_S=4, V_R=0V dI_S/dt=100A/us	-	220	-	ns
Reverse recovery charge (Note 3,4)	Q_{rr}		-	1.6	-	uC

Note:
1. Calculated continuous current based on maximum allowable junction temperature
2. L=60mH, I_{AS}=2A, V_{DD}=60V, R_G=25Ω, 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

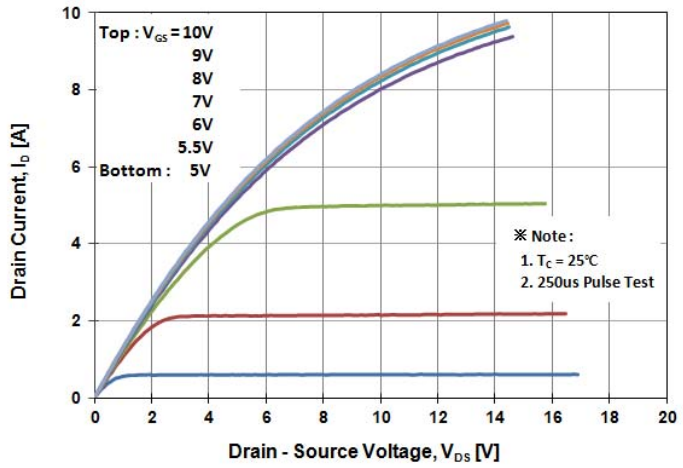


Fig. 2 Typical Transfer Characteristics

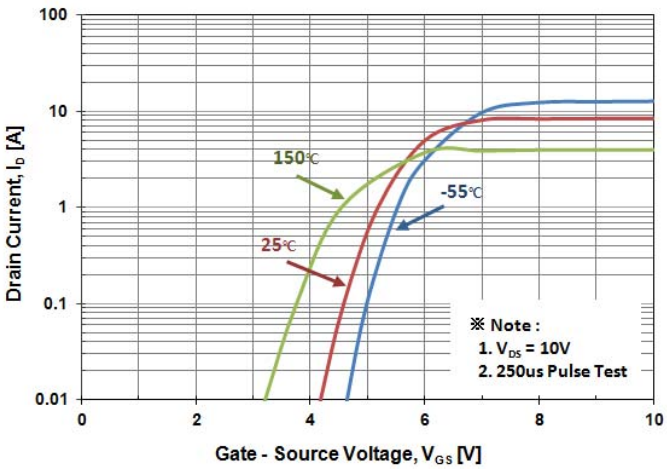


Fig.3 On-Resistance Variation with Drain Current and Gate Voltage

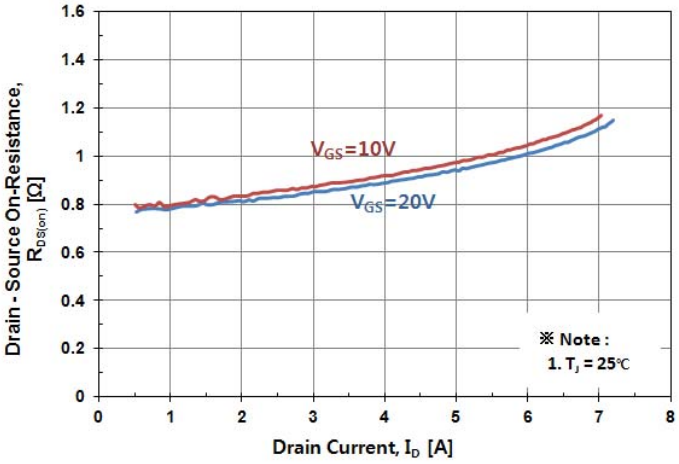


Fig. 4 Body Diode Forward Voltage Variation with Source Current

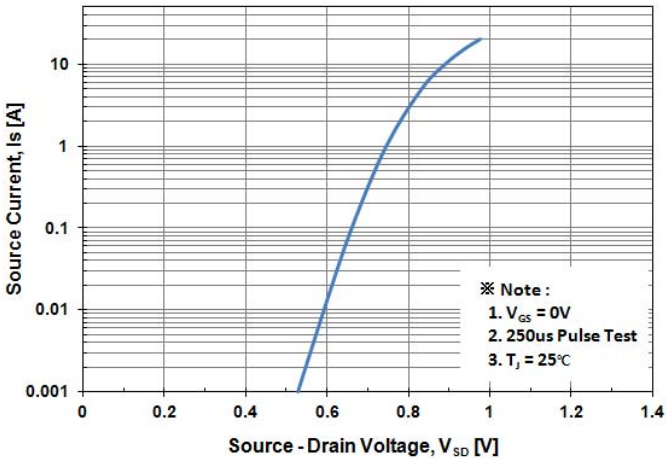


Fig. 5 Typical Capacitance Characteristics

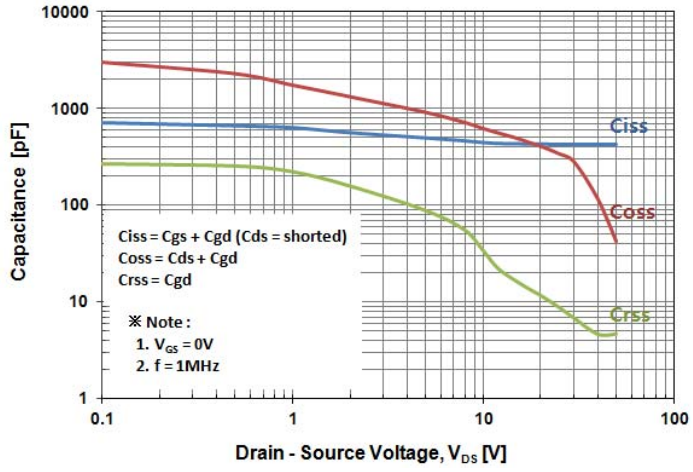


Fig. 6 Typical Total Gate Charge Characteristics

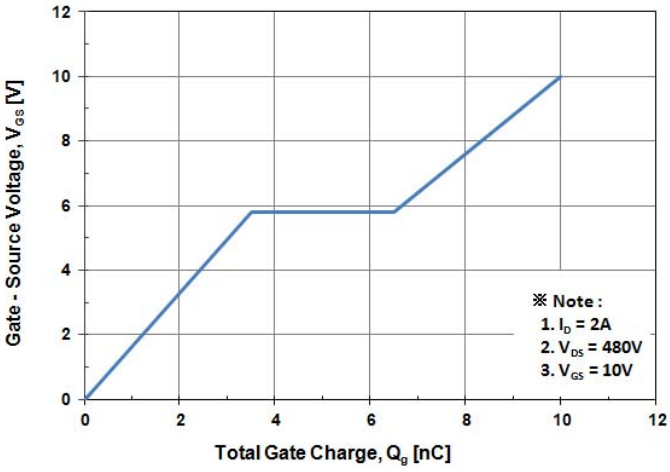


Fig. 7 Breakdown Voltage Variation vs. Temperature

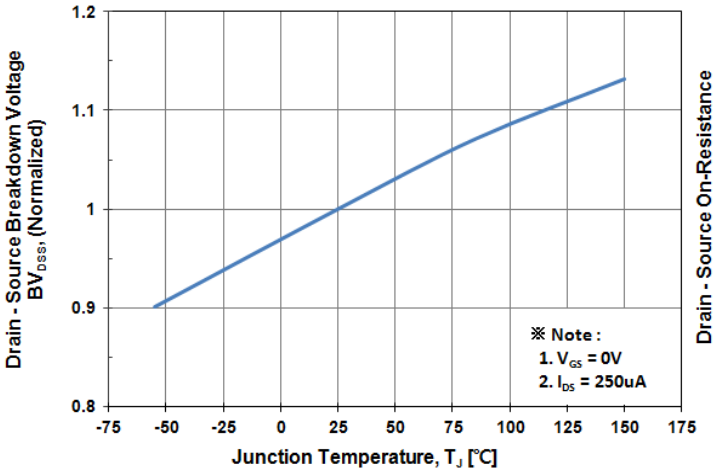


Fig. 8 On-Resistance Variation vs. Temperature

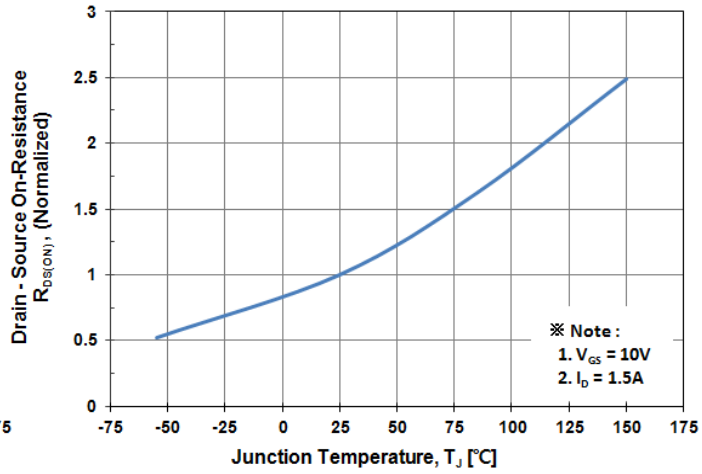


Fig. 9 Maximum Drain Current vs. Case Temperature

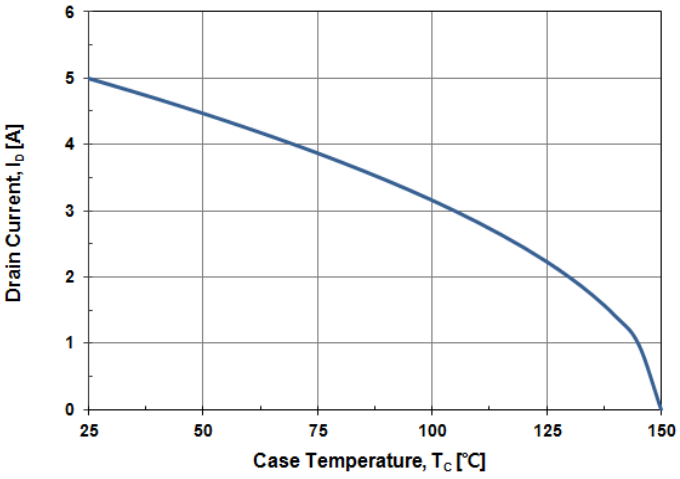


Fig. 10 Maximum Safe Operating Area

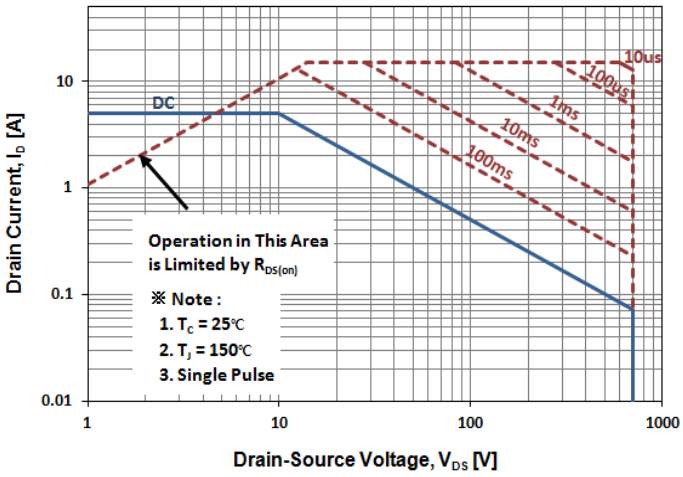


Fig. 11 Transient Thermal Impedance

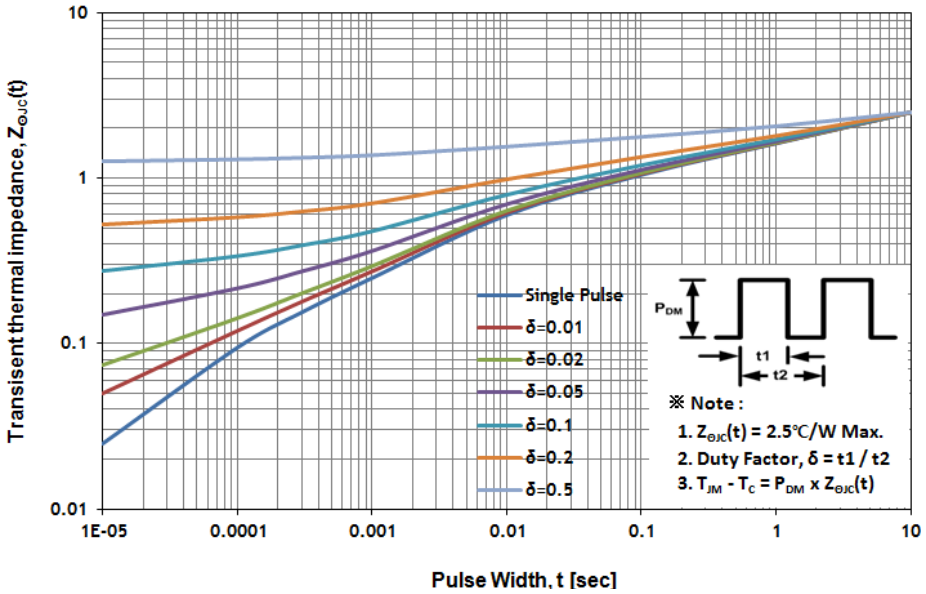
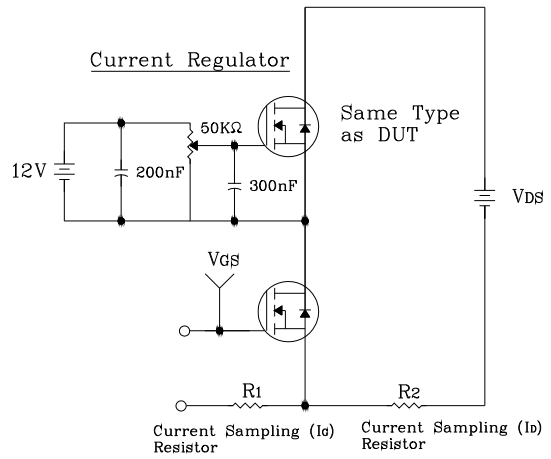


Fig. 12 Gate Charge Test Circuit & Waveform



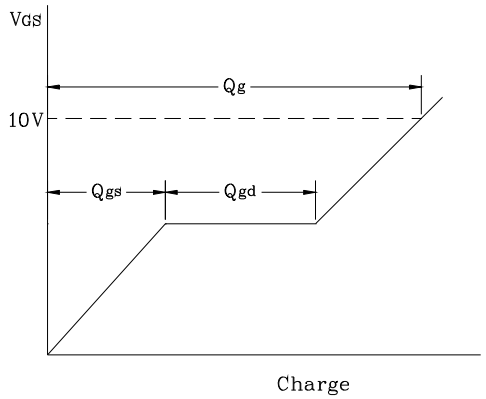
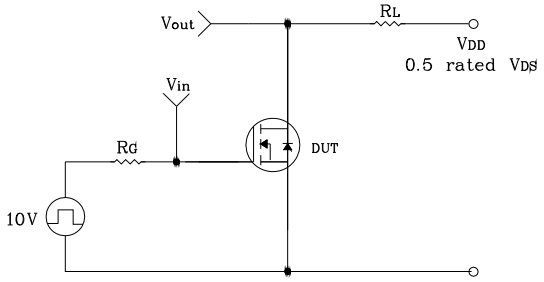


Fig. 13 Resistive Switching Test Circuit & Waveform



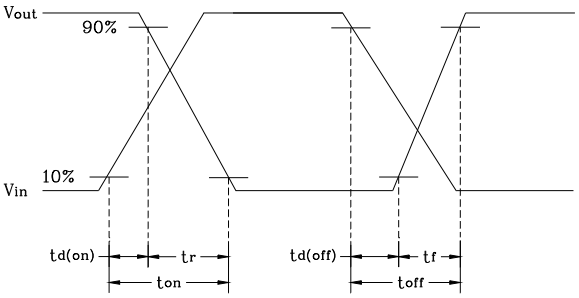
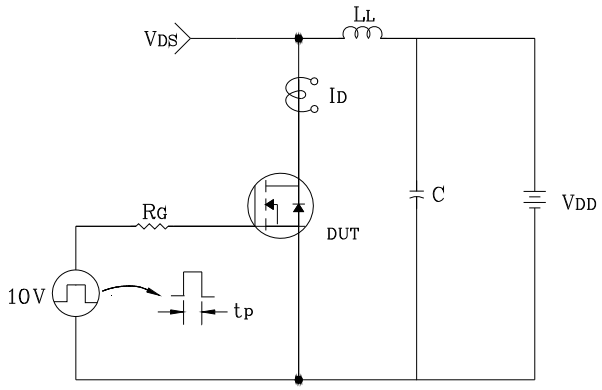


Fig. 14 E_{AS} Test Circuit & Waveform



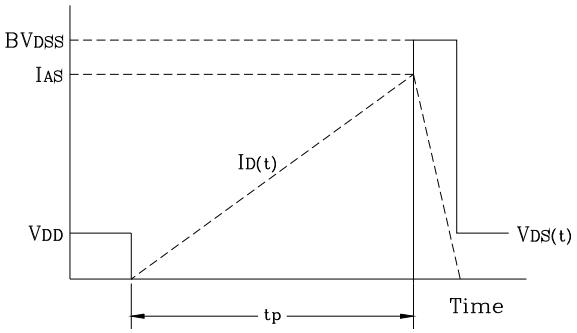
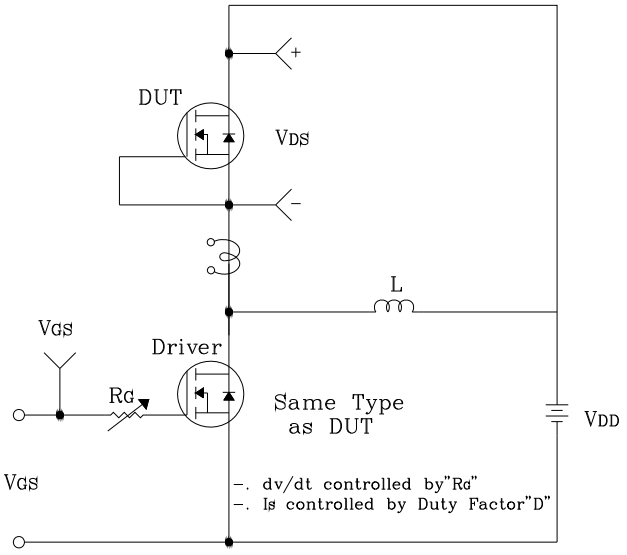
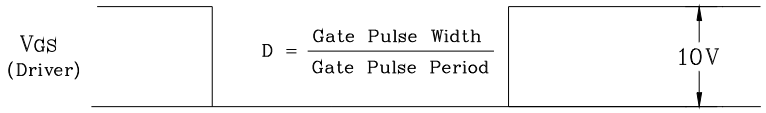
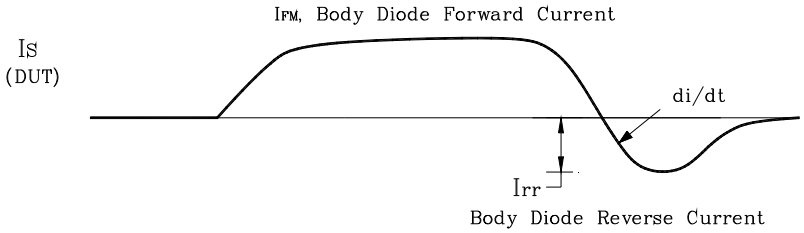
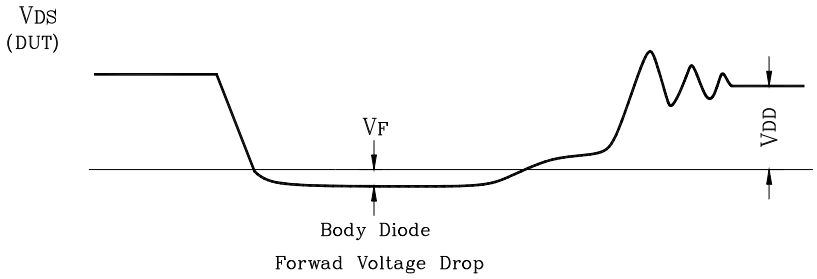


Fig. 15 Diode Reverse Recovery Time Test Circuit & Waveform

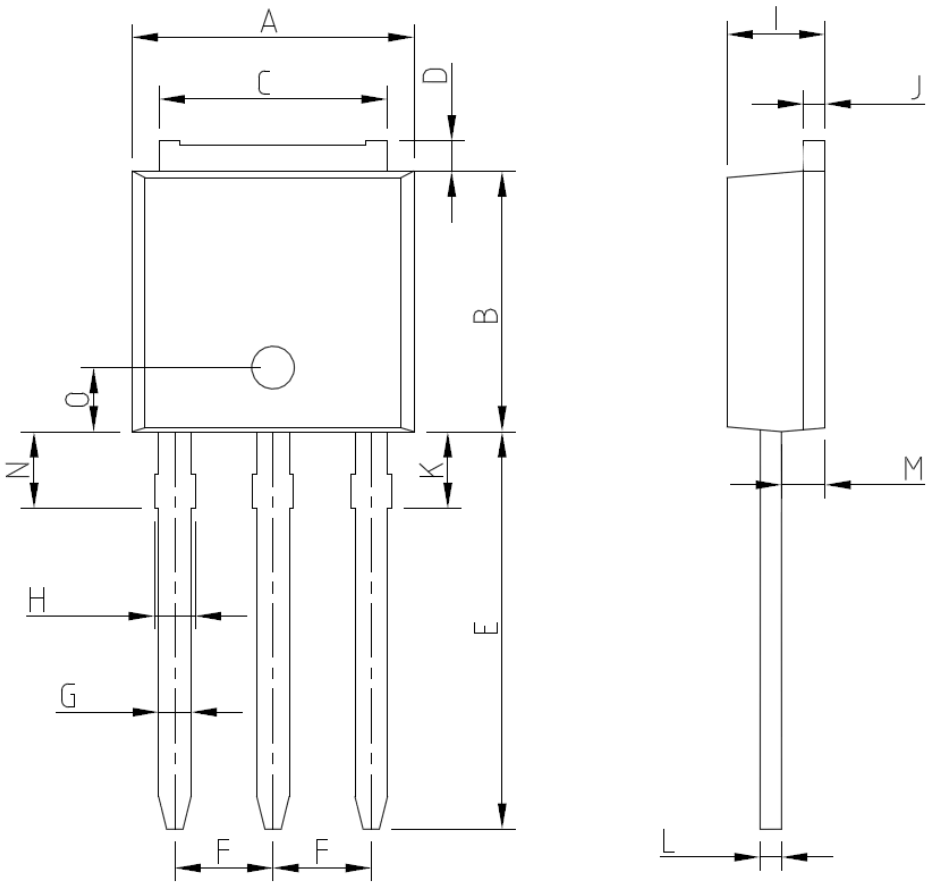








Package Outline Dimensions (Unit: mm)



SYMBOL	MILLIMETERS			NOTE
	MINIMUM	NOMINAL	MAXIMUM	
A	6.40	6.60	6.80	
B	5.90	6.10	6.30	
C	5.04	5.34	5.64	
D	0.50	0.70	0.90	
E	9.00	9.30	9.60	
F	2.10	2.30	2.50	
G	0.66	0.76	0.86	
H	0.96 MAX			
I	2.20	2.30	2.40	
J	0.40	0.50	0.60	
K	1.60	1.80	2.00	
L	0.40	0.50	0.60	
M	0.72	1.02	1.32	
N	0.90	1.00	1.10	
O	1.50			

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