

# 产品规格书

批准	审核	校核	编制
纪春华	朴致均	赵宇辉	郑羿
2019.07.16	2019.07.16	2019.07.16	2019.07.16

规格书更改履历:

序号	更改内容	履历号	更改时间	责任人
1	新规制定	000	2019.07.16	郑羿

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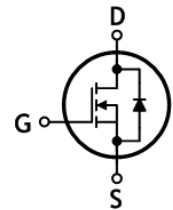
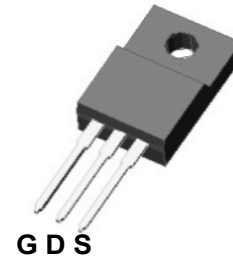
## N-Channel Super Junction MOSFET

### Features

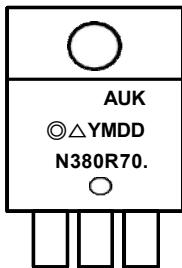
- Drain-Source voltage:  $V_{DS}=750V$  (@ $T_J=150^{\circ}C$ )
- Low drain-source On resistance:  $R_{DS(on)}=0.38\Omega$  (Max.)
- Ultra low gate charge:  $Q_g=20nC$ (Typ.)
- RoHS compliant device
- 100%avalanche tested

### Ordering Information

Part Number	Marking	Package
KJMN380R70FA	N380R70.	TO-220F-3L


**TO-220F-3L**

### Marking Information



**Column 1: Manufacturer**  
**Column 2: Production Information**  
 e. g.) ◎△YMDD  
 -. ◎△: Factory Management Code  
 -. YMDD: Date Code (Year, Month, Daily)  
**Column 3: Device Code . Dalian**

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

Characteristic	Symbol	Rating	Unit	
Drain-source voltage	$V_{DSS}$	700	V	
Gate-source voltage	$V_{GSS}$	$\pm 30$	V	
Drain current (DC) (Note 1)	$I_D$	$T_c=25^{\circ}C$	11	A
		$T_c=100^{\circ}C$	7	A
Drain current (Pulsed) (Note 1)	$I_{DM}$	44	A	
Single pulsed avalanche energy (Note 2)	$E_{AS}$	263	mJ	
Repetitive avalanche current (Note 1)	$I_{AR}$	7	A	
Repetitive avalanche energy (Note 1)	$E_{AR}$	3.2	mJ	
Power dissipation	$P_D$	32	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	$^{\circ}C$	
Storage temperature range	$T_{stg}$	-55~150	$^{\circ}C$	

## Thermal Characteristics

Characteristic	Symbol	Rating	Unit
Thermal resistance, junction to case	$R_{th(j-c)}$	Max. 3.9	°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	$BV_{DSS}$	$I_D=250\mu\text{A}, V_{GS}=0$	700	-	-	V
Gate threshold voltage	$V_{GS(th)}$	$I_D=250\mu\text{A}, V_{DS}=V_{GS}$	2	3	4	V
Drain-source cutoff current	$I_{DSS}$	$V_{DS}=700\text{V}, V_{GS}=0\text{V}$	-	-	1	$\mu\text{A}$
		$V_{DS}=560\text{V}, T_J=125^\circ\text{C}$	-	-	10	$\mu\text{A}$
Gate leakage current	$I_{GSS}$	$V_{DS}=0\text{V}, V_{GS}=\pm 30\text{V}$	-	-	$\pm 100$	nA
Drain-source on-resistance	$R_{DS(ON)}$	$V_{GS}=10\text{V}, I_D=5.5\text{A}$	-	0.3	0.38	$\Omega$
Internal gate resistance	$R_g$	$f=1\text{MHz}, \text{Open drain}$	-	20	-	$\Omega$
Input capacitance	$C_{iss}$	$V_{DS}=25\text{V}, V_{GS}=0\text{V}, f=1\text{MHz}$	-	858	-	pF
Output capacitance	$C_{oss}$		-	470	-	
Reverse transfer capacitance	$C_{rss}$		-	21	-	
Turn-on delay time (Note 5)	$t_{d(on)}$	$V_{DS}=350\text{V}, I_D=11\text{A}, R_G=25\Omega$	-	17	-	ns
Rise time (Note 5)	$t_r$		-	14	-	
Turn-off delay time (Note 5)	$t_{d(off)}$		-	40	-	
Fall time (Note 5)	$t_f$		-	5	-	
Total gate charge (Note 6)	$Q_g$	$V_{DS}=400\text{V}, V_{GS}=10\text{V}, I_D=6\text{A}$	-	20	-	nC
Gate-source charge (Note 6)	$Q_{gs}$		-	6.5	-	
Gate-drain charge (Note 6)	$Q_{gd}$		-	5.5	-	

## 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	-	-	11	A
Source current (Pulsed)	$I_{SM}$		-	-	44	A
Forward voltage	$V_{SD}$	$V_{GS}=0\text{V}, I_S=11\text{A}$	-	-	1.2	V
Reverse recovery time (Note 5, 6)	$t_{rr}$	$I_S=11\text{A}, V_{GS}=0\text{V}, di_S/dt=100\text{A}/\mu\text{s}$	-	270	-	ns
Reverse recovery charge (Note 5, 6)	$Q_{rr}$		-	2.8	-	$\mu\text{C}$

Notes:

1. Calculated continuous current based on maximum allowable junction temperature
2.  $L=10\text{mH}, I_{AS}=7\text{A}, V_{DD}=50\text{V}, \text{Starting } T_J=25^\circ\text{C}$
3.  $I_S \leq 11\text{A}, V_{DS} \leq 400\text{V}, di_S/dt \leq 100\text{A}/\mu\text{s}, T_J=25^\circ\text{C}$
4.  $V_{DS} \leq 400\text{V}, I_S \leq 11\text{A}$
5. Guaranteed by design, not subject to production testing
6. Pulse test: Pulse width  $\leq 300\mu\text{s}$ , Duty cycle  $\leq 2\%$

## Typical Electrical Characteristics Curves

Fig. 1 Typical Output Characteristics

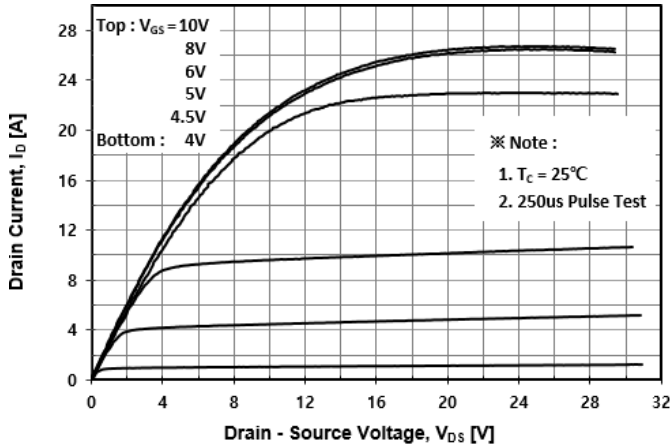


Fig. 2 Typical Transfer Characteristics

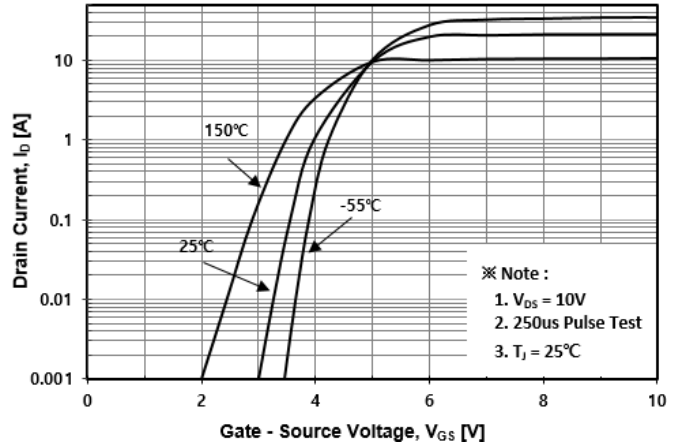


Fig. 3 On-Resistance Variation with Drain Current and Gate Voltage

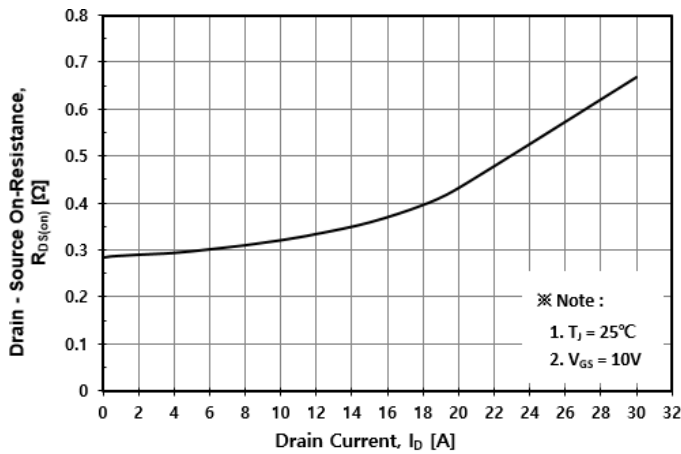


Fig. 4 Body Diode Forward Voltage Variation with Source Current

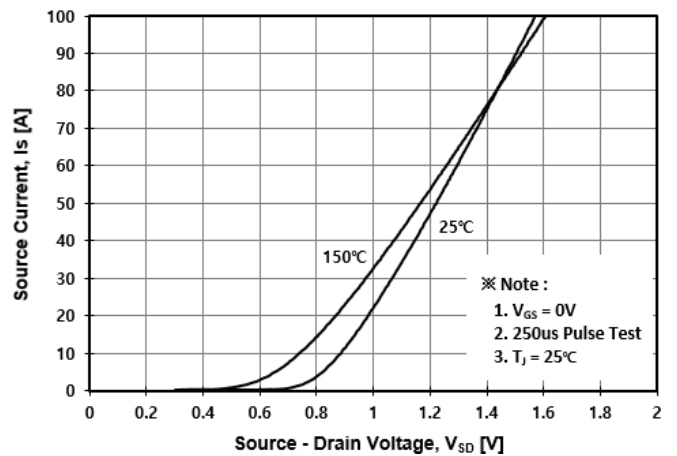


Fig. 5 Typical Capacitance Characteristics

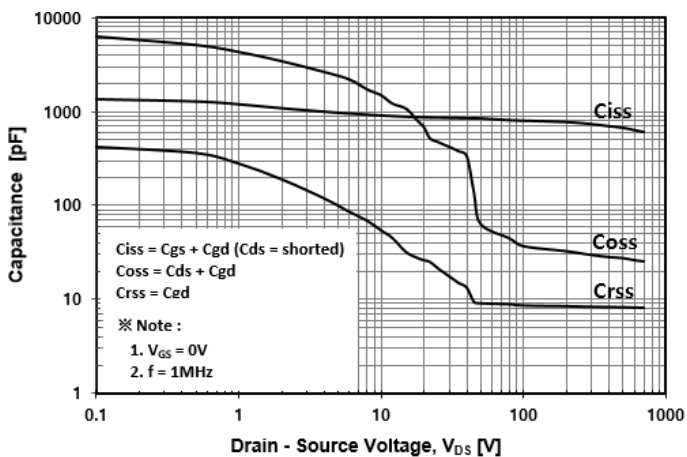


Fig. 6 Typical Total Gate Charge Characteristics

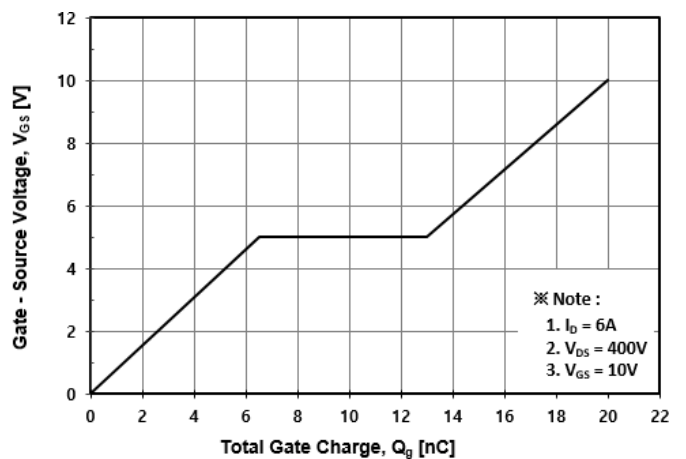


Fig. 7 Breakdown Voltage Variation vs. Temperature

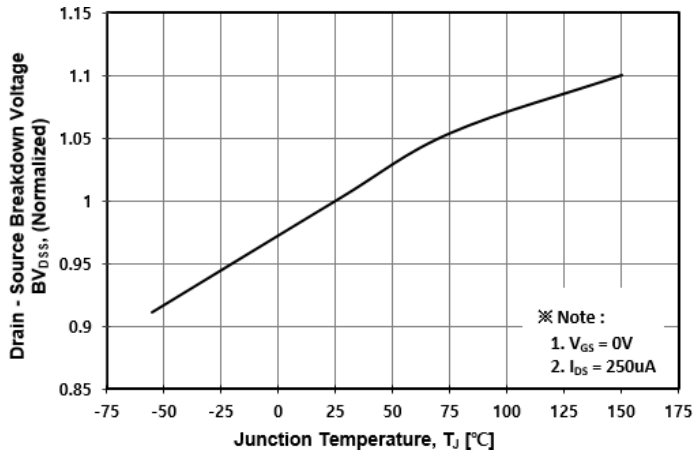


Fig. 8 On-Resistance Variation vs. Temperature

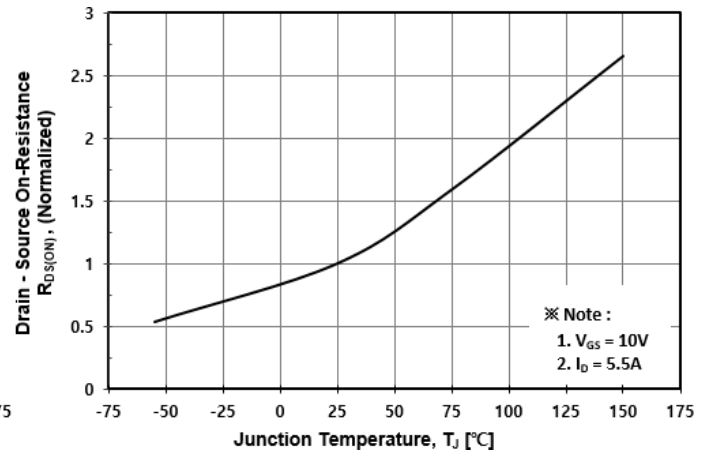


Fig. 9 Maximum Drain Current vs. Case Temperature

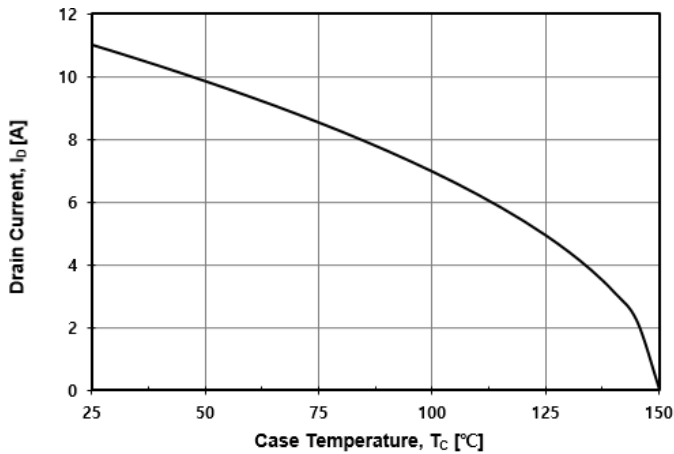


Fig. 10 Maximum Safe Operating Area

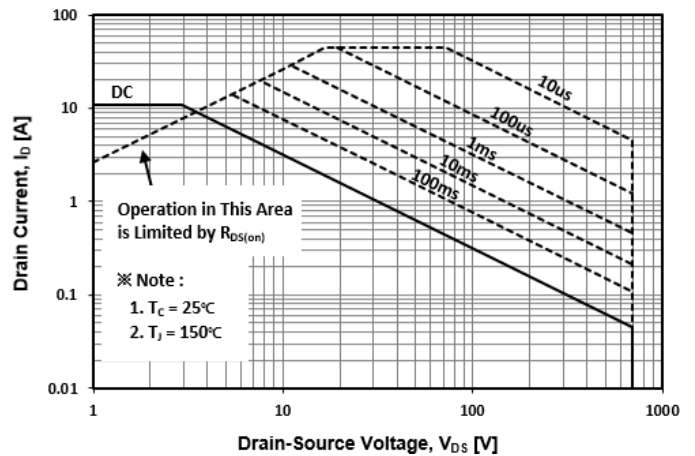
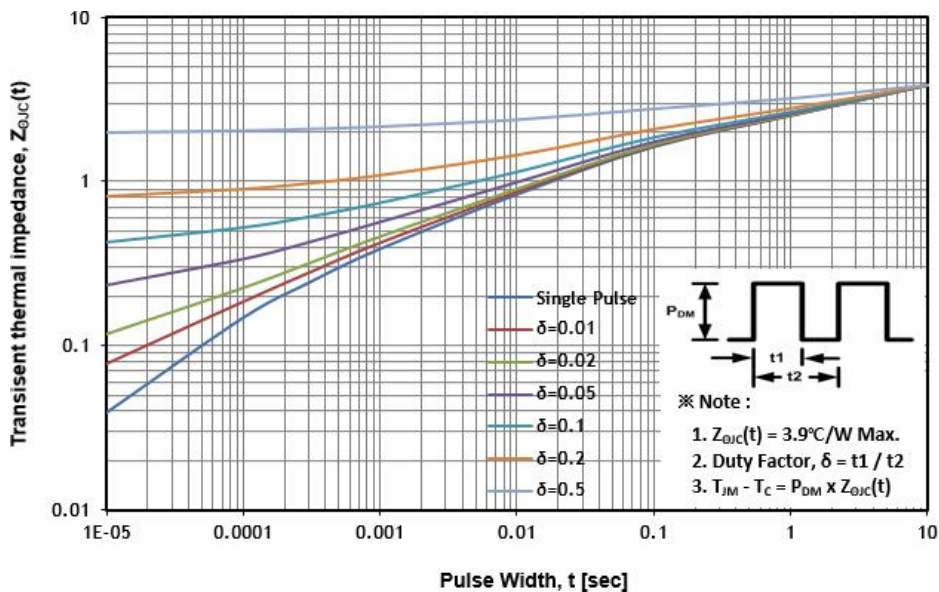
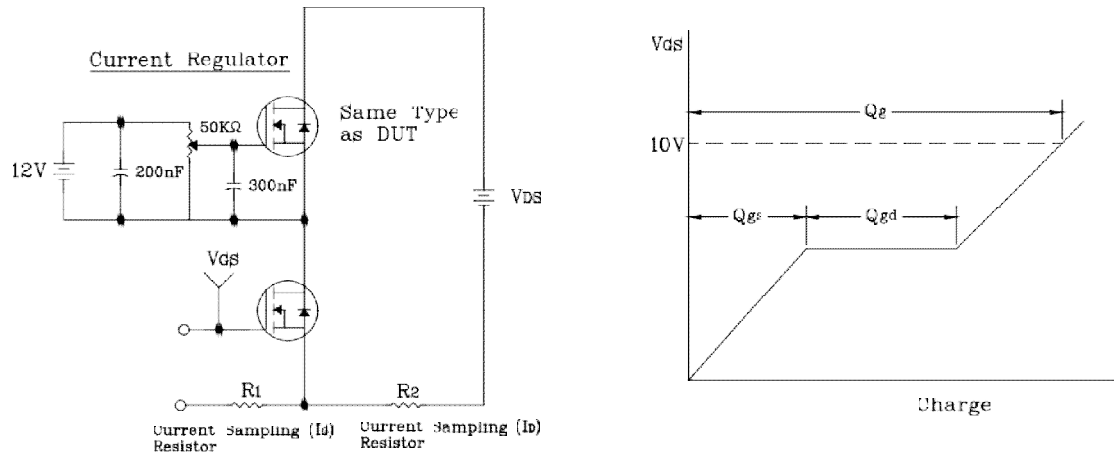


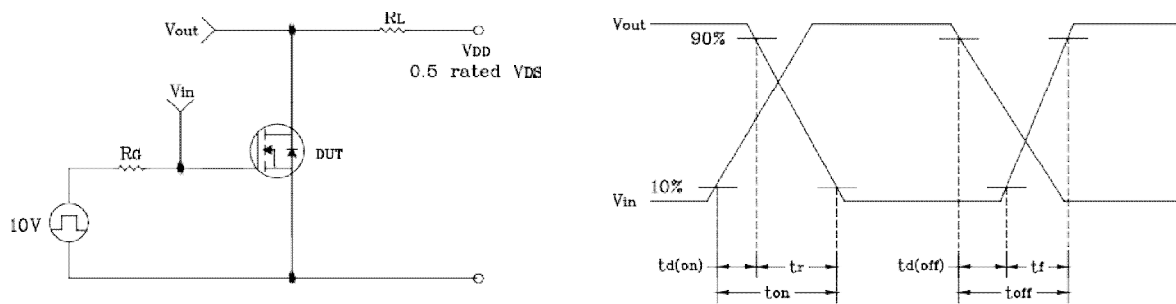
Fig. 11 Transient Thermal Impedance



**Fig. 12 Gate Charge Test Circuit & Waveform**



**Fig. 13 Resistive Switching Test Circuit & Waveform**



**Fig. 14 EAS Test Circuit & Waveform**

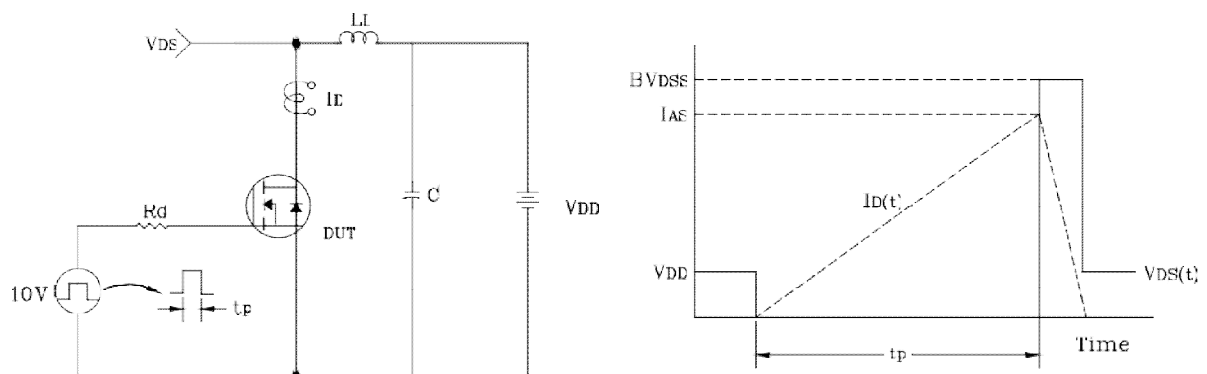
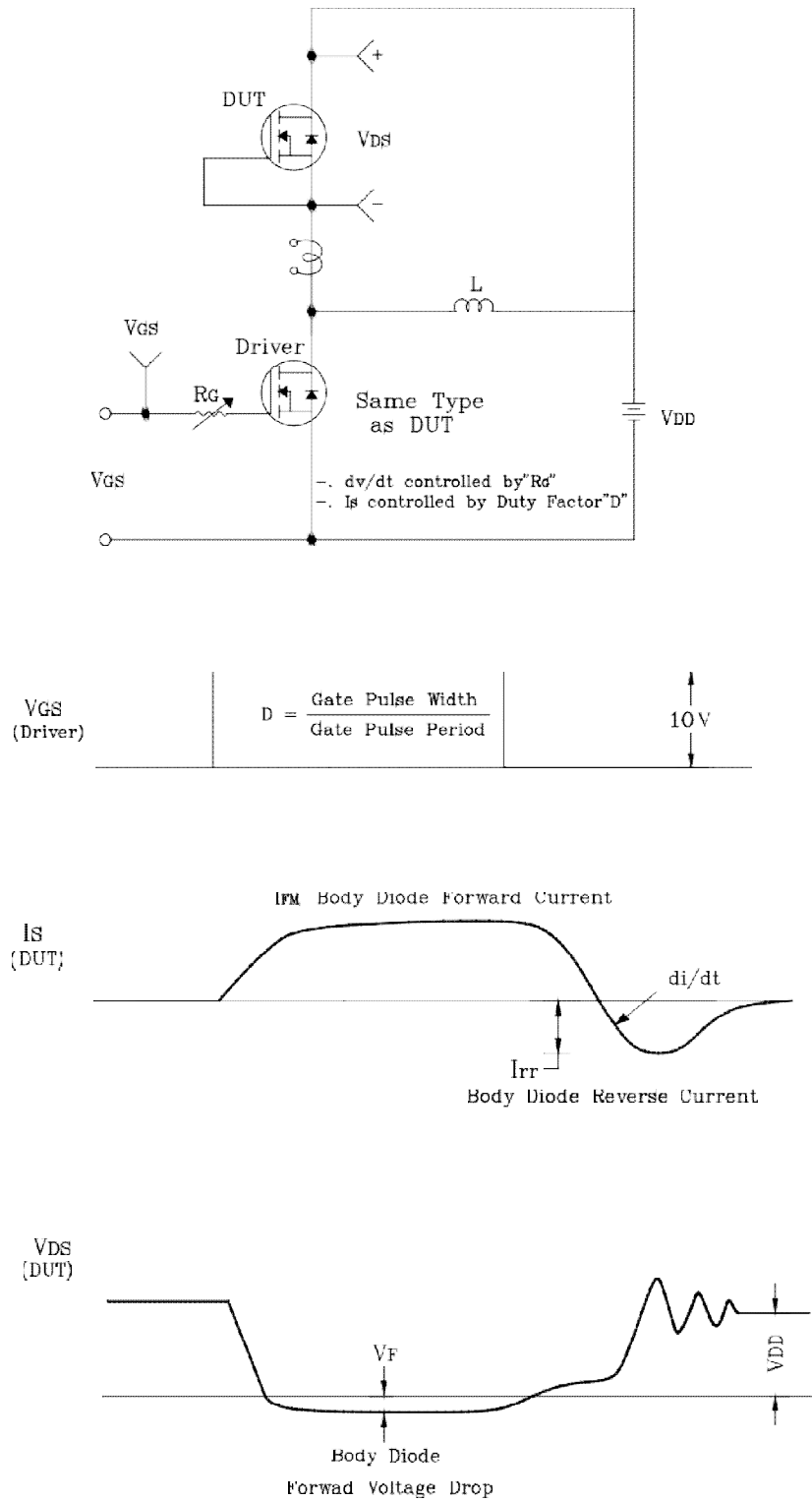
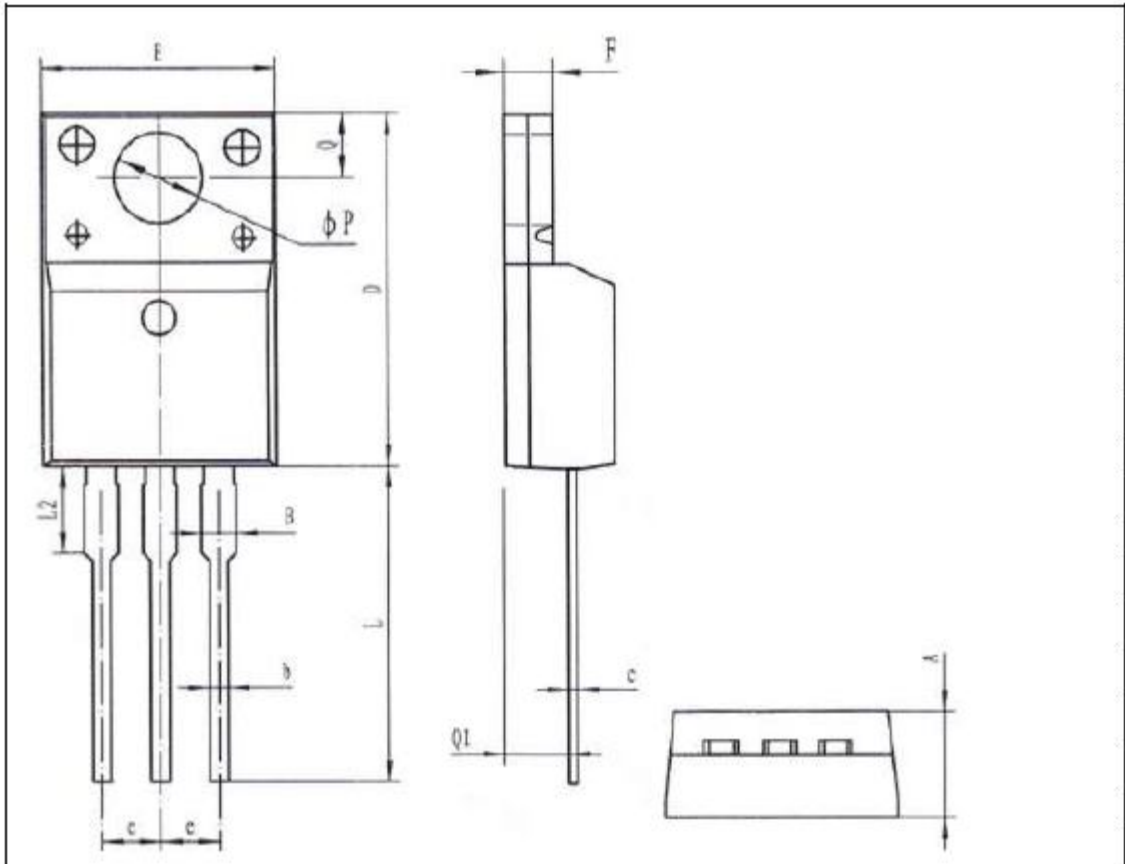


Fig. 15 Diode Reverse Recovery Time Test Circuit & Waveform



## Package Outline Dimensions



符号 Symbol	最小值 Min	典型值 Typ	最大值 Max
A	4.50		4.90
B			1.47
b	0.70		0.90
C	0.45		0.60
D	15.67		16.07
E	9.96		10.36
e		2.54	
F	2.34		2.74
L	12.58		13.38
L2	3.25		3.75
Q	3.20		3.40
Q1	2.56		2.96
ΦP	3.08		3.28



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