

SWITCHING REGULATOR APPLICATIONS

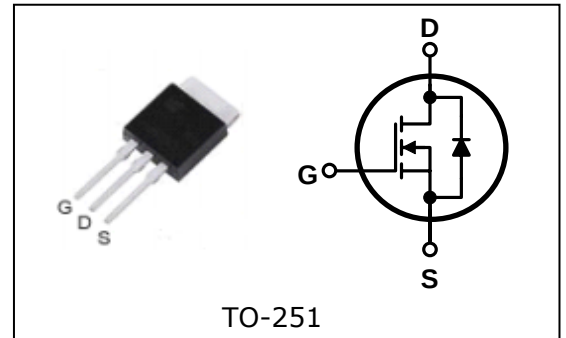
Features

- High Voltage : $BV_{DSS}=650V$ (Min.)
- Low C_{rss} : $C_{rss}=7.6pF$ (Typ.)
- Low gate charge : $Q_g=15.3nC$ (Typ.)
- Low $R_{DS(on)}$: $R_{DS(on)}=5.0\Omega$ (Max.)

Ordering Information

Type No.	Marking	Package Code
MU2N65	MU2N65	TO-251

PIN Connection



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

Characteristic	Symbol	Rating	Unit
Drain-source voltage	V_{DSS}	650	V
Gate-source voltage	V_{GSS}	± 30	V
Drain current (DC) *	I_D	($T_C=25^\circ C$)	2.0
		($T_C=100^\circ C$)	1.3
Drain current (Pulsed) *	I_{DM}	6.0	A
Power dissipation	P_D	46	W
Avalanche current (Single) ②	I_{AS}	2.0	A
Single pulsed avalanche energy ②	E_{AS}	120	mJ
Avalanche current (Repetitive) ①	I_{AR}	2.0	A
Repetitive avalanche energy ①	E_{AR}	5.4	mJ
Junction temperature	T_J	150	$^\circ C$
Storage temperature range	T_{stg}	-55~150	

* Limited by maximum junction temperature

Characteristic	Symbol	Typ.	Max.	Unit
Thermal resistance	Junction-case	$R_{th(J-C)}$	-	2.7
	Junction-ambient	$R_{th(J-A)}$	-	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}	$I_D=250\mu\text{A}$, $V_{GS}=0$	650	-	-	V
Gate threshold voltage	$V_{GS(th)}$	$I_D=250\mu\text{A}$, $V_{DS}=V_{GS}$	2.0	-	4.0	V
Drain-source cut-off current	I_{DSS}	$V_{DS}=650\text{V}$, $V_{GS}=0\text{V}$	-		10	μA
Gate leakage current	I_{GSS}	$V_{DS}=0\text{V}$, $V_{GS}=\pm 30\text{V}$	-	-	± 100	nA
Drain-source on-resistance ④	$R_{DS(on)}$	$V_{GS}=10\text{V}$, $I_D=1\text{A}$	-	4.2	5.0	Ω
Forward transfer conductance ④	g_{fs}	$V_{DS}=50\text{V}$, $I_D=1\text{A}$	-	2.05		S
Input capacitance	C_{iss}	$V_{GS}=0\text{V}$, $V_{DS}=25\text{V}$, $f=1\text{MHz}$		380	490	pF
Output capacitance C_{oss}	C_{oss}			35	46	
Reverse transfer capacitance	C_{rss}		-	7.6	9.9	
Turn-on delay time	$t_{d(on)}$	$V_{DD}=300\text{V}$, $I_D=2.0\text{A}$ $R_G=25\Omega$ ③④	-	5.5	-	ns
Rise time	t_r		-	16	40	
Turn-off delay time	$t_{d(off)}$		-	40	90	
Fall time	t_f		-	40	90	
Total gate charge	Q_g	$V_{DS}=320\text{V}$, $V_{GS}=10\text{V}$ $I_D=2.0\text{A}$ ③④	-	15.3	19	nC
Gate-source charge	Q_{gs}		-	1.8		
Gate-drain charge	Q_{gd}		-	7.2	-	

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	-	-	2.0	A
Source current (Pulsed) ①	I_{SM}		-	-	6.0	
Forward voltage ④	V_{SD}	$V_{GS}=0\text{V}$, $I_S=1.0\text{A}$	-	-	1.4	V
Reverse recovery time	t_{rr}	$I_S=1.0\text{A}$, $V_{GS}=0\text{V}$ $dI_F/dt=100\text{A}/\mu\text{s}$	-	250	-	ns
Reverse recovery charge	Q_{rr}		-	1.31	-	μC

Note ;

- ① Repetitive rating : Pulse width limited by maximum junction temperature
- ② $L=1080\text{mH}$, $I_{AS}=0.3\text{A}$, $V_{DD}=50\text{V}$, $R_G=25\Omega$, Starting $T_J=25^{\circ}\text{C}$
- ③ Pulse Test : Pulse width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$
- ④ Essentially independent of operating temperature

Electrical Characteristic Curves

Fig. 1 $I_D - V_{DS}$

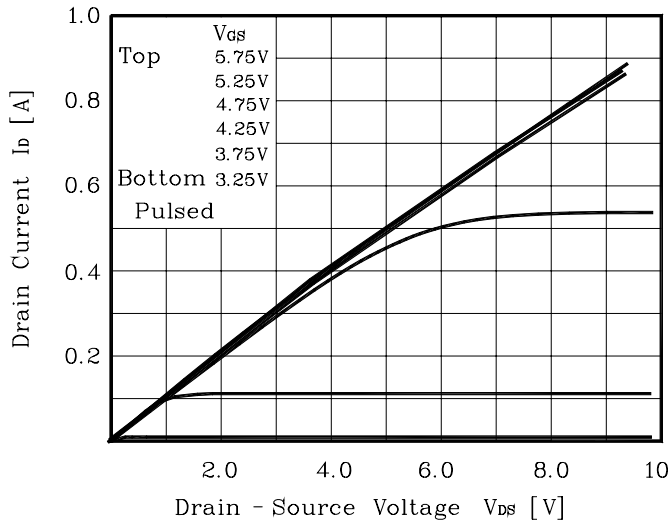


Fig. 2 $I_D - V_{GS}$

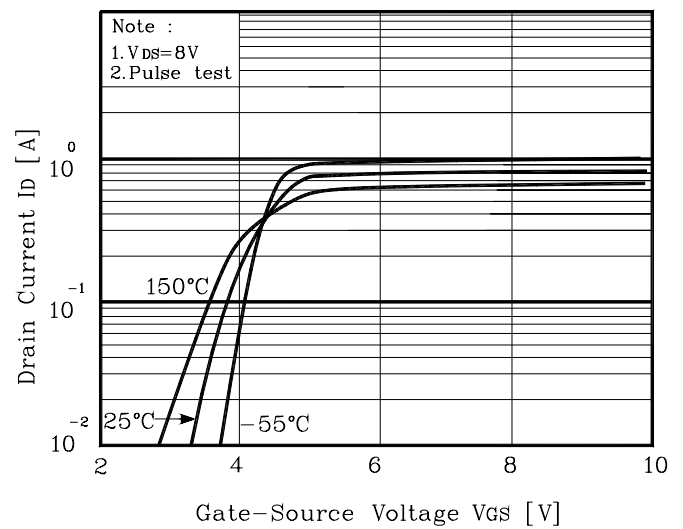


Fig. 3 $R_{DS(on)} - I_D$

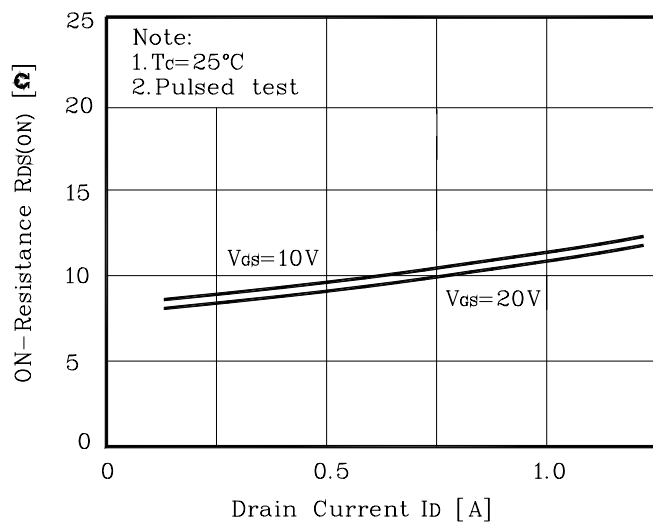


Fig. 4 $I_S - V_{SD}$

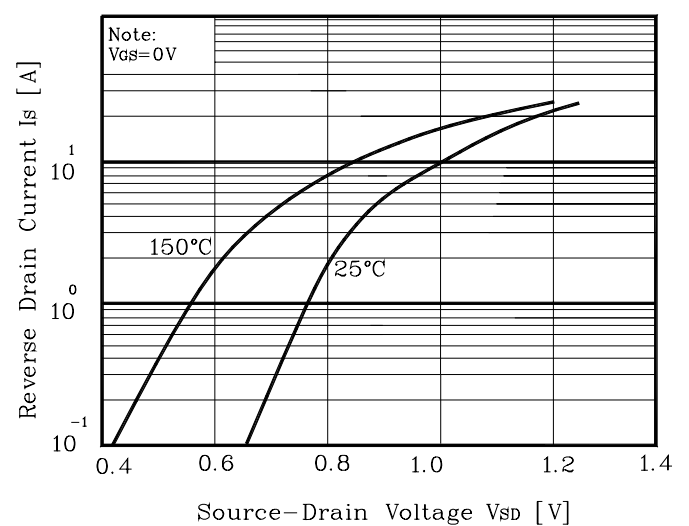


Fig. 5 Capacitance - V_{DS}

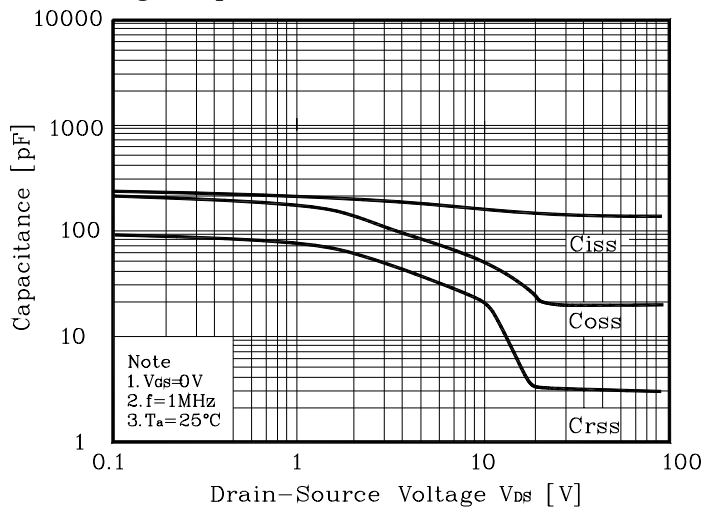


Fig. 6 $V_{GS} - Q_G$

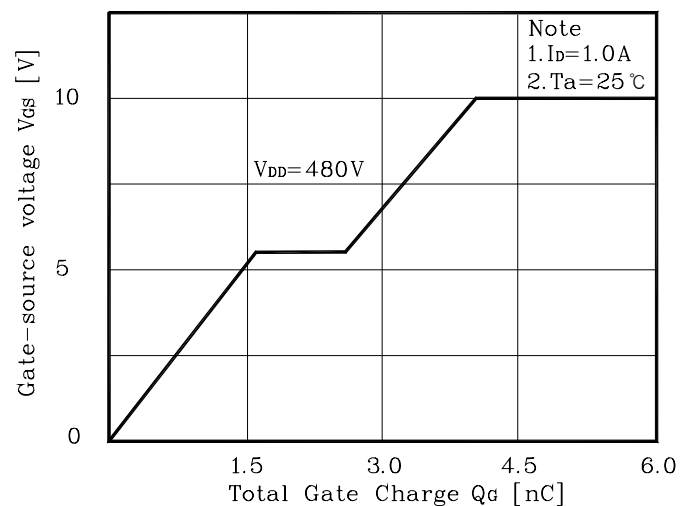


Fig. 7 $V_{DS} - T_J$

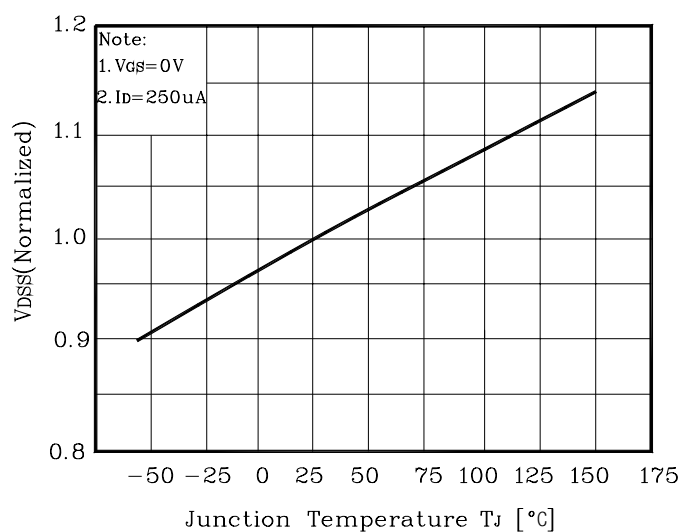


Fig. 8 $R_{DS(on)} - T_J$

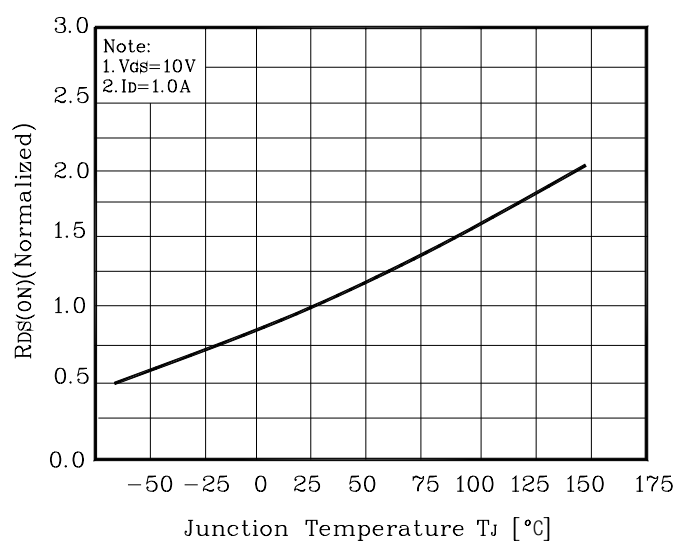


Fig. 9 $I_D - T_a$

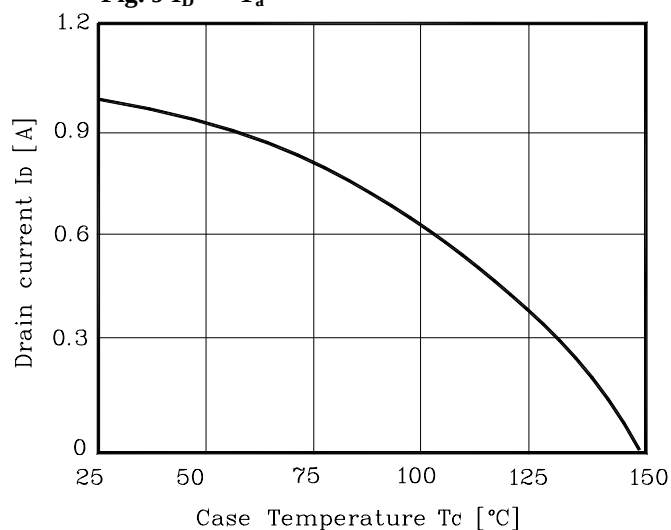


Fig. 10 Safe Operating Area

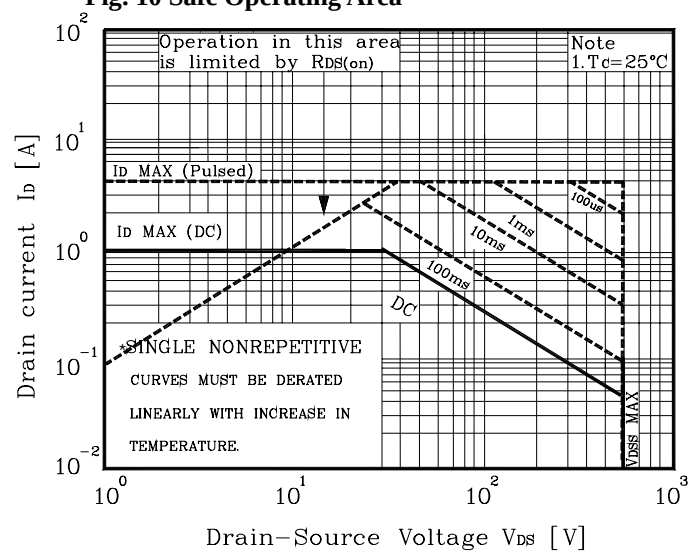


Fig. 11 Gate Charge Test Circuit & Waveform

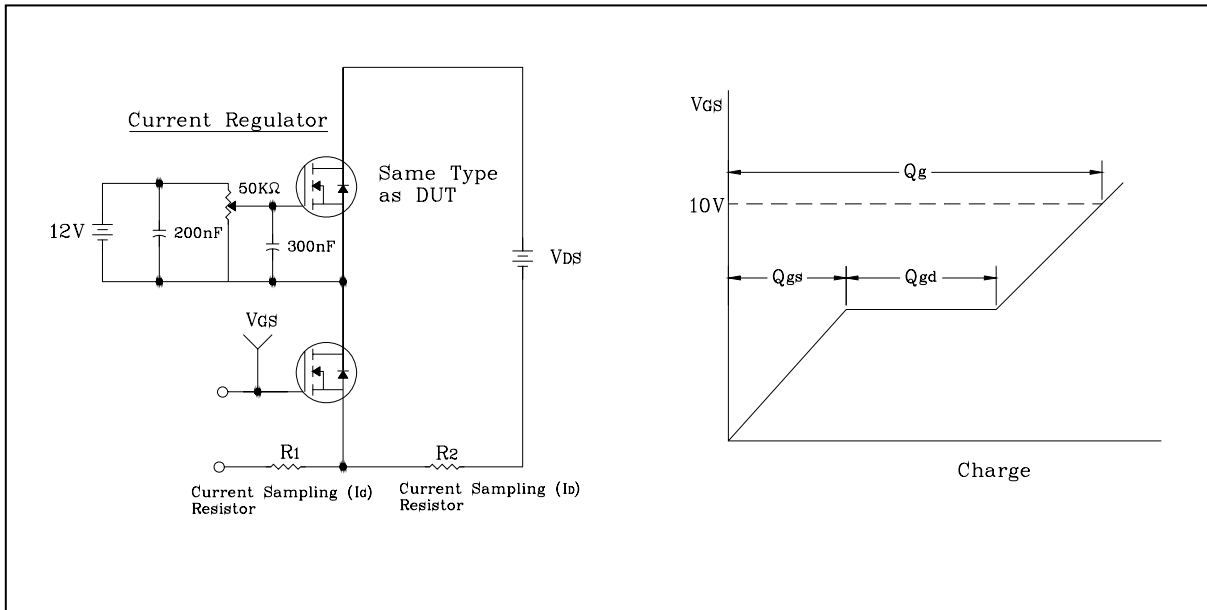


Fig. 12 Resistive Switching Test Circuit & Waveform

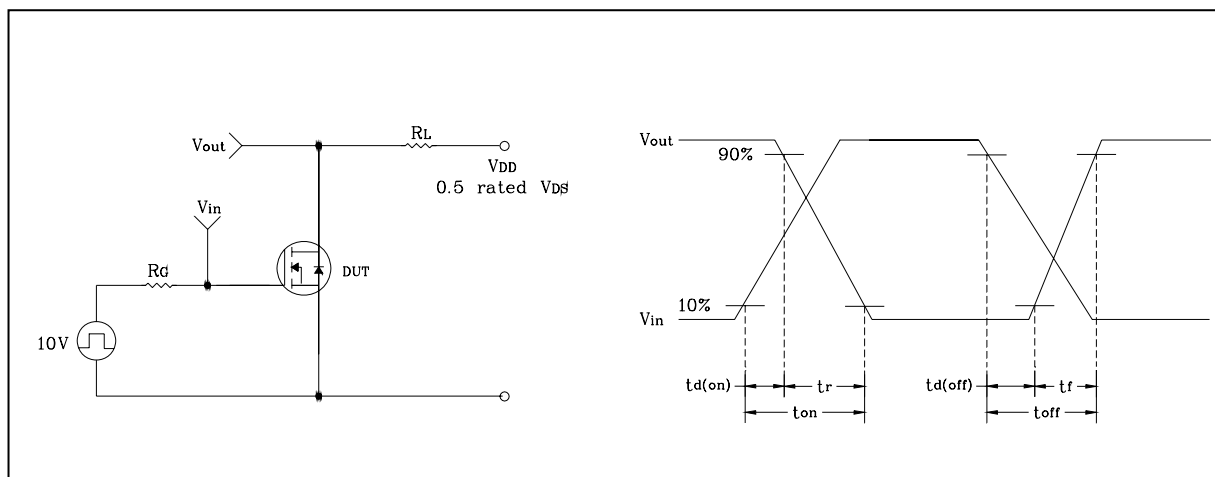


Fig. 13 E_{AS} Test Circuit & Waveform

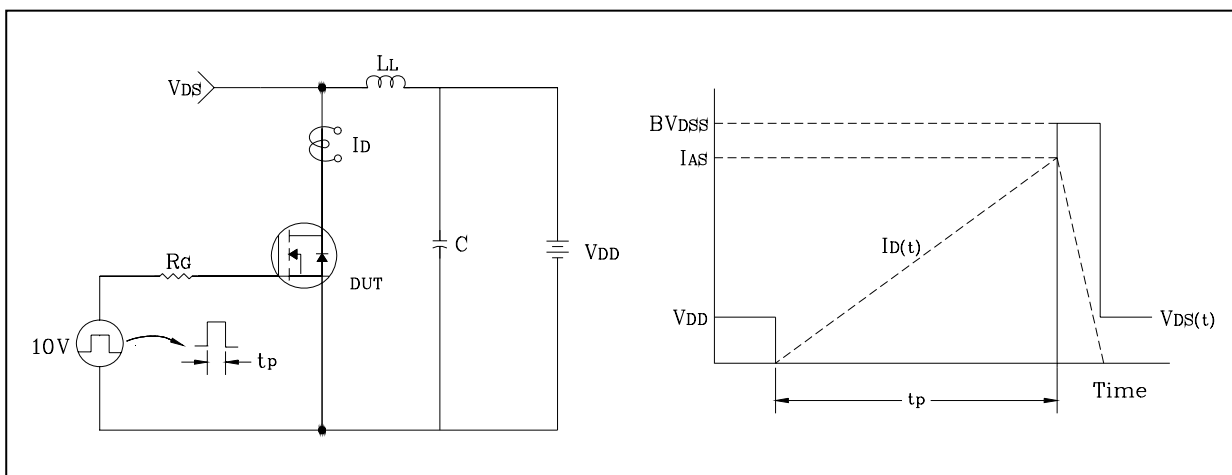
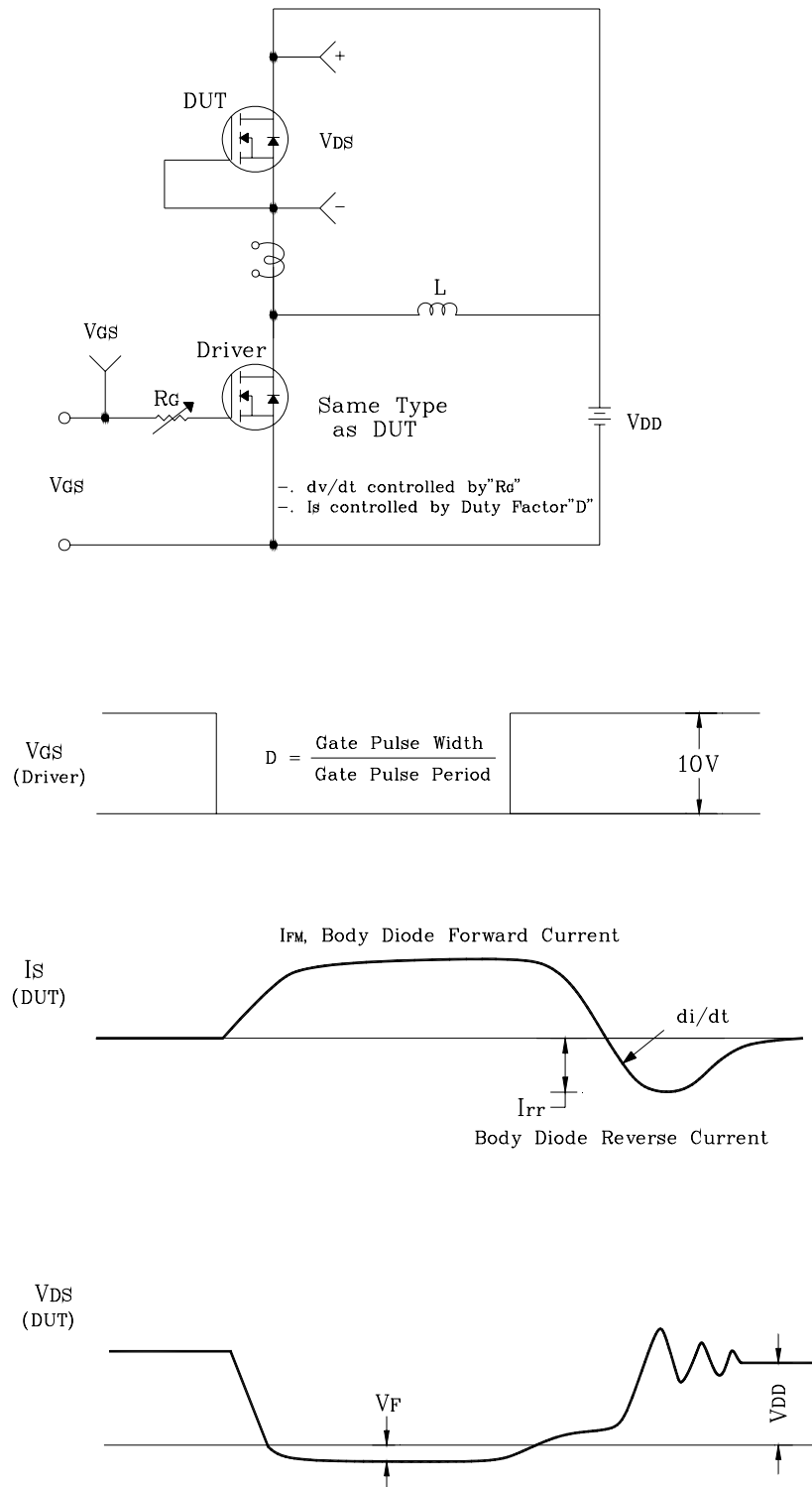
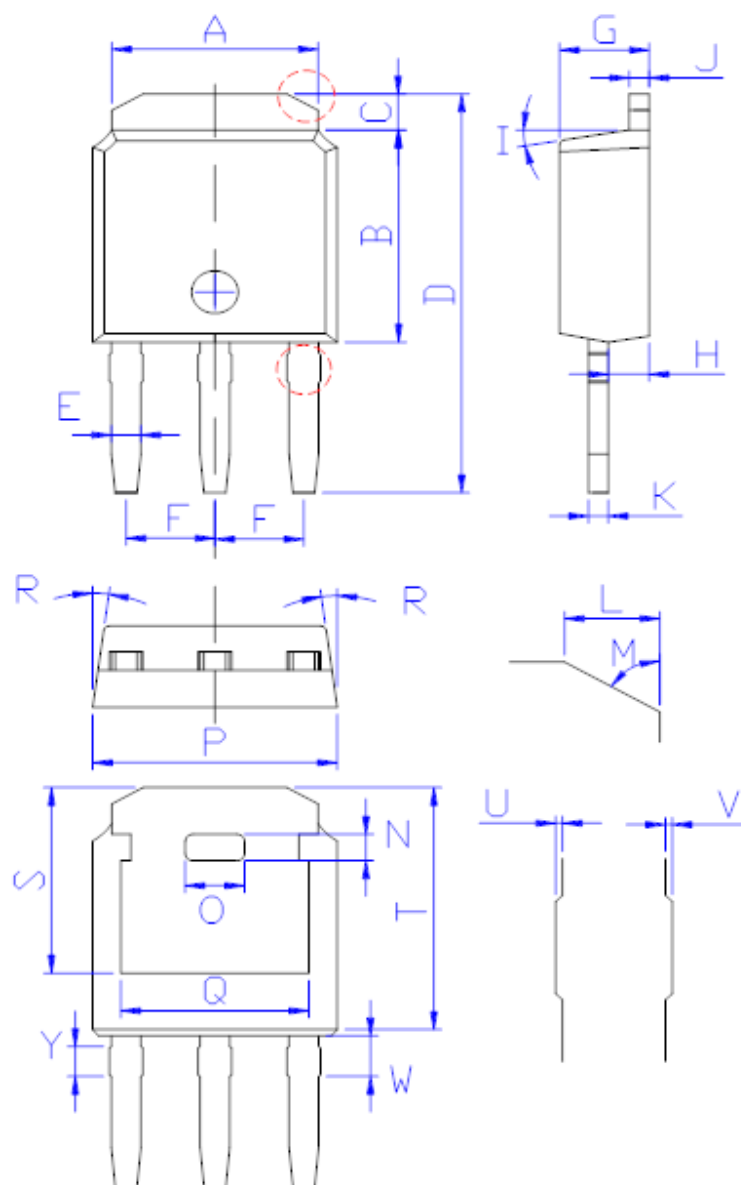


Fig. 14 Diode Reverse Recovery Time Test Circuit & Waveform



Outline Dimension

unit: mm



DIM	MILLIMETERS
A	5.34 ± 0.30
B	6.00 ± 0.30
C	1.05 ± 0.30
D	11.31 ± 0.30
E	0.76 ± 0.15
F	2.28 ± 0.15
G	2.30 ± 0.30
H	1.06 ± 0.30
I	(4-10)°
J	0.51 ± 0.15
K	0.52 ± 0.15
L	0.80 ± 0.30
M	60°
N	0.75 ± 0.30
O	1.80 ± 0.30
P	6.60 ± 0.30
Q	4.85 ± 0.30
R	(4-8.5)°
S	5.30 ± 0.30
T	6.90 ± 0.30
U	0.05 ± 0.05
V	0.05 ± 0.05
W	1.15 ± 0.25
Y	0.85 ± 0.25

(单位: mm)