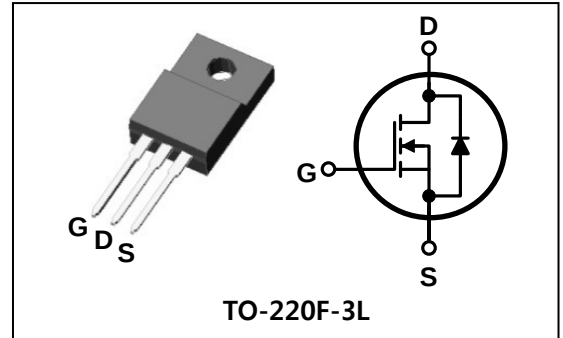


SWITCHING REGULATOR APPLICATIONS

Features

- High Voltage : $BV_{DSS}=650V(\text{Min.})$
- Low C_{RSS} : $C_{RSS}=13pF(\text{Typ.})$
- Low gate charge : $Q_g=45nC(\text{Typ.})$
- Low $R_{DS(on)}$: $R_{DS(on)}=0.9\Omega(\text{Max.})$

PIN Connection

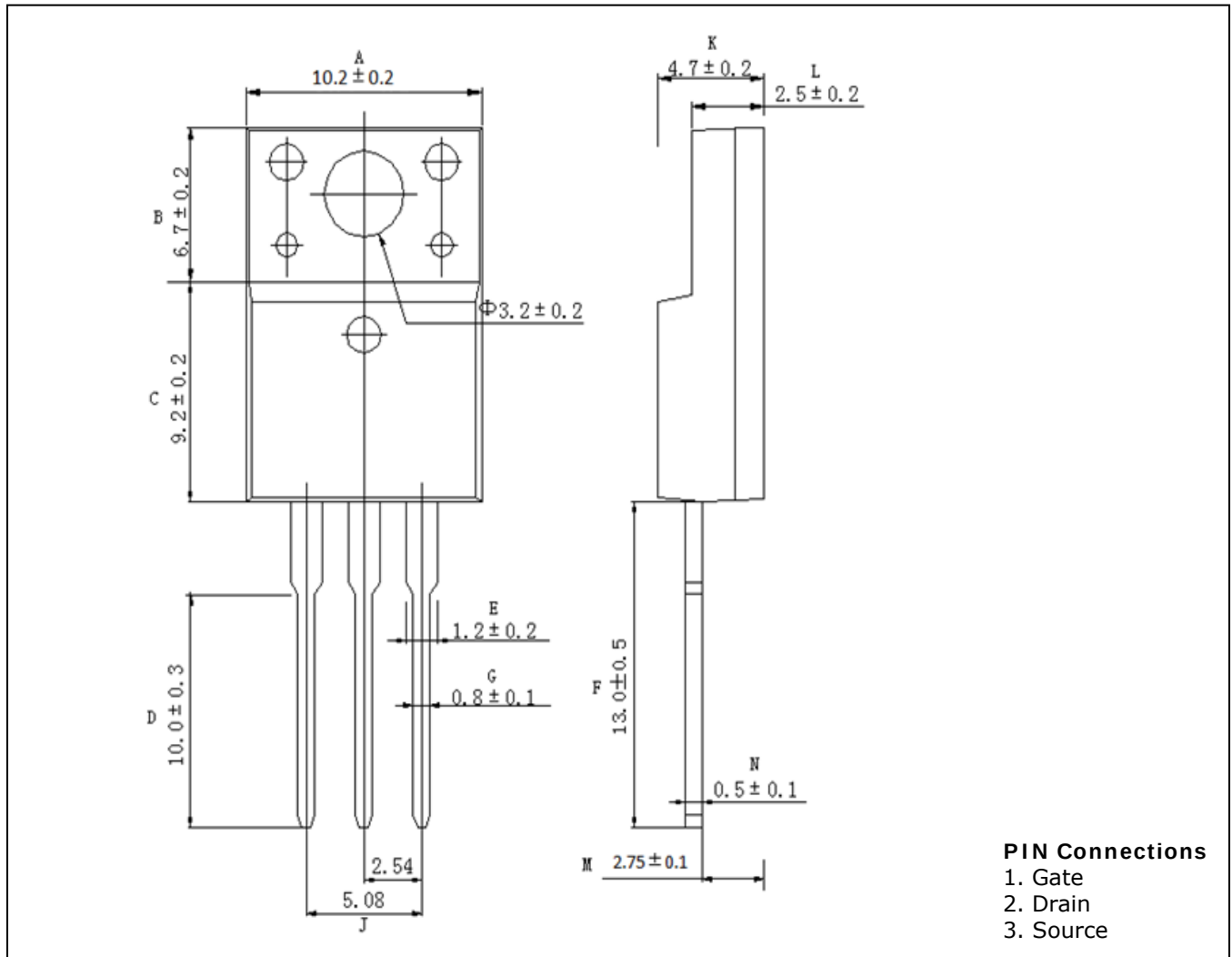


Ordering Information

Type NO.	Marking	Package Code
MF10N65	MF10N65	TO-220F-3L

Outline Dimensions

unit : mm



Absolute maximum ratings ($T_C=25^{\circ}\text{C}$ 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	$T_C=25^{\circ}\text{C}$	10
		$T_C=100^{\circ}\text{C}$	5.5
Drain current (Pulsed) *	I_{DM}	40	A
Power dissipation	P_D	50	W
Avalanche current (Single) ②	I_{AS}	10	A
Single pulsed avalanche energy ②	E_{AS}	480	mJ
Avalanche current (Repetitive) ①	I_{AR}	10	A
Repetitive avalanche energy ①	E_{AR}	11.6	mJ
Junction temperature	T_J	150	$^{\circ}\text{C}$
Storage temperature range	T_{stg}	-55~150	

* Limited by maximum junction temperature

Characteristic		Symbol	Typ.	Max.	Unit
Thermal resistance	Junction-case	$R_{th(J-C)}$	-	2.5	$^{\circ}\text{C/W}$
	Junction-ambient	$R_{th(J-A)}$	-	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 =250uA, V _{GS} =0V	650		-	-
Gate threshold voltage	V _{GS(th)}	I _D =250uA, V _{DS} =V _{GS}	2.0	-	4.0	V
Drain-source cut-off current	I _{DSS}	V _{DS} =650V, V _{GS} =0V	-	-	1	uA
Gate leakage current	I _{GSS}	V _{DS} =0V, V _{GS} =±30V	-	-	±100	nA
Drain-source on-resistance ④	R _{DS(on)}	V _{GS} =10V, I _D =5.0A	-	0.75	0.9	Ω
Forward transfer conductance ④	g _{fs}	V _{DS} =10V, I _D =5.0A	-	8.0	-	S
Input capacitance	C _{iss}	V _{GS} =0V, V _{DS} =25V f=1 MHz	-	1600	2350	pF
Output capacitance	C _{oss}		-	110	160	
Reverse transfer capacitance	C _{rss}		-	13	18	
Turn-on delay time	t _{d(on)}	V _{DD} =300V, I _D =10A R _G =25Ω ③④	-	23	-	ns
Rise time	t _r		-	69	-	
Turn-off delay time	t _{d(off)}		-	144	-	
Fall time	t _f		-	77	-	
Total gate charge	Q _g	V _{DS} =480V, V _{GS} =10V I _D =10A ③④	-	45	-	nC
Gate-source charge	Q _{gs}		-	7.5	-	
Gate-drain charge	Q _{gd}		-	18.5	-	

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	-	-	10	A
Source current (Pulsed) ①	I _{SM}		-	-	40	
Forward voltage ④	V _{SD}	V _{GS} =0V, I _S =10A	-	-	1.4	V
Reverse recovery time	t _{rr}	I _S =10A, V _{GS} =0V dI _F /dt=100A/us	-	420	-	ns
Reverse recovery charge	Q _{rr}		-	4.2	-	uC

Note ;

- ① Repetitive rating : Pulse width limited by maximum junction temperature
- ② L=10mH, I_{AS}=10A, V_{DD}=50V, R_G=25Ω, Starting T_J=25°C
- ③ Pulse Test : Pulse width≤300us, Duty cycle≤2%
- ④ Essentially independent of operating temperature

Fig. 11 Gate Charge Test Circuit & Waveform

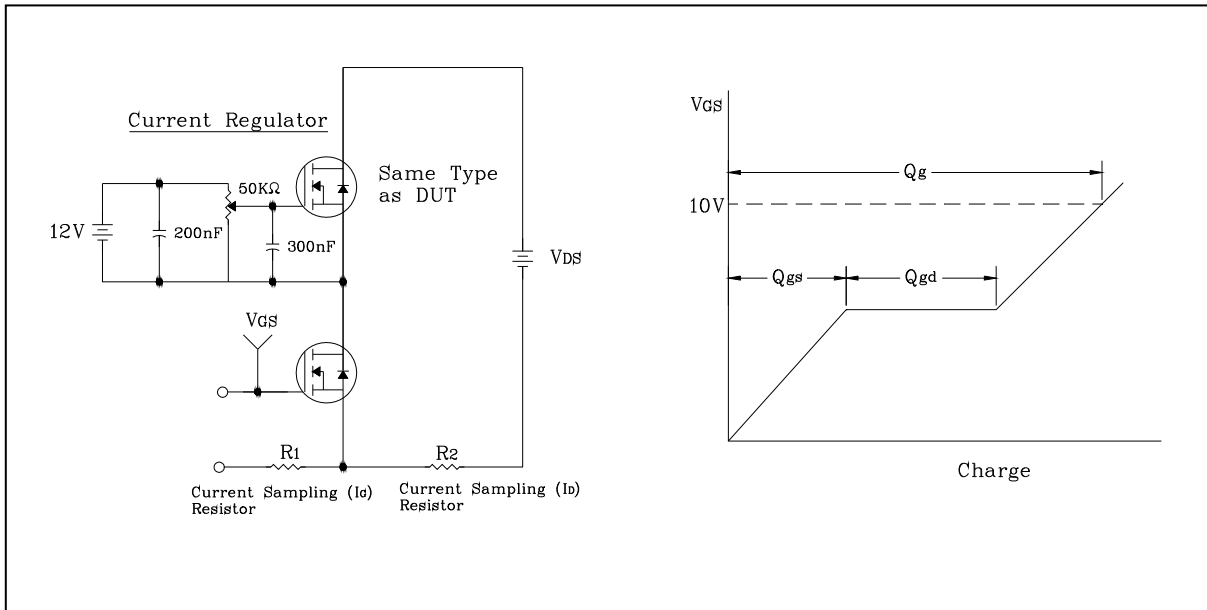


Fig. 12 Resistive Switching Test Circuit & Waveform

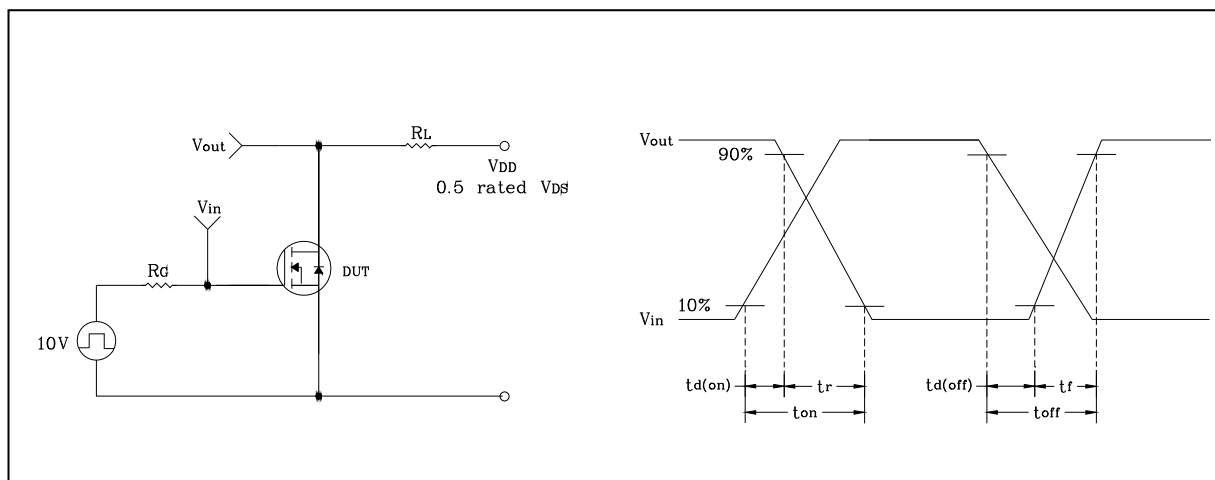


Fig. 13 E_{AS} Test Circuit & Waveform

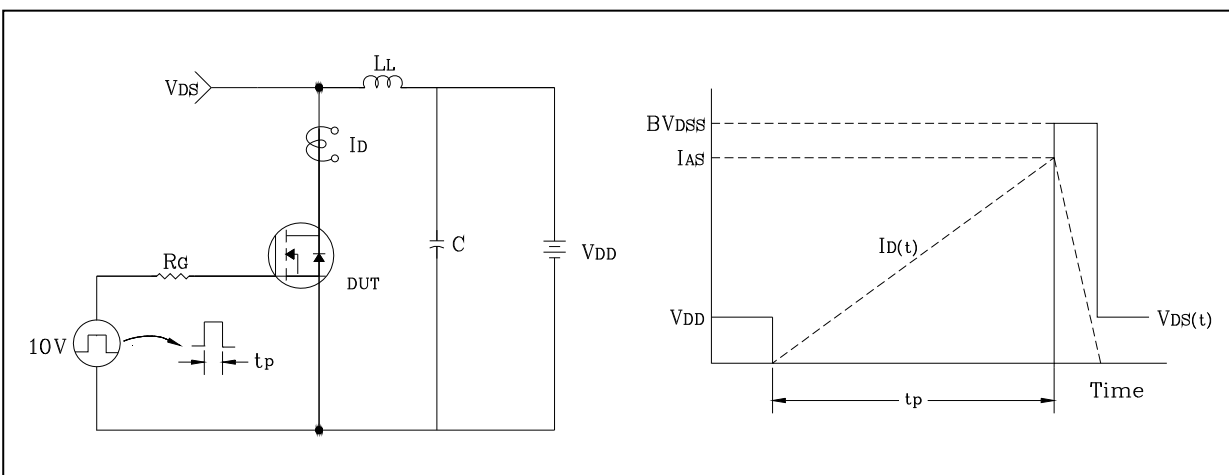


Fig. 14 Diode Reverse Recovery Time Test Circuit & Waveform

