N Channel MOSFET

Pb   Lead Free Package and Finish
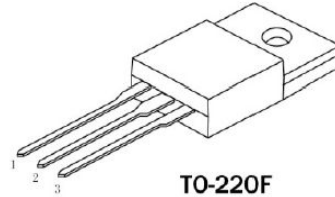
Applications:

- Adapter & Charger
- SMPS Standby Power
- AC-DC Switching Power Supply
- LED driving power

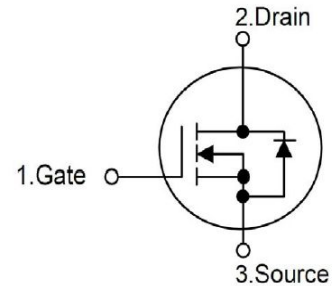| I_D	$R_{DS(ON)}$ (Typ.)	V_{DSS}
7.0A	1.39 Ω	800V

Features:

- Low On Resistance
- Low Gate Charge
- Peak Current vs Pulse Width Curve
- RoHS Compliant

TO-220F

Not to Scale

2.Drain

1.Gate

3.Source

Ordering Information

Part Number	Package	Marking
RS7N80F	TO-220F	RS7N80F

Absolute Maximun Ratings Tc=25℃ unless otherwise specified

Symbol	Parameter	RS7N80F	Units
VDSS	Drain-to-Source Voltage (Note*1)	800	V
ID	Continuous Drain Current	7.0	A
ID@ 100 ℃	Continuous Drain Current	4.4	
IDM	Pulsed Drain Current (Note*2)	28.0	
PD	Power Dissipation	50	W
	Derating Factor above 25℃	0.4	W/℃
VGS	Gate-to-Source Voltage	±30	V
EAS	Single Pulse Avalanche Engergy L=30mH IAS=5.5A VDD=135V RG=20Ω TJ=25℃	534	mJ
TL TPKG	Maximum Temperature for Soldering Leads at 0.063in(1.6mm)from Case for 10 seconds Package Body for 10 seconds	300 260	℃
TJ and TSTG	Operating Junction and Storage Temperature Range	-55 to 150	

*Drain Current Limited by Maximum Junction Temperature

Caution:Stresses greater than those listed in the "Absolute Maximum Ratings" Table may cause permanent damage to the device.

Thermal Resistance

Symbol	Parameter	RS7N80F	Units	Test Conditions
RθJC	Junction-to-Case	2.5	℃/W	Drain lead soldered to water cooled heatsink,PD adjusted for a peak junction temperature of +150℃.
RθJA	Junction-to-Ambient	120		1 cubic foot chamber,free air.

OFF Characteristics   TJ=25℃ unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
BV_{DSS}	Drain-to-source Breakdown Voltage	800	––	––	V	V_{GS}=0V, I_D=250μA
I_{DSS}	Drain-to-Source Leakage Current	––	––	1.0	μA	V_{DS}=800V, V_{GS}=0V
I_{GSS}	Gate-to-Source Forward Leakage	––	––	100	nA	V_{GS}=+30V V_{DS}=0V
	Gate-to-Source Reverse Leakage	––	––	–100		V_{GS}=–30V V_{DS}=0V

ON Characteristics   TJ=25℃ unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	––	1.39	1.55	Ω	V_{GS}=10V, I_D=3.5A
$V_{GS(TH)}$	Gate Threshold Voltage	2.0	––	4.0	V	V_{GS}=V_{DS}, I_D=250μA

Resistive Switching Characteristics Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
$t_{d(ON)}$	Turn-on Delay Time	––	33.67	––	nS	V_{DS}=400V I_D=7.0A R_G=25 Ω (Note:3,4)
t_{rise}	Rise Time	––	71.67	––		
$t_{d(OFF)}$	Turn-OFF Delay Time	––	63.33	––		
t_{fall}	Fall Time	––	35.33	––		

Dynamic Characteristics Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
C_{iss}	Input Capacitance	––	1087	––	pF	V_{GS}=0V V_{DS}=25V f=1.0MHz
C_{oss}	Output Capacitance	––	104	––		
C_{rss}	Reverse Transfer Capacitance	––	5.65	––		
Q_g	Total Gate Charge	––	23.27	––	nC	V_{DS}=640V I_D=7.0A V_{GS}=10V (Note:3,4)
Q_{gs}	Gate-to-Source Charge	––	6.98	––		
Q_{gd}	Gate-to-Drain("Miller") Charge	––	8.97	––		

Source-Drain Diode Characteristics

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
I_S	Continuous Source Current	--	--	7.0	A	Integral pn-diode in MOSFET
I_{SM}	Maximum Pulsed Current	--	--	28.0	A	Integral pn-diode in MOSFET
V_{SD}	Diode Forward Voltage	--	--	1.4	V	I_S=7.0A,V_{GS}=0V
t_{rr}	Reverse Recovery Time	--	590.27	--	nS	V_{GS}=0V
Q_{rr}	Reverse Recovery Charge	--	3.93	--	μC	I_S=7.0A,di/dt=100A/μs

Notes:

*1. TJ=±25℃ to +150℃.
*2. Repetitive rating;pulse width limited by maximum junction temperature.
*3. Pulse width≤300μs;duty cycle ≤2%.
*4. Basically not affected by temperature.

Typical Feature curve

Figure1.Typical Output Characteristics
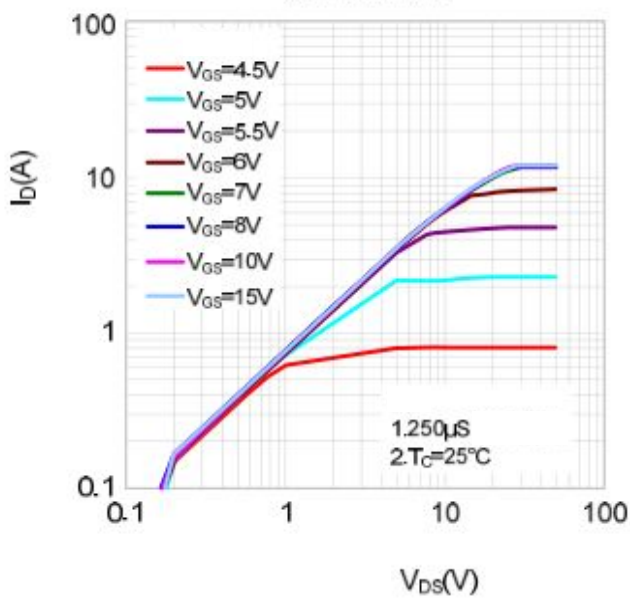
Figure2.Typical Transfer Characteristics
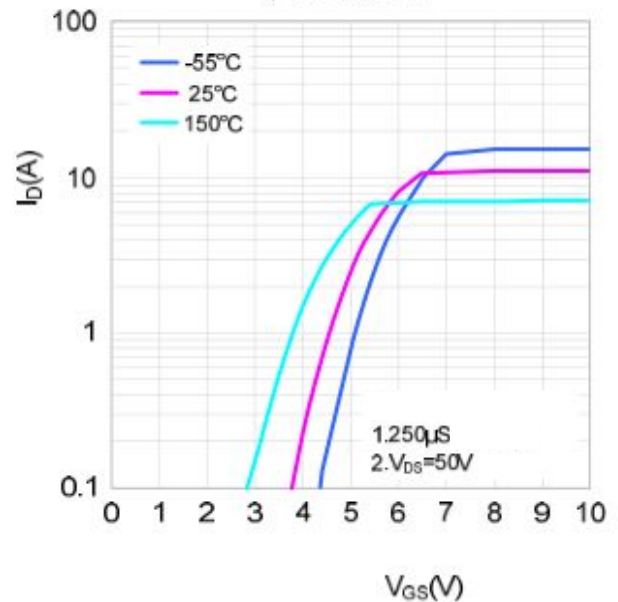
Figuer3.Typical ON Resistance vs
Drain Current
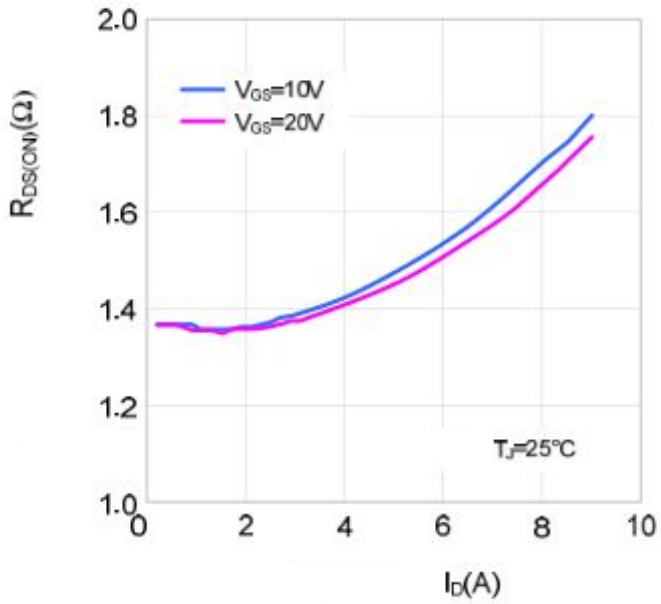
Figuer4.Typical Body Diode Transfer
Characteristics
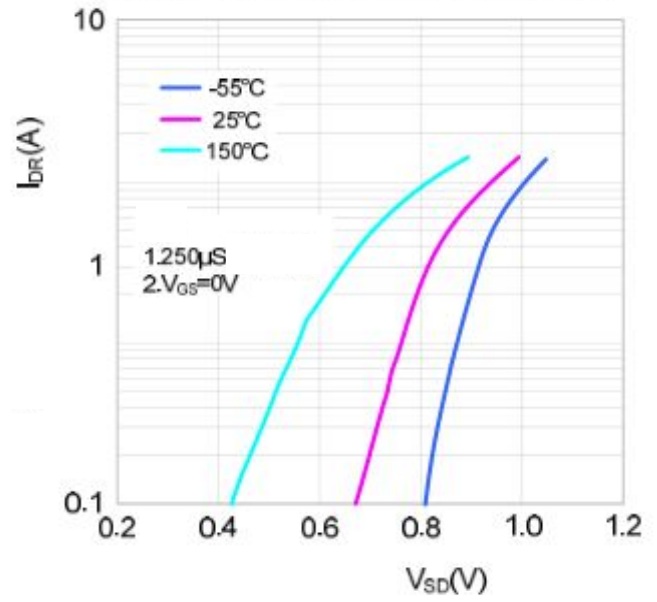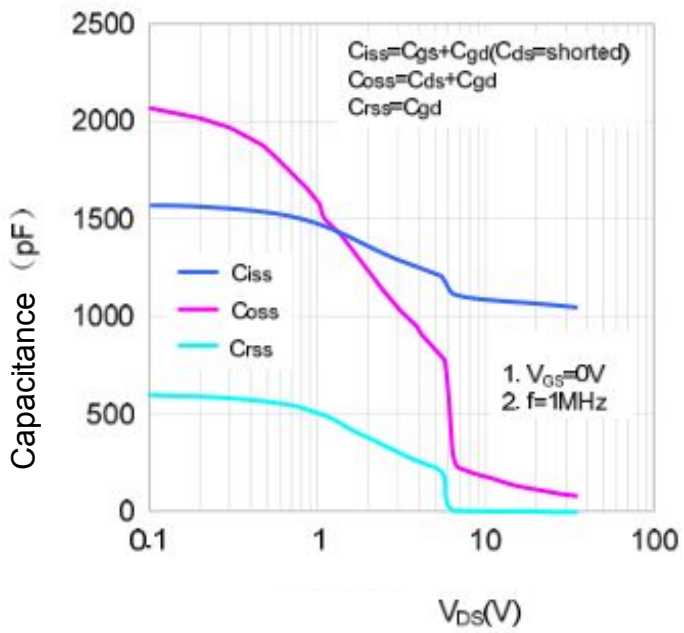

Figure5.Typical Capacitance vs
Drain-to-Source Voltage
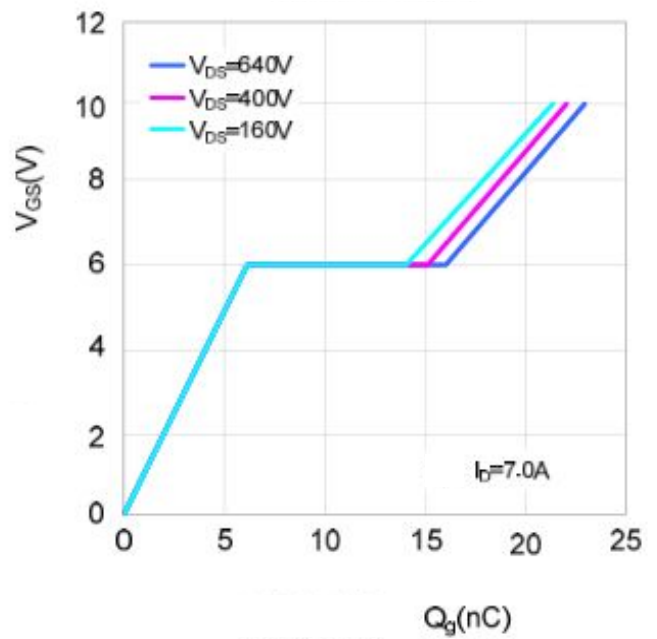

Figure6.Typical Gate Charge vs
Gate-to-Source Voltage

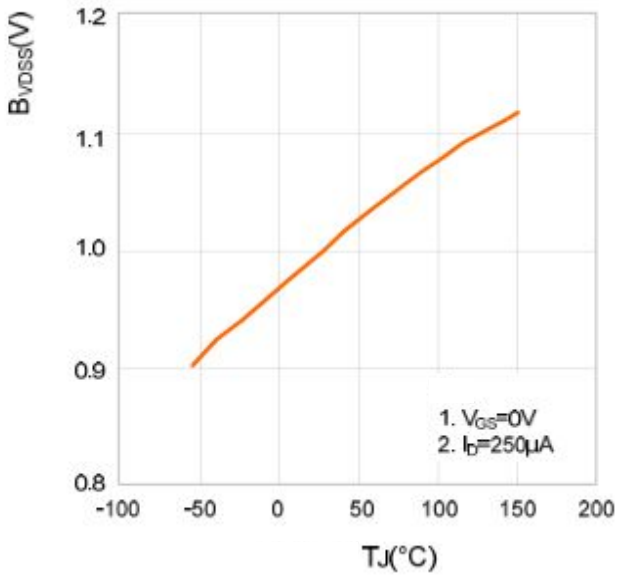Figure7. Typical Breakdown Voltage vs Junation Temperature

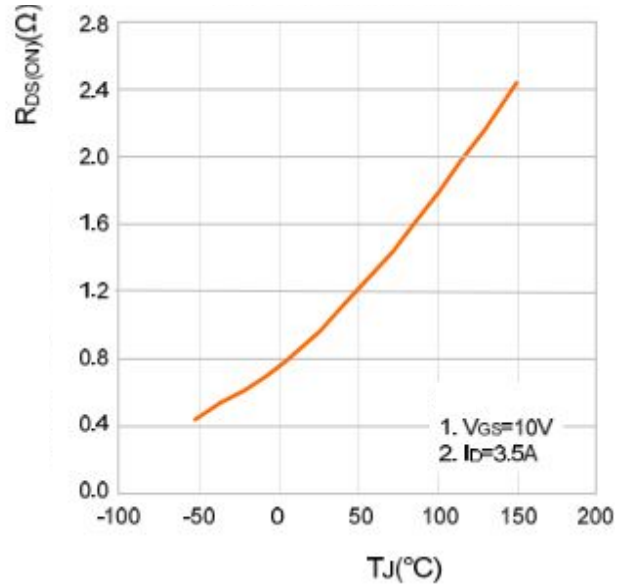Figure8. Figure10.Typical Drain-to-Source ON Resistance vs Junction Temperature

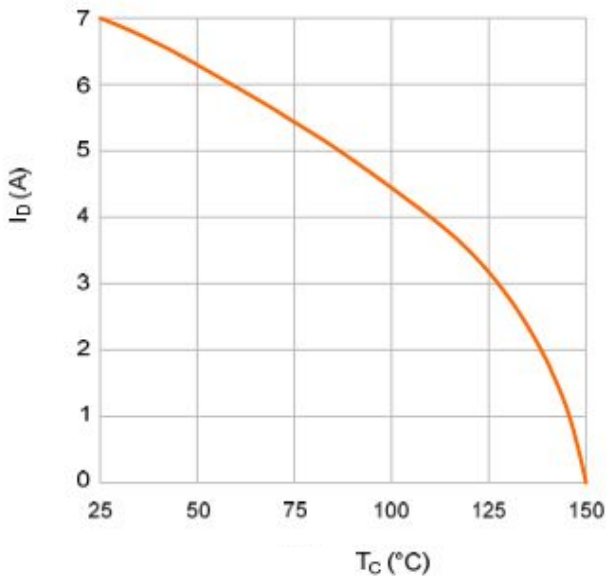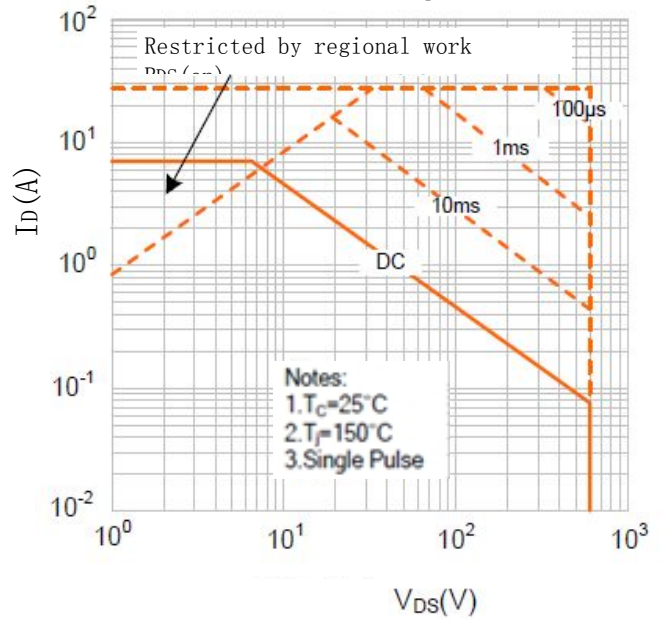Figure9.Maximum Continuous Drain Current vs Case Temperature

Figure10.Maximum Continuous Drain Current vs Case Temperature
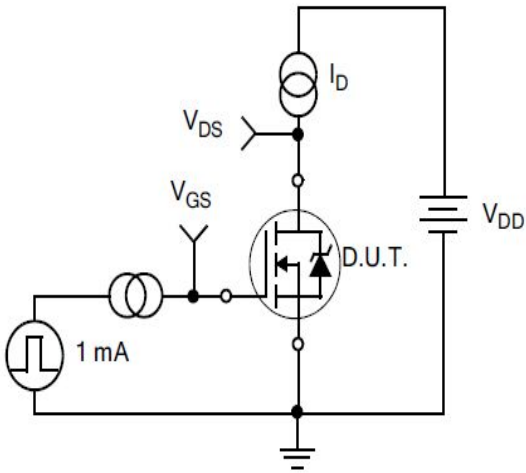
Test Circuits and Waveforms
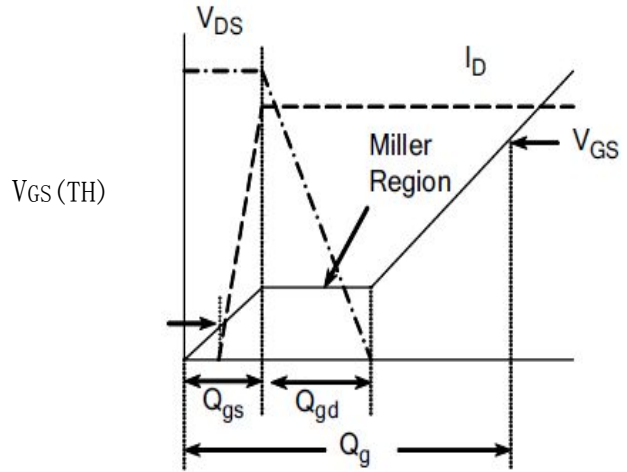
Figure11.
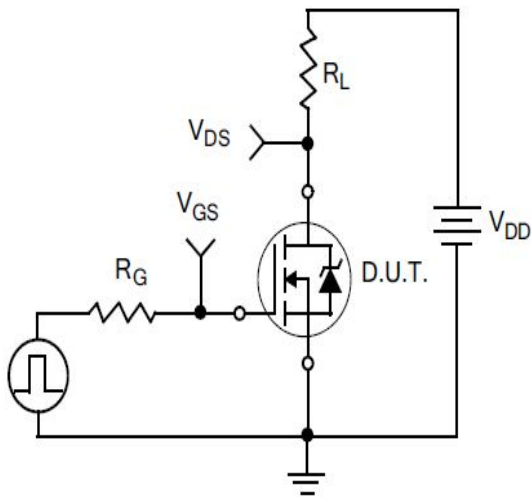Gate Charge Test Circuit

Figure12.
Gate Charge Waveform

Figure13.
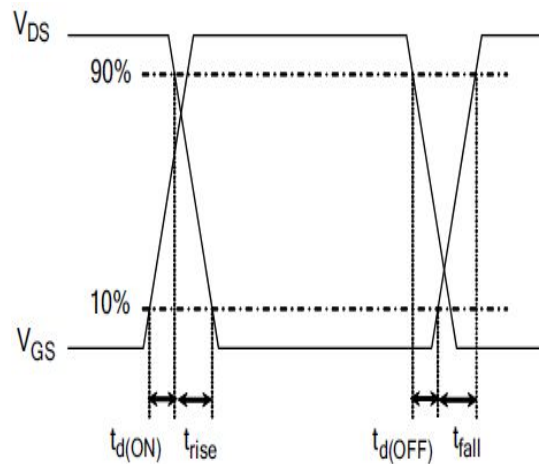Resistive Switching Test Circuit

Figure14.
Resistive Switching Waveforms
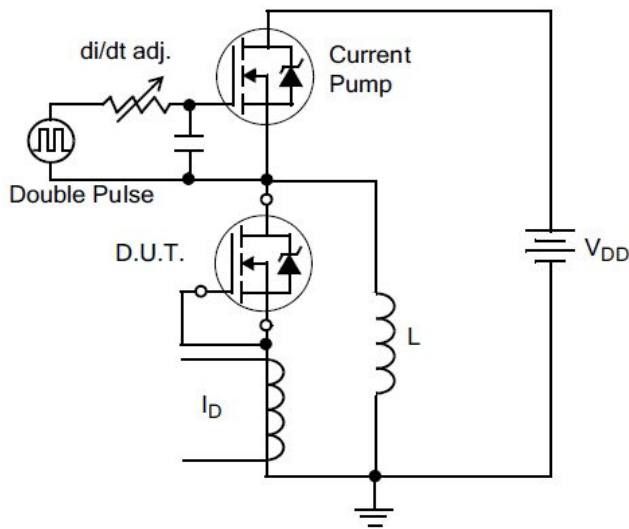
Test Circuits and Waveforms

Figure15. Diode Reverse Recovery
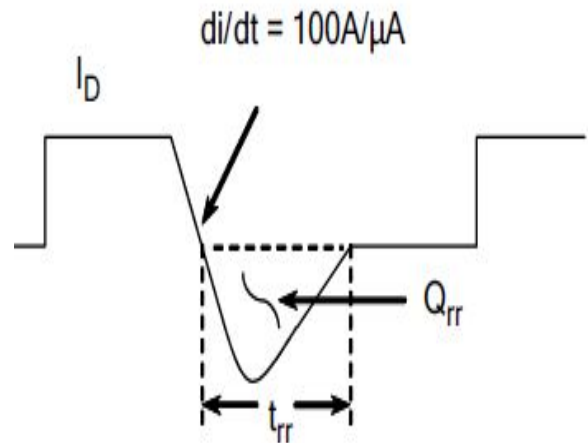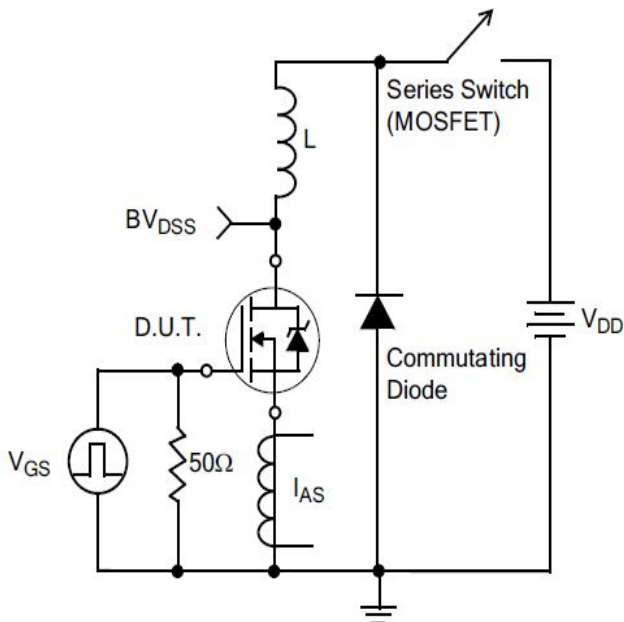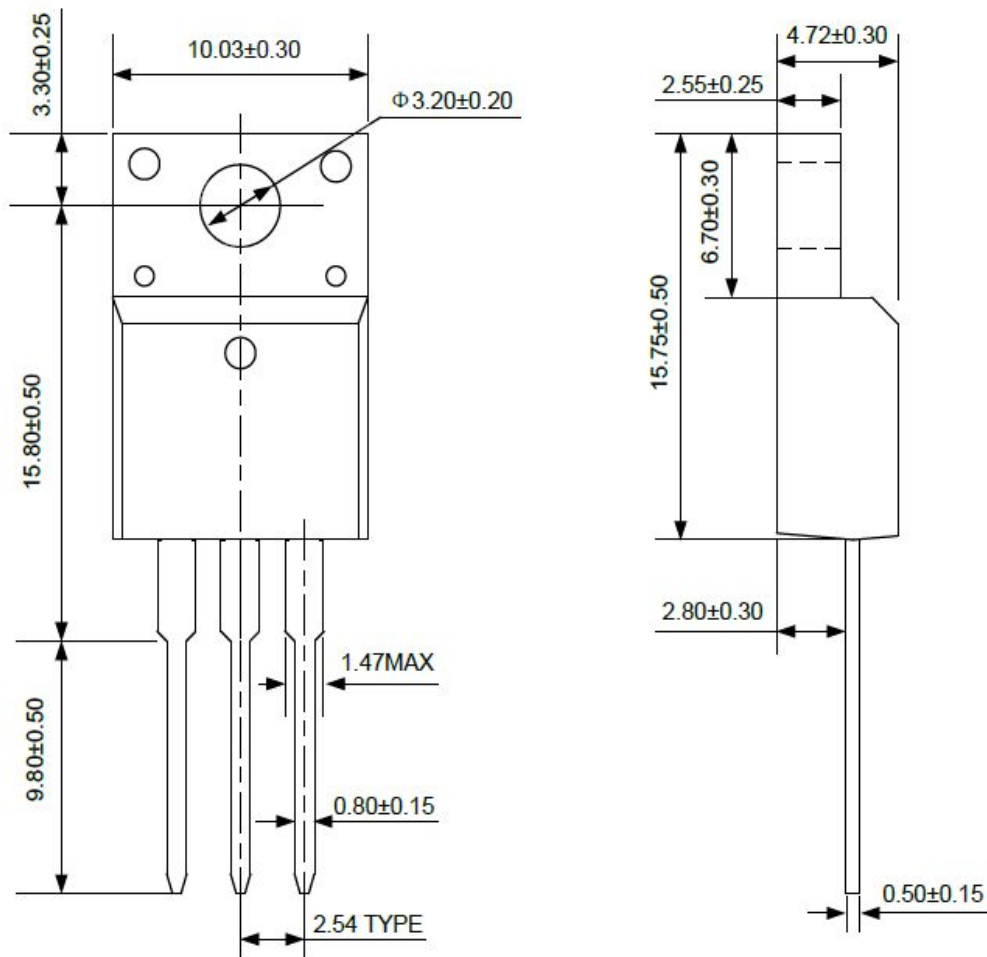Test Circuit

Figure16. Diode Reverse Recovery
Waveform

di/dt = 100A/μA

Figure17. Unclamped Inductive
Switching Test Circuit
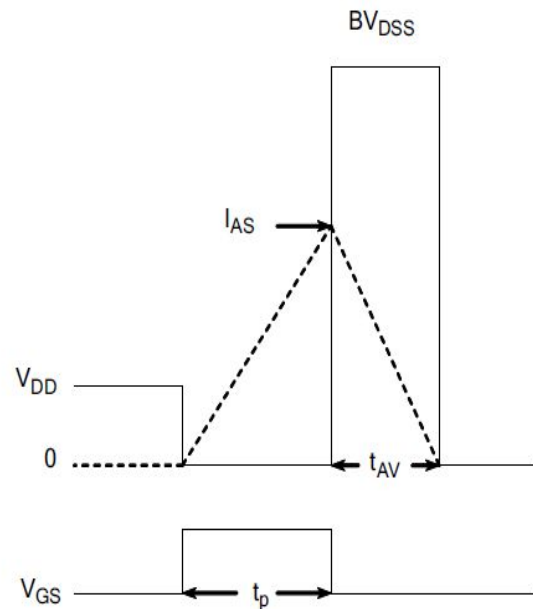
Figure18. Unclamped Inductive
Switching Waveforms

$$E_{AS} = \frac{I_{AS}^2 L}{2}$$

Package outline drawing

TO-220F

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