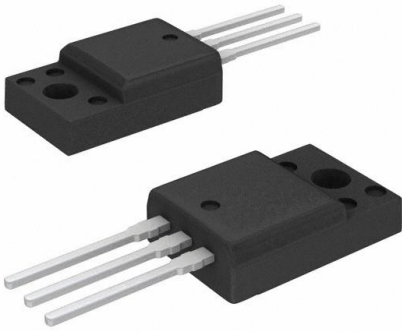


FQPF2N80 Datasheet

www.digi-electronics.com



<https://www.DiGi-Electronics.com>

DiGi Electronics Part Number	FQPF2N80-DG
Manufacturer	onsemi
Manufacturer Product Number	FQPF2N80
Description	MOSFET N-CH 800V 1.5A TO220F
Detailed Description	N-Channel 800 V 1.5A (Tc) 35W (Tc) Through Hole T O-220F-3



Tel: +00 852-30501935

RFQ Email: Info@DiGi-Electronics.com

DiGi is a global authorized distributor of electronic components.

Purchase and inquiry

Manufacturer Product Number:

FQPF2N80

Series:

-

FET Type:

N-Channel

Drain to Source Voltage (Vdss):

800 V

Drive Voltage (Max Rds On, Min Rds On):

10V

Vgs(th) (Max) @ Id:

5V @ 250µA

Vgs (Max):

±30V

FET Feature:

-

Operating Temperature:

-55°C ~ 150°C (Tj)

Supplier Device Package:

TO-220F-3

Base Product Number:

FQPF2

Manufacturer:

onsemi

Product Status:

Active

Technology:

MOSFET (Metal Oxide)

Current - Continuous Drain (Id) @ 25°C:

1.5A (Tc)

Rds On (Max) @ Id, Vgs:

6.30hm @ 750mA, 10V

Gate Charge (Qg) (Max) @ Vgs:

15 nC @ 10 V

Input Capacitance (Ciss) (Max) @ Vds:

550 pF @ 25 V

Power Dissipation (Max):

35W (Tc)

Mounting Type:

Through Hole

Package / Case:

TO-220-3 Full Pack

Environmental & Export classification

RoHS Status:

ROHS3 Compliant

REACH Status:

REACH Unaffected

HTSUS:

8541.29.0095

Moisture Sensitivity Level (MSL):

Not Applicable

ECCN:

EAR99

MOSFET – N-Channel, QFET

800 V, 1.5 A, 6.3 mΩ

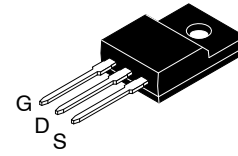
FQPF2N80

Description

This N-Channel enhancement mode power MOSFET is produced using onsemi's proprietary planar stripe and DMOS technology. This advanced MOSFET technology has been especially tailored to reduce on-state resistance, and to provide superior switching performance and high avalanche energy strength. These devices are suitable for switched mode power supplies, active power factor correction (PFC), and electronic lamp ballasts.

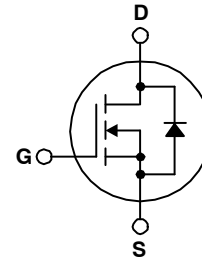
Features

- 1.5 A, 800 V, $R_{DS(on)} = 6.3 \Omega$ (Max.) @ $V_{GS} = 10$ V, $I_D = 0.75$ A
- Low Gate Charge (Typ. 12 nC)
- Low C_{rss} (Typ. 5.5 pF)
- 100% Avalanche Tested

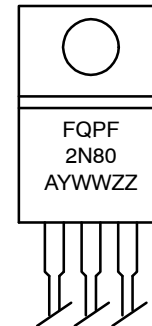


TO-220 Fullpack,
3-Lead /
TO-220F-3SG
CASE 221AT

N-CHANNEL MOSFET



MARKING DIAGRAM



FQPF2N80	= Specific Device Code
A	= Assembly Location
YWW	= Date Code (Year & Week)
ZZ	= Assembly Lot

ORDERING INFORMATION

Device	Package	Shipping
FQPF2N80	TO-220 Fullpack	1,000 Units / Tube

FQPF2N80**ABSOLUTE MAXIMUM RATINGS** ($T_C = 25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Value	Unit
V_{DSS}	Drain-Source Voltage	800	V
I_D	Drain Current	- Continuous ($T_C = 25^\circ\text{C}$)	1.5
		- Continuous ($T_C = 100^\circ\text{C}$)	0.95
I_{DM}	Drain Current	- Pulsed (Note 1)	6.0
V_{GSS}	Gate-Source Voltage	± 30	V
E_{AS}	Single Pulsed Avalanche Energy (Note 2)	180	mJ
I_{AR}	Avalanche Current (Note 1)	1.5	A
E_{AR}	Repetitive Avalanche Energy (Note 1)	3.5	mJ
dv/dt	Peak Diode Recovery dv/dt (Note 3)	4.0	V/ns
P_D	Power Dissipation	($T_C = 25^\circ\text{C}$)	35
		- Derate Above 25°C	0.28
T_J, T_{STG}	Operating and Storage Temperature Range	-55 to +150	$^\circ\text{C}$
T_L	Maximum Lead Temperature for Soldering, 1/8" from Case for 5 Seconds	300	$^\circ\text{C}$

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

THERMAL CHARACTERISTICS

Symbol	Parameter	Value	Unit
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case, Max.	3.57	$^\circ\text{C}/\text{W}$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient, Max.	62.5	$^\circ\text{C}/\text{W}$

ELECTRICAL CHARACTERISTICS ($T_C = 25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
--------	-----------	------------	-----	-----	-----	------

OFF CHARACTERISTICS

BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS} = 0\text{ V}, I_D = 250\ \mu\text{A}$	800	-	-	V
$\Delta BV_{DSS} / \Delta T_J$	Breakdown Voltage Temperature Coefficient	$I_D = 250\ \mu\text{A}$, Referenced to 25°C	-	0.9	-	$\text{V}/^\circ\text{C}$
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 800\text{ V}, V_{GS} = 0\text{ V}$ $V_{DS} = 640\text{ V}, T_C = 125^\circ\text{C}$	-	-	10	μA
			-	-	100	μA
I_{GSSF}	Gate-Body Leakage Current, Forward	$V_{GS} = 30\text{ V}, V_{DS} = 0\text{ V}$	-	-	100	nA
I_{GSSR}	Gate-Body Leakage Current, Reverse	$V_{GS} = -30\text{ V}, V_{DS} = 0\text{ V}$	-	-	-100	nA

ON CHARACTERISTICS

$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\ \mu\text{A}$	3.0	-	5.0	V
$R_{DS(on)}$	Static Drain-Source On-Resistance	$V_{GS} = 10\text{ V}, I_D = 0.75\text{ A}$	-	4.6	6.3	Ω
g_{FS}	Forward Transconductance	$V_{DS} = 50\text{ V}, I_D = 0.75\text{ A}$	-	2.2	-	S

DYNAMIC CHARACTERISTICS

C_{iss}	Input Capacitance	$V_{DS} = 25\text{ V}, V_{GS} = 0\text{ V}, f = 1.0\text{ MHz}$	-	425	550	pF
C_{oss}	Output Capacitance		-	45	60	pF
C_{rss}	Reverse Transfer Capacitance		-	5.5	7.0	pF

FQPF2N80**ELECTRICAL CHARACTERISTICS** ($T_C = 25^\circ\text{C}$ unless otherwise noted)(continued)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
SWITCHING CHARACTERISTICS						
$t_{d(on)}$	Turn-On Delay Time	$V_{DD} = 400\text{ V}$, $I_D = 2.4\text{ A}$, $R_G = 25\ \Omega$ (Note 4)	–	12	35	ns
t_r	Turn-On Rise Time		–	30	70	ns
$t_{d(off)}$	Turn-Off Delay Time		–	25	60	ns
t_f	Turn-Off Fall Time		–	28	65	ns
Q_g	Total Gate Charge	$V_{DS} = 640\text{ V}$, $I_D = 2.4\text{ A}$, $V_{GS} = 10\text{ V}$ (Note 4)	–	12	15	nC
Q_{gs}	Gate-Source Charge		–	2.6	–	nC
Q_{gd}	Gate-Drain Charge		–	6.0	–	nC

DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS

I_S	Maximum Continuous Drain-Source Diode Forward Current	–	–	1.5	A	
I_{SM}	Maximum Pulsed Drain-Source Diode Forward Current	–	–	6.0	A	
V_{SD}	Drain-Source Diode Forward Voltage	$V_{GS} = 0\text{ V}$, $I_S = 1.5\text{ A}$	–	–	1.4	V
t_{rr}	Reverse Recovery Time	$V_{GS} = 0\text{ V}$, $I_S = 2.4\text{ A}$, $di_F/dt = 100\text{ A}/\mu\text{s}$	–	480	–	ns
Q_{rr}	Reverse Recovery Charge		–	2.0	–	μC

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

1. Repetitive rating; pulse-width limited by maximum junction temperature.
2. $L = 150\text{ mH}$, $I_{AS} = 1.5\text{ A}$, $V_{DD} = 50\text{ V}$, $R_G = 25\ \Omega$, starting $T_J = 25^\circ\text{C}$.
3. $I_{SD} \leq 2.4\text{ A}$, $di/dt \leq 200\text{ A}/\mu\text{s}$, $V_{DD} \leq BV_{DSS}$, starting $T_J = 25^\circ\text{C}$.
4. Essentially independent of operating temperature.

FQPF2N80

TYPICAL CHARACTERISTICS

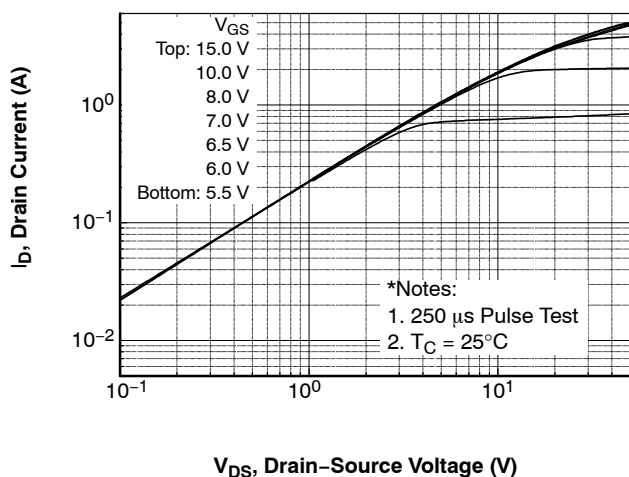


Figure 1. On-Region Characteristics

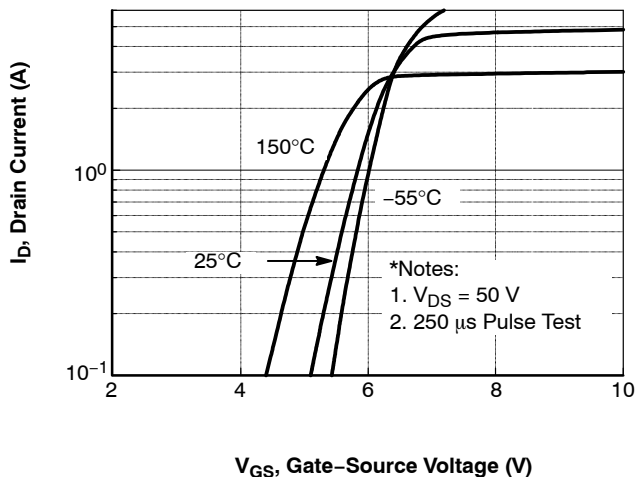


Figure 2. Transfer Characteristics

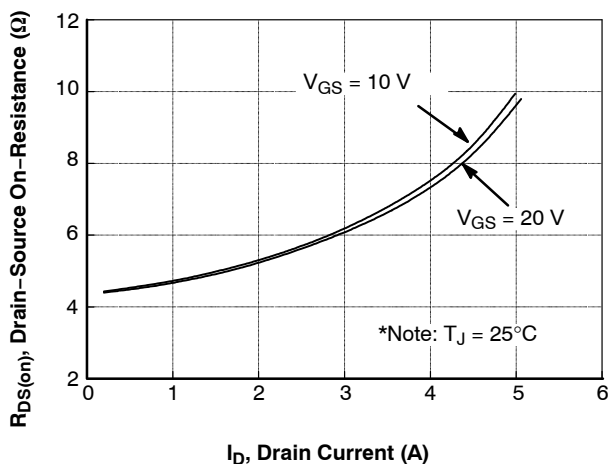


Figure 3. On-Resistance Variation vs. Drain Current and Gate Voltage

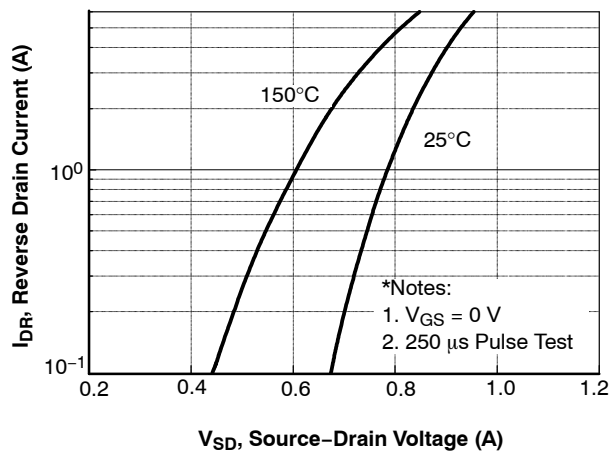


Figure 4. Body Diode Forward Voltage Variation with Source Current and Temperature

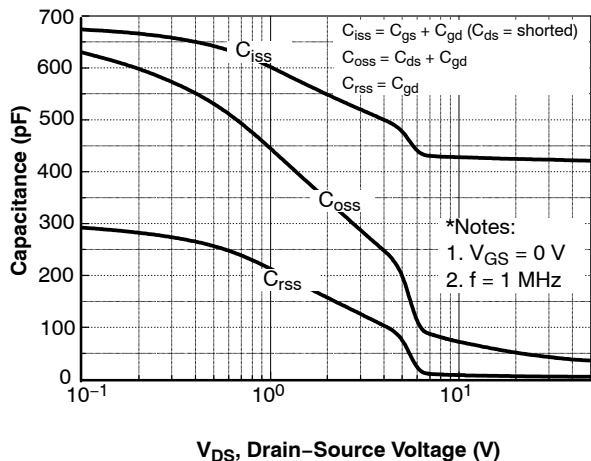


Figure 5. Capacitance Characteristics

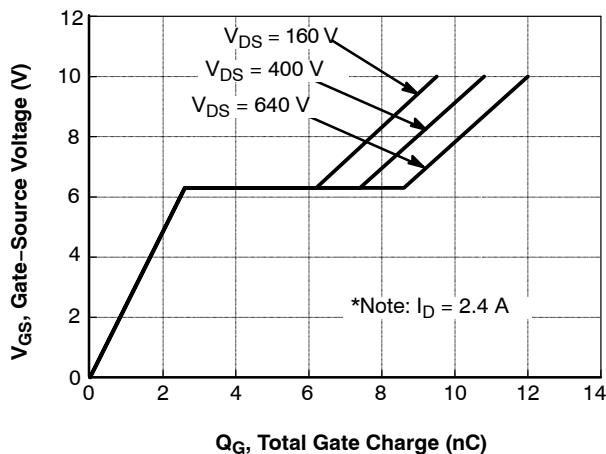


Figure 6. Gate Charge Characteristics

FQPF2N80

TYPICAL CHARACTERISTICS (continued)

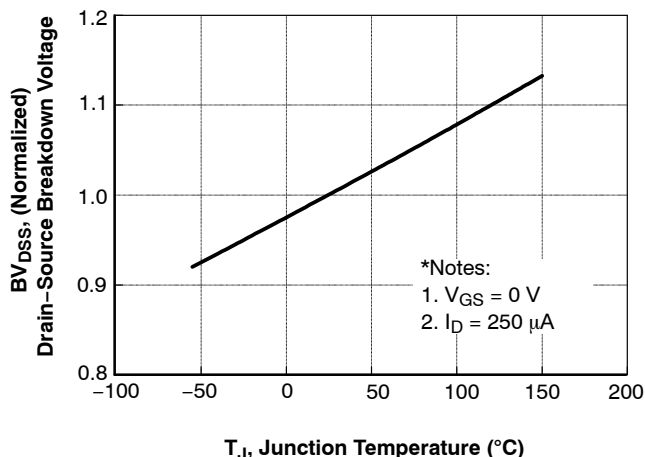


Figure 7. Breakdown Voltage Variation vs. Temperature

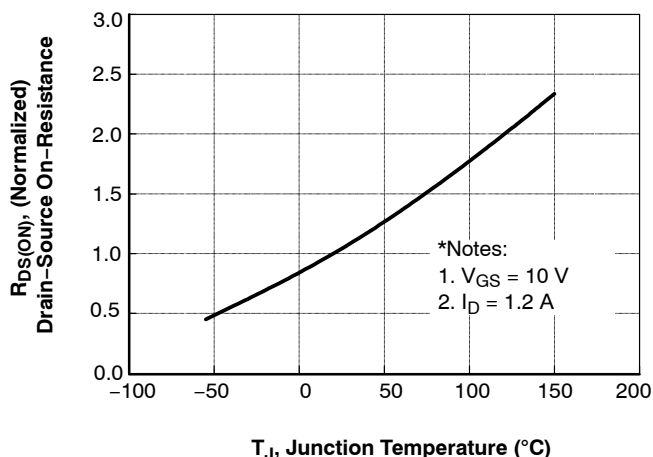


Figure 8. On-Resistance Variation vs. Temperature

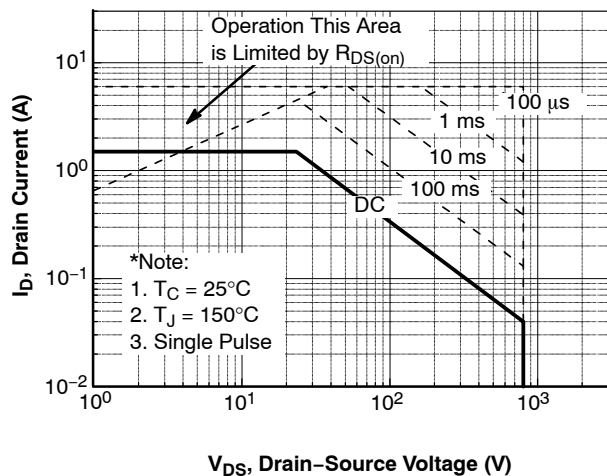


Figure 9. Maximum Safe Operating Area

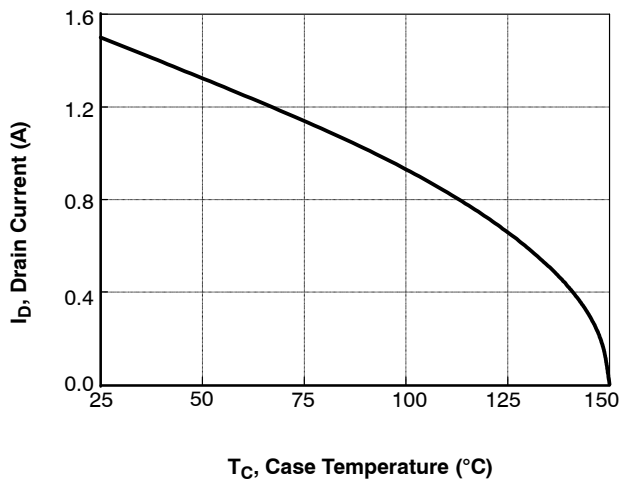


Figure 10. Maximum Drain Current vs. Case Temperature

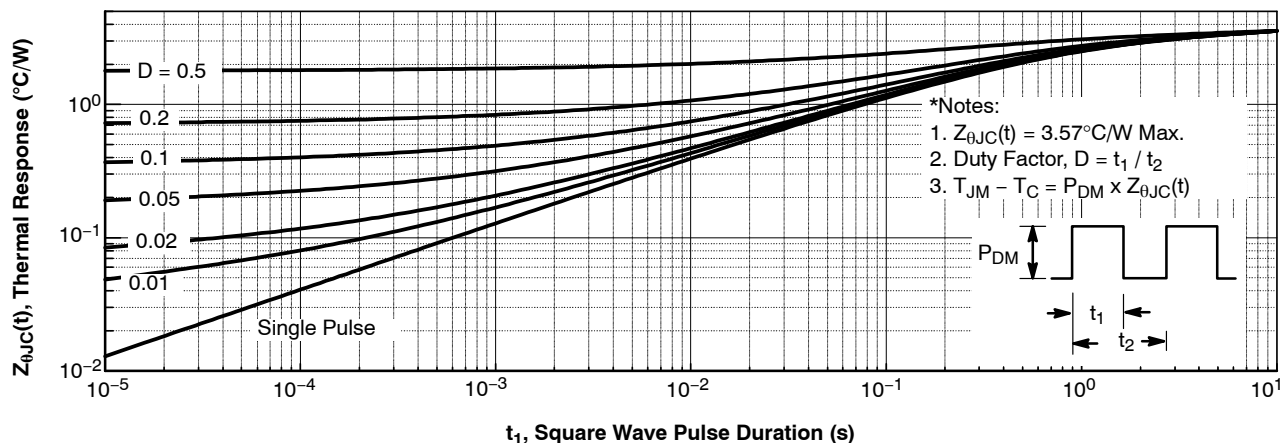


Figure 11. Transient Thermal Response Curve

FQPF2N80

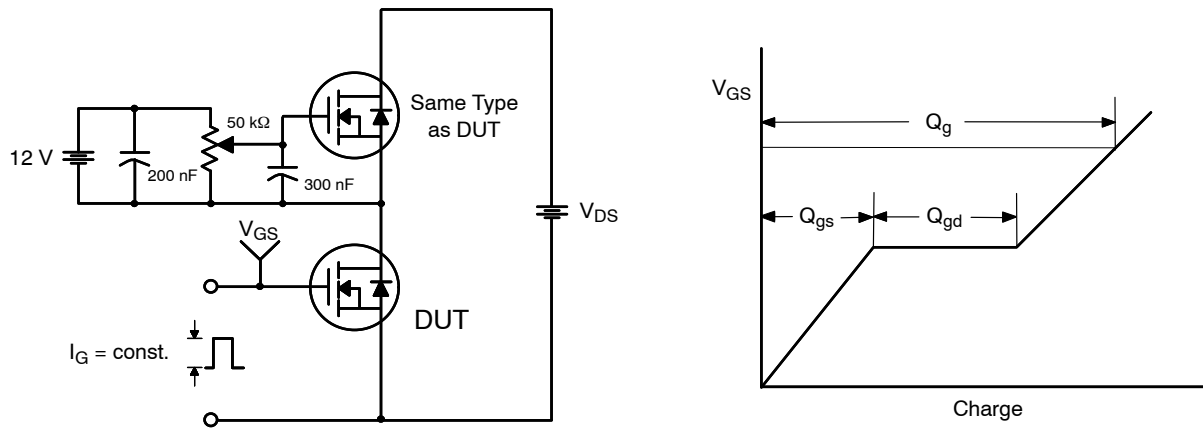


Figure 12. Gate Charge Test Circuit & Waveform

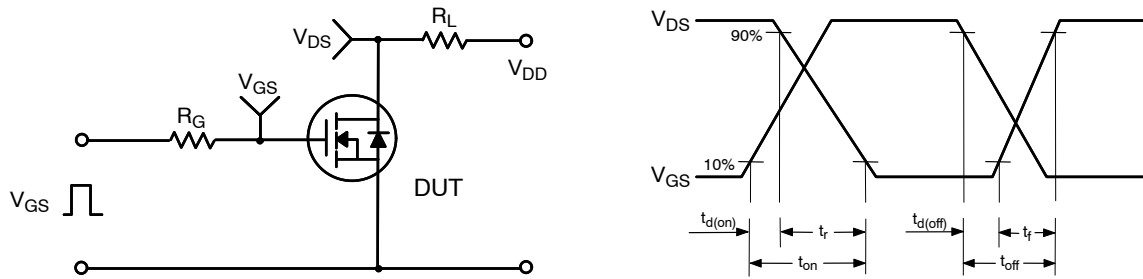


Figure 13. Resistive Switching Test Circuit & Waveforms

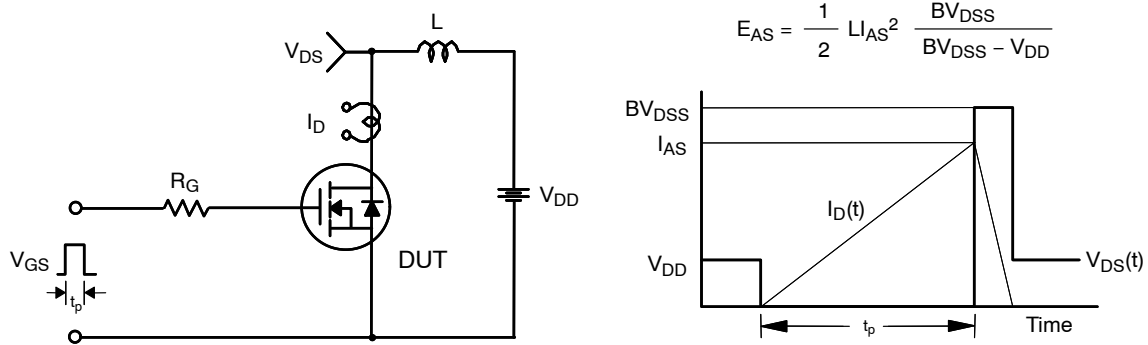


Figure 14. Unclamped Inductive Switching Test Circuit & Waveforms

FQPF2N80

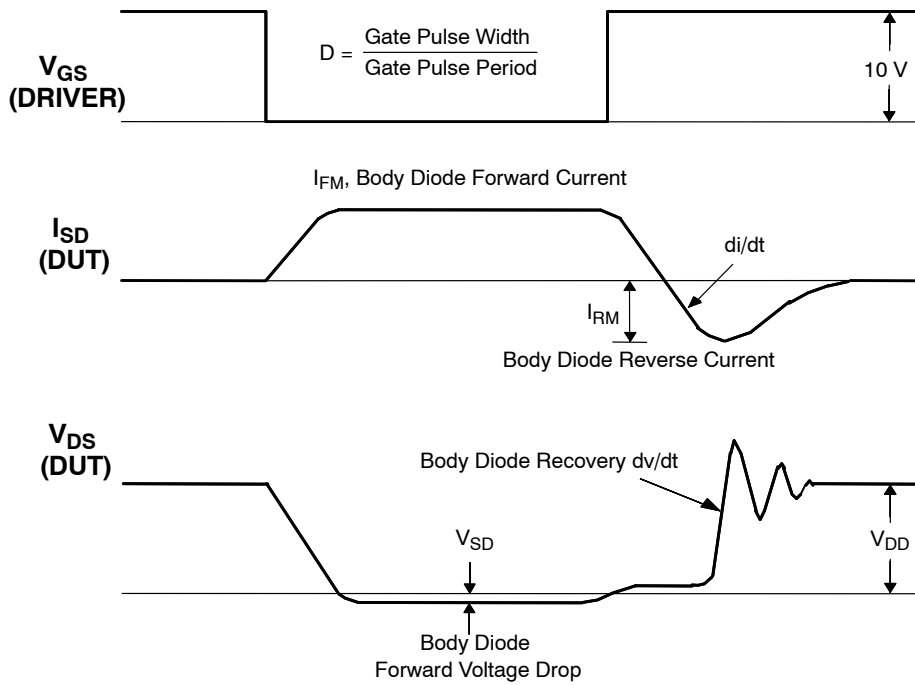
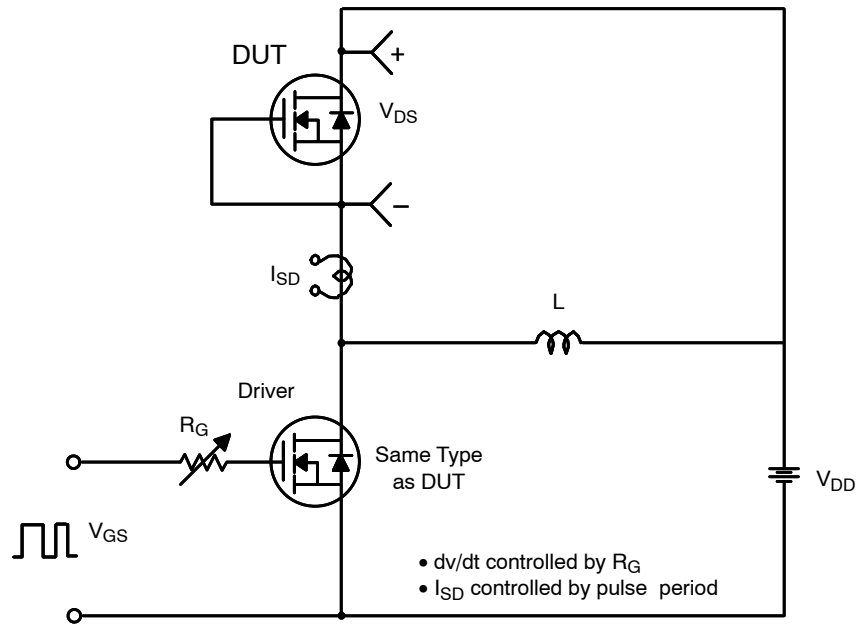
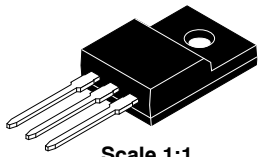


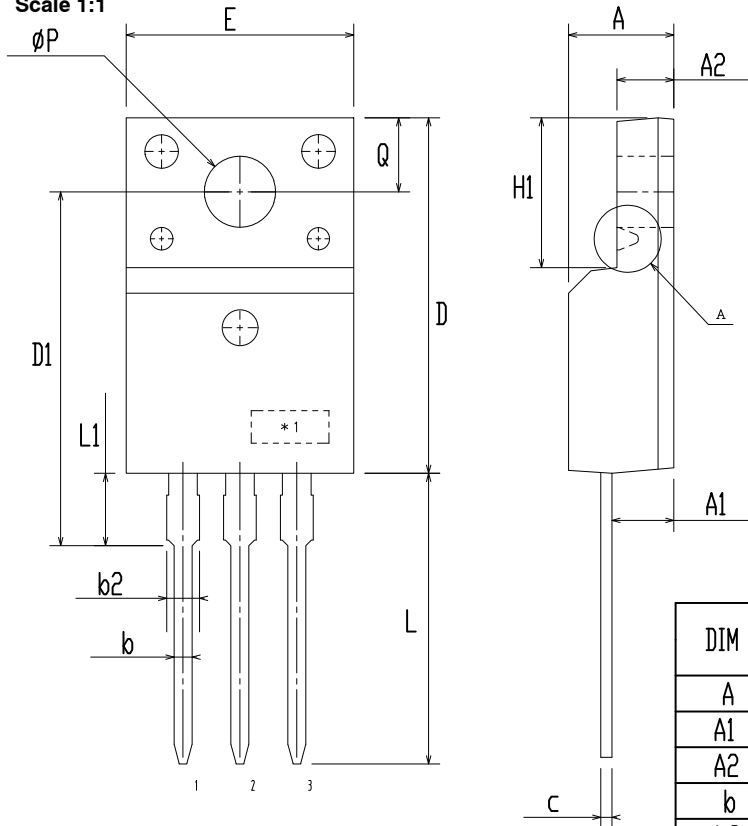
Figure 15. Peak Diode Recovery dv/dt Test Circuit & Waveforms

TO-220 Fullpack, 3-Lead / TO-220F-3SG
CASE 221AT
ISSUE B

DATE 19 JAN 2021



Scale 1:1



DIM	MILLIMETERS		
	MIN	NOM	MAX
A	4.50	4.70	4.90
A1	2.56	2.76	2.96
A2	2.34	2.54	2.74
b	0.70	0.80	0.90
b2	~	~	1.47
c	0.45	0.50	0.60
D	15.67	15.87	16.07
D1	15.60	15.80	16.00
E	9.96	10.16	10.36
e	2.34	2.54	2.74
F	~	0.84	~
H1	6.48	6.68	6.88
L	12.78	12.98	13.18
L1	3.03	3.23	3.43
∅ P	2.98	3.18	3.38
∅ P1	~	1.00	~
Q	3.20	3.30	3.40

NOTES:

- A. DIMENSION AND TOLERANCE AS ASME Y14.5-2009
- B. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH AND TIE BAR PROTRUCTIONS.
- C. OPTION 1 - WITH SUPPORT PIN HOLE
OPTION 2 - NO SUPPORT PIN HOLE

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DESCRIPTION:	TO-220 FULLPACK, 3-LEAD / TO-220F-3SG	PAGE 1 OF 1

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