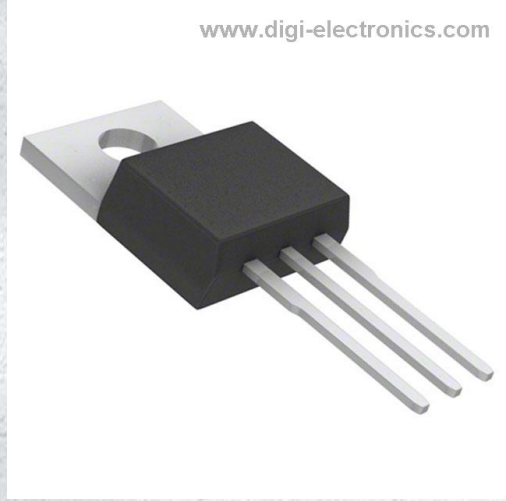
FQP13N10 Datasheet



https://www.DiGi-Electronics.com

DiGi Electronics Part Number	FQP13N10-DG
Manufacturer	onsemi
Manufacturer Product Number	FQP13N10
Description	MOSFET N-CH 100V 12.8A TO220-3
Detailed Description	N-Channel 100 V 12.8A (Tc) 65W (Tc) Through Hole TO-220-3

Tel: +00 852-30501935

RFQ Email: Info@DiGi-Electronics.com

Purchase and inquiry

Manufacturer Product Number:	Manufacturer:
FQP13N10	onsemi
Series:	Product Status:
QFET®	Obsolete
FET Type:	Technology:
N-Channel	MOSFET (Metal Oxide)
Drain to Source Voltage (Vdss):	Current - Continuous Drain (Id) @ 25°C:
100 V	12.8A (Tc)
Drive Voltage (Max Rds On, Min Rds On):	Rds On (Max) @ Id, Vgs:
10V	180mOhm @ 6.4A, 10V
Vgs(th) (Max) @ Id:	Gate Charge (Qg) (Max) @ Vgs:
4V @ 250µA	16 nC @ 10 V
Vgs (Max):	Input Capacitance (Ciss) (Max) @ Vds:
±25V	450 pF @ 25 V
FET Feature:	Power Dissipation (Max):
-	65W (Tc)
Operating Temperature:	Mounting Type:
-55°C ~ 175°C (TJ)	Through Hole
Supplier Device Package:	Package / Case:
TO-220-3	TO-220-3
Base Product Number:	
FQP13	

Environmental & Export classification

RoHS Status:	Moisture Sensitivity Level (MSL):
ROHS3 Compliant	Not Applicable
REACH Status:	ECCN:
REACH Unaffected	EAR99
HTSUS:	
8541.29.0095	

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FAIRCHILD SEMICONDUCTOR®

November 2013

FQP13N10

N-Channel QFET® MOSFET

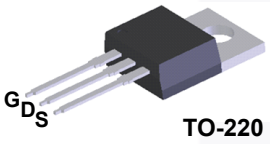
100 V, 12.8 A, 180 mΩ

Description

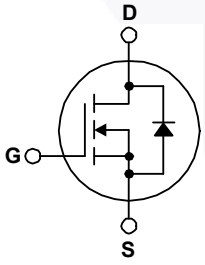
This N-Channel enhancement mode power MOSFET is produced using Fairchild Semiconductor's proprietary planar stripe and DMOS technology. This advanced MOSFET technology has been especially tailored to reduce on-state resistance, and to provide superior switching performance and high avalanche energy strength. These devices are suitable for switched mode power supplies, audio amplifier, DC motor control, and variable switching power applications.

Features

- 12.8 A, 100 V, $R_{DS(on)}$ = 180 mΩ (Max.) @ V_{GS} = 10 V, I_D= 6.4 A
- Low Gate Charge (Typ. 12 nC)
- Low Crss (Typ. 20 pF)
- 100% Avalanche Tested
- 175°C Maximum Junction Temperature Rating



TO-220



Absolute Maximum Ratings

T_C = 25°C unless otherwise noted.

Symbol	Parameter		FQP13N10	Unit
V_{DSS}	Drain-Source Voltage		100	V
I_D	Drain Current - Continuous (T_C = 25°C)		12.8	A
	- Continuous (T_C = 100°C)		9.05	A
I_{DM}	Drain Current - Pulsed	(Note 1)	51.2	A
V_{GSS}	Gate-Source Voltage		± 25	V
E_{AS}	Single Pulsed Avalanche Energy	(Note 2)	95	mJ
I_{AR}	Avalanche Current	(Note 1)	12.8	A
E_{AR}	Repetitive Avalanche Energy	(Note 1)	6.5	mJ
dv/dt	Peak Diode Recovery dv/dt	(Note 3)	6.0	V/ns
P_D	Power Dissipation (T_C = 25°C)		65	W
	- Derate above 25°C		0.43	W/°C
T_J, T_{STG}	Operating and Storage Temperature Range		-55 to +175	°C
T_L	Maximum Lead Temperature for Soldering, 1/8" from Case for 5 seconds		300	°C

Thermal Characteristics

Symbol	Parameter	FQP13N10	Unit
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case, Max.	2.31	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient, Max.	62.5	°C/W

Marking and Ordering Information

Part Number	Top Mark	Package	Packing Method	Reel Size	Tape Width	Quantity
FQP13N10	FQP13N10	TO-220	Tube	N/A	N/A	50 units

Electrical Characteristics

T_C = 25°C unless otherwise noted.

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
Off Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS} = 0 V, I_D = 250 μA	100	--	--	V
ΔBV_{DSS} / ΔT_J	Breakdown Voltage Temperature Coefficient	I_D = 250 μA, Referenced to 25°C	--	0.09	--	V/°C
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 100 V, V_{GS} = 0 V	--	--	1	μA
		V_{DS} = 80 V, T_C = 150°C	--	--	10	μA
I_{GSSF}	Gate-Body Leakage Current, Forward	V_{GS} = 25 V, V_{DS} = 0 V	--	--	100	nA
I_{GSSR}	Gate-Body Leakage Current, Reverse	V_{GS} = -25 V, V_{DS} = 0 V	--	--	-100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250 μA	2.0	--	4.0	V
$R_{DS(on)}$	Static Drain-Source On-Resistance	V_{GS} = 10 V, I_D = 6.4 A	--	0.142	0.18	Ω
g_{FS}	Forward Transconductance	V_{DS} = 40 V, I_D = 6.4 A	--	6.8	--	S
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS} = 25 V, V_{GS} = 0 V, f = 1.0 MHz	--	345	450	pF
C_{oss}	Output Capacitance		--	100	130	pF
C_{rss}	Reverse Transfer Capacitance		--	20	25	pF
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	V_{DD} = 50 V, I_D = 12.8 A, R_G = 25 Ω (Note 4)	--	5	20	ns
t_r	Turn-On Rise Time		--	55	120	ns
$t_{d(off)}$	Turn-Off Delay Time		--	20	50	ns
t_f	Turn-Off Fall Time		--	25	60	ns
Q_g	Total Gate Charge	V_{DS} = 80 V, I_D = 12.8 A, V_{GS} = 10 V (Note 4)	--	12	16	nC
Q_{gs}	Gate-Source Charge		--	2.5	--	nC
Q_{gd}	Gate-Drain Charge		--	5.1	--	nC
Drain-Source Diode Characteristics and Maximum Ratings						
I_S	Maximum Continuous Drain-Source Diode Forward Current		--	--	12.8	A
I_{SM}	Maximum Pulsed Drain-Source Diode Forward Current		--	--	51.2	A
V_{SD}	Drain-Source Diode Forward Voltage	V_{GS} = 0 V, I_S = 12.8 A	--	--	1.5	V
t_{rr}	Reverse Recovery Time	V_{GS} = 0 V, I_S = 12.8 A, dI_F / dt = 100 A/μs	--	72	--	ns
Q_{rr}	Reverse Recovery Charge		--	0.17	--	μC

Notes:
1. Repetitive Rating : Pulse width limited by maximum junction temperature.
2. L = 0.87 mH, I_{AS} = 12.8 A, V_{DD} = 25 V, R_G = 25 Ω, starting T_J = 25°C.
3. $I_{SD} \leq$ 12.8 A, di/dt $\leq$ 300 A/μs, $V_{DD} \leq BV_{DSS}$, starting T_J = 25°C.
4. Essentially Independent of Operating Temperature.

Typical Characteristics

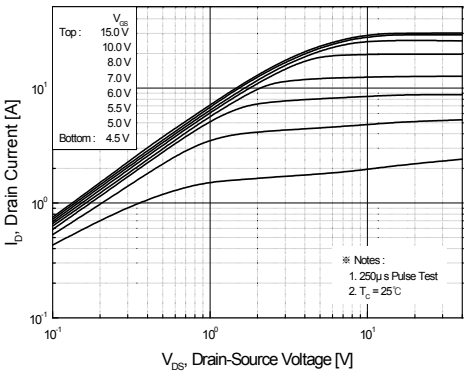


Figure 1. On-Region Characteristics

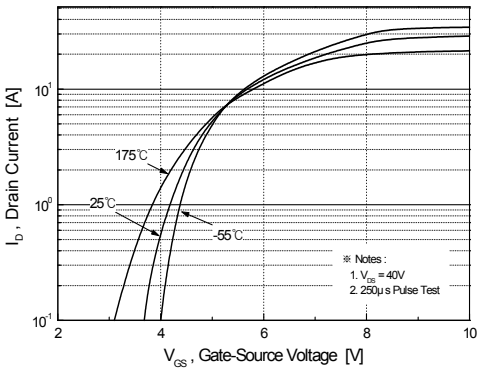


Figure 2. Transfer Characteristics

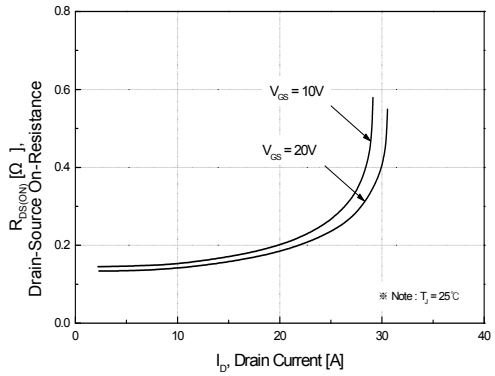


Figure 3. On-Resistance Variation vs. Drain Current and Gate Voltage

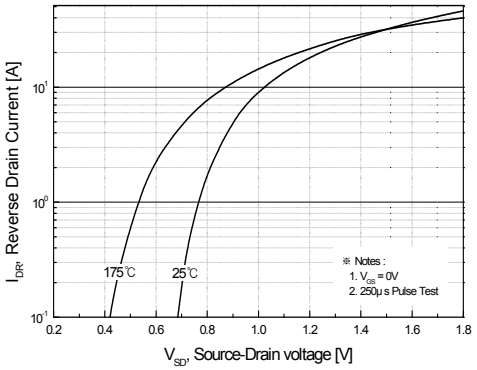


Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature

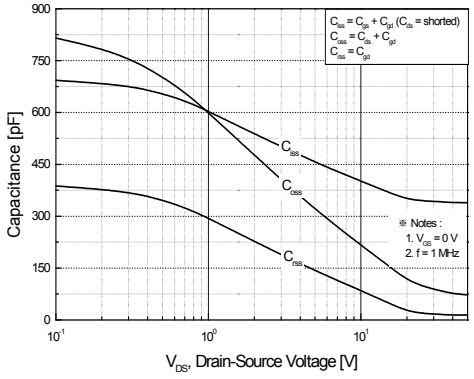


Figure 5. Capacitance Characteristics

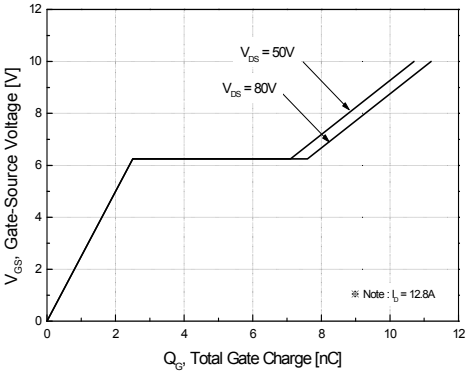


Figure 6. Gate Charge Characteristics

Typical Characteristics (Continued)

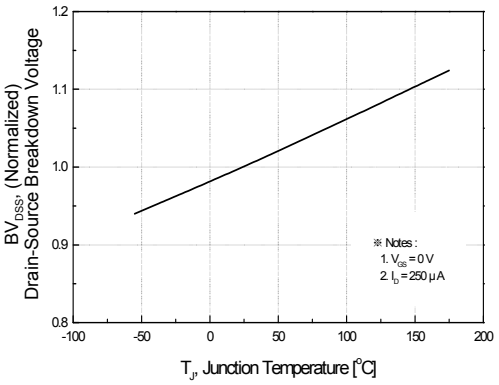


Figure 7. Breakdown Voltage Variation vs. Temperature

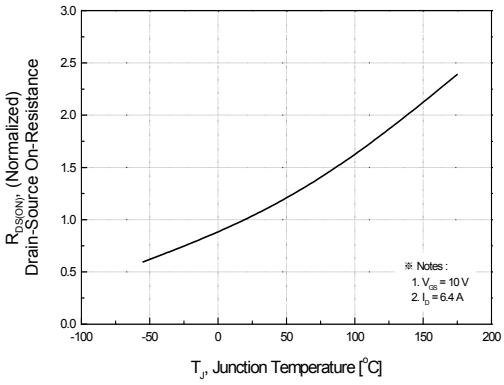


Figure 8. On-Resistance Variation vs. Temperature

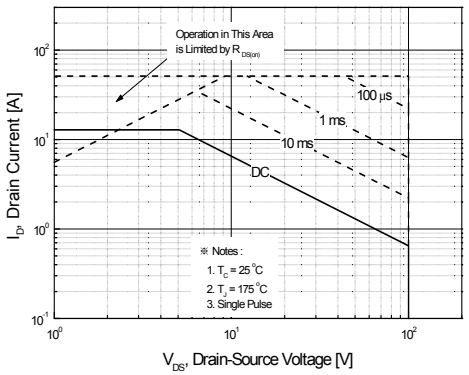


Figure 9. Maximum Safe Operating Area

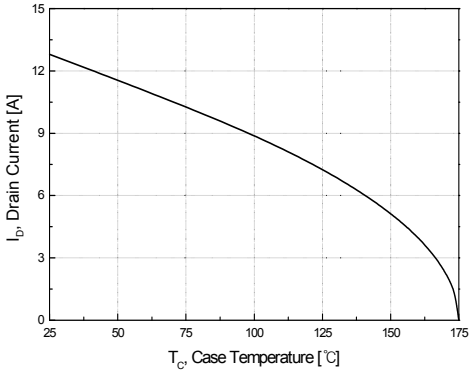


Figure 10. Maximum Drain Current vs. Case Temperature

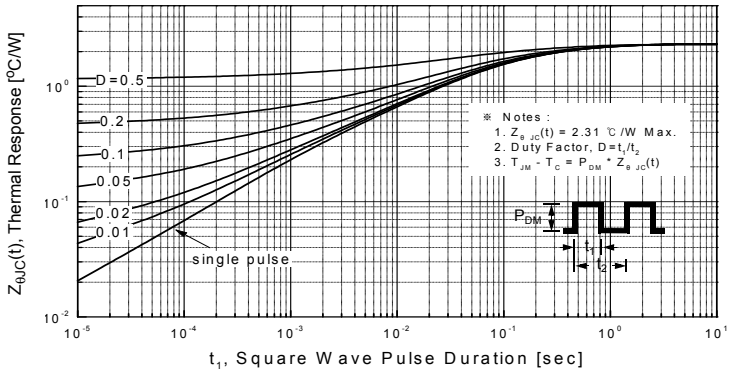


Figure 11. Transient Thermal Response Curve

Figure 12. Gate Charge Test Circuit & Waveform

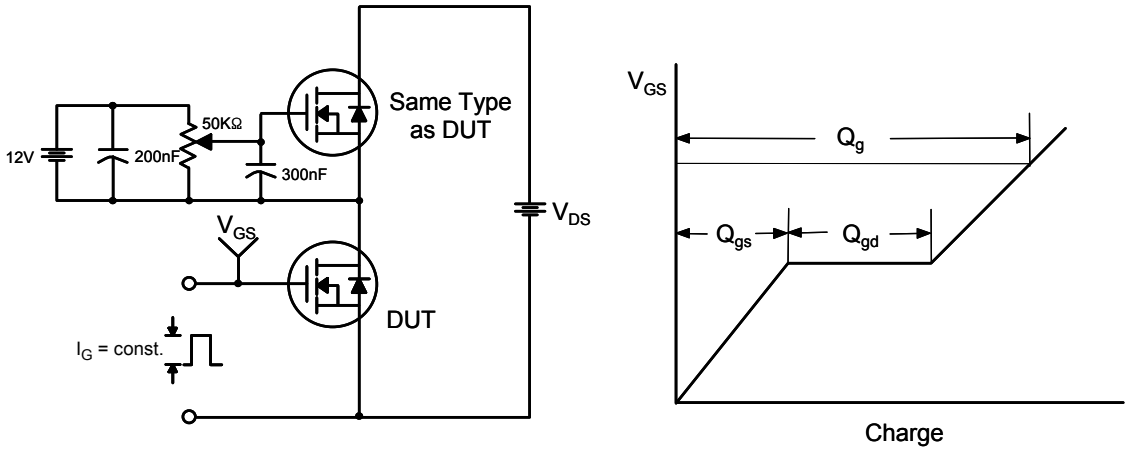


Figure 13. Resistive Switching Test Circuit & Waveforms

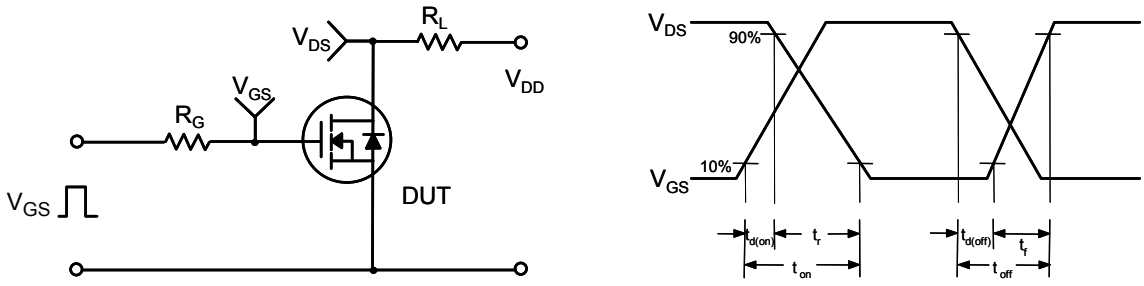


Figure 14. Unclamped Inductive Switching Test Circuit & Waveforms

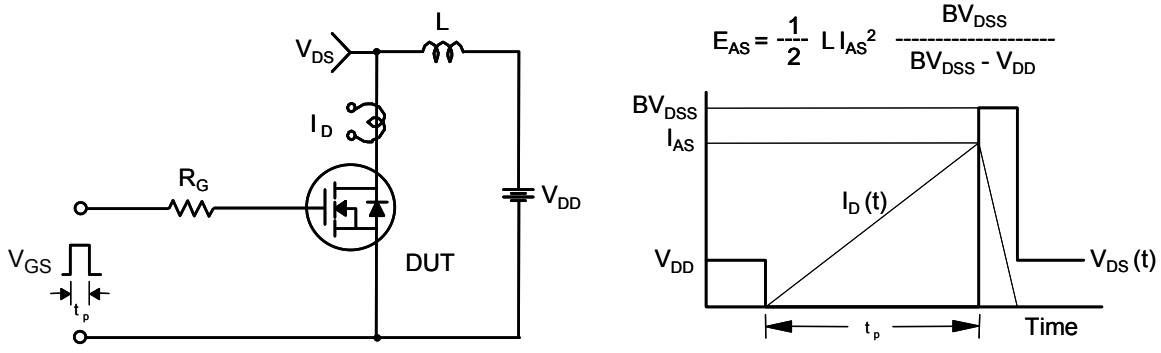
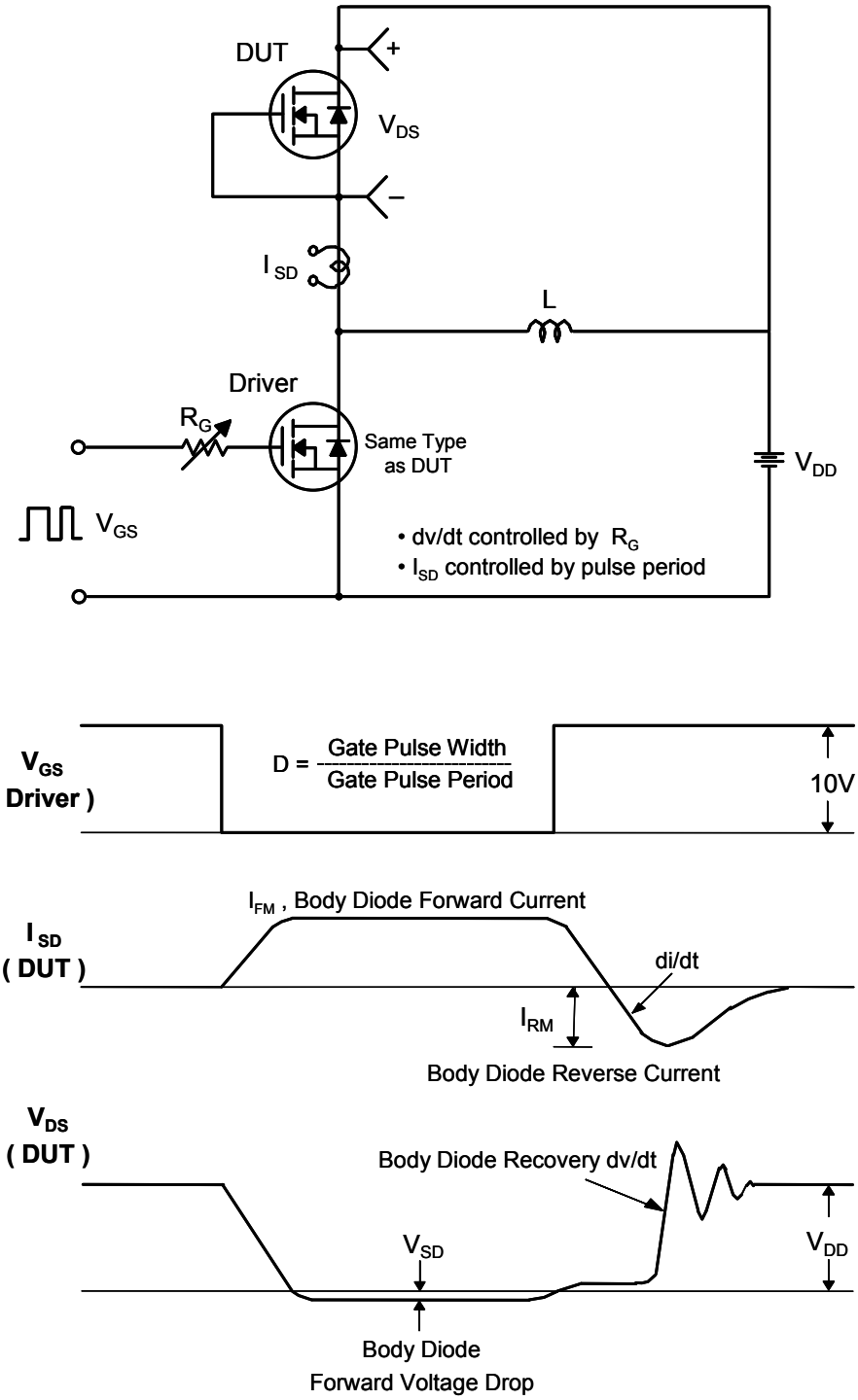


Figure 15. Peak Diode Recovery dv/dt Test Circuit & Waveforms



Mechanical Dimensions

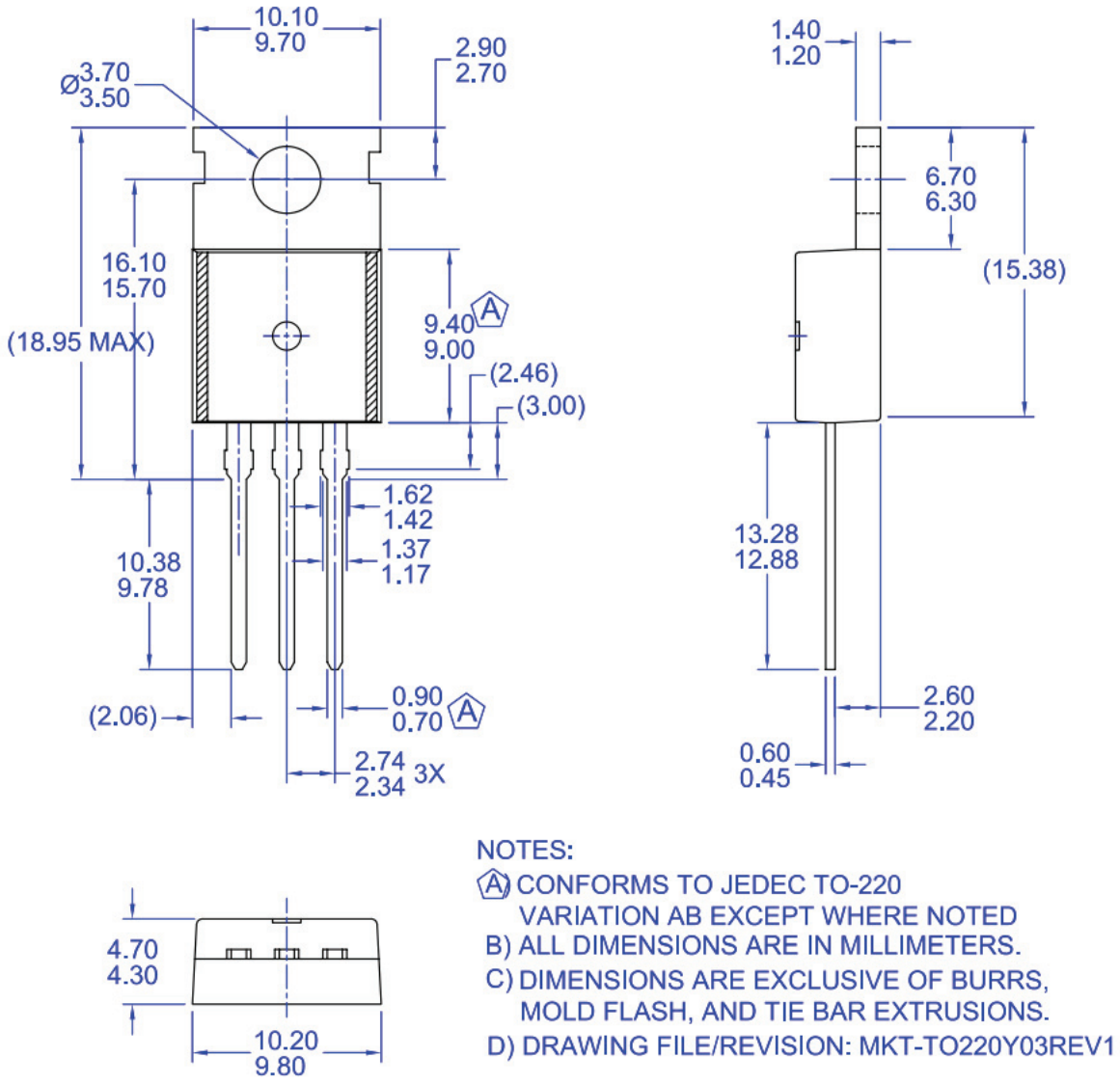


Figure 16. TO220, Molded, 3-Lead, Jedec Variation AB

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No Identification Needed	Full Production	Datasheet contains final specifications. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve the design.
Obsolete	Not In Production	Datasheet contains specifications on a product that is discontinued by Fairchild Semiconductor. The datasheet is for reference information only.

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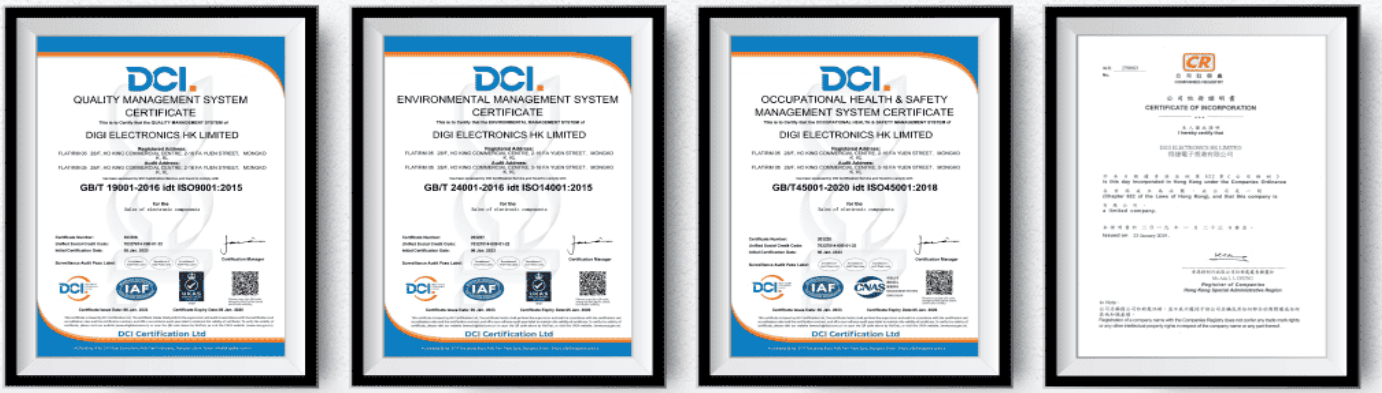

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