FAIRCHILD
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FQPF8N60CF

N-Channel QFET® FRFET® MOSFET

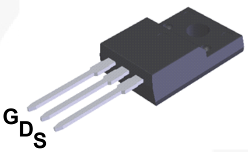
600 V, 6.26 A, 1.5 Ω

Description

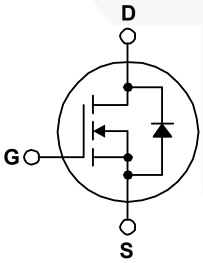
This N-Channel enhancement mode power MOSFET is produced using Fairchild Semiconductor's proprietary planar stripe and DMOS technology. This advanced MOSFET technology has been especially tailored to reduce on-state resistance, and to provide superior switching performance and high avalanche energy strength.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

Features

- 6.26 A, 600 V, $R_{DS(on)}$ = 1.5 Ω (Max.) @ V_{GS} = 10 V, I_D = 3.13 A
- Low Gate Charge (Typ. 28 nC)
- Low Crss (Typ. 12 pF)
- 100% Avalanche Tested



TO-220F



Absolute Maximum Ratings T_C = 25°C unless otherwise noted.

Symbol	Parameter		FQPF8N60CFT	Unit
V_{DSS}	Drain-Source Voltage		600	V
I_D	Drain Current - Continuous (T_C = 25°C)		6.26*	A
	- Continuous (T_C = 100°C)		3.96*	A
I_{DM}	Drain Current - Pulsed	(Note 1)	25*	A
V_{GSS}	Gate-Source Voltage		± 30	V
E_{AS}	Single Pulsed Avalanche Energy	(Note 2)	160	mJ
I_{AR}	Avalanche Current	(Note 1)	6.26	A
E_{AR}	Repetitive Avalanche Energy	(Note 1)	14.7	mJ
dv/dt	Peak Diode Recovery dv/dt	(Note 3)	4.5	V/ns
P_D	Power Dissipation (T_C = 25°C)		48	W
	- Derate above 25°C		0.38	W/°C
T_J, T_{STG}	Operating and Storage Temperature Range		-55 to +150	°C
T_L	Maximum Lead Temperature for Soldering, 1/8" from Case for 5 Seconds		300	°C

* Drain current limited by maximum junction temperature

Thermal Characteristics

Symbol	Parameter	FQPF8N60CFT	Unit
$R_{\theta JC}$	Thermal Resistance, Junction to Case, Max.	2.6	^{o}C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient, Max.	62.5	

Package Marking and Ordering Information

Part Number	Top Mark	Package	Packing Method	Reel Size	Tape Width	Quantity
FQPF8N60CFT	FQPF8N60CFT	TO-220F	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	600	--	--	V
ΔBV_{DSS} / ΔT_J	Breakdown Voltage Temperature Coefficient	I_D = 250 μA, Referenced to 25°C	--	0.7	--	V/°C
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 600 V, V_{GS} = 0 V	--	--	10	μA
		V_{DS} = 480 V, T_C = 125°C	--	--	100	μA
I_{GSSF}	Gate-Body Leakage Current, Forward	V_{GS} = 30 V, V_{DS} = 0 V	--	--	100	nA
I_{GSSR}	Gate-Body Leakage Current, Reverse	V_{GS} = -30 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 = 3.13 A	--	1.25	1.5	Ω
g_{FS}	Forward Transconductance	V_{DS} = 40 V, I_D = 3.13 A	--	8.7	--	S
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS} = 25 V, V_{GS} = 0 V, f = 1.0 MHz	--	965	1255	pF
C_{oss}	Output Capacitance		--	105	135	pF
C_{rss}	Reverse Transfer Capacitance		--	12	16	pF
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	V_{DD} = 300 V, I_D = 6.26A, R_G = 25 Ω (Note 4)	--	16.5	45	ns
t_r	Turn-On Rise Time		--	60.5	130	ns
$t_{d(off)}$	Turn-Off Delay Time		--	81	170	ns
t_f	Turn-Off Fall Time		--	64.5	140	ns
Q_g	Total Gate Charge	V_{DS} = 480 V, I_D = 6.26A, V_{GS} = 10 V (Note 4)	--	28	36	nC
Q_{gs}	Gate-Source Charge		--	4.5	--	nC
Q_{gd}	Gate-Drain Charge		--	12	--	nC
Drain-Source Diode Characteristics and Maximum Ratings						
I_S	Maximum Continuous Drain-Source Diode Forward Current		--	--	6.26	A
I_{SM}	Maximum Pulsed Drain-Source Diode Forward Current		--	--	25	A
V_{SD}	Drain-Source Diode Forward Voltage	V_{GS} = 0 V, I_S = 6.26 A	--	--	1.4	V
t_{rr}	Reverse Recovery Time	V_{GS} = 0 V, I_S = 6.26 A, dI_F / dt = 100 A/μs	--	82	--	ns
Q_{rr}	Reverse Recovery Charge		--	242	--	nC

NOTES:

1. Repetitive rating : pulse-width limited by maximum junction temperature.
2. L = 7.3 mH, I_{AS} = 6.26 A, V_{DD} = 50 V, R_G = 25 Ω, starting T_J = 25°C.
3. $I_{SD} \leq$ 6.26 A, di/dt $\leq$ 200 A/μs, $V_{DD} \leq BV_{DSS,}$ Starting T_J = 25°C.
4. Essentially independent of operating temperature.

Typical Performance Characteristics

Figure 1. On-Region Characteristics

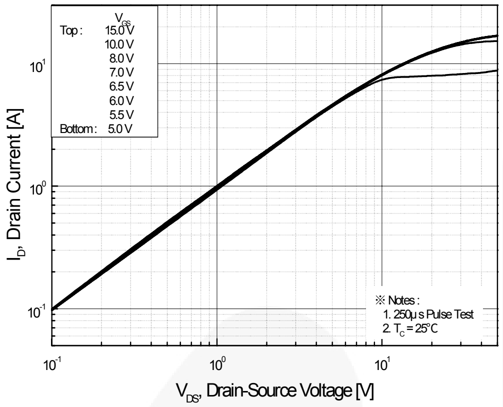


Figure 2. Transfer Characteristics

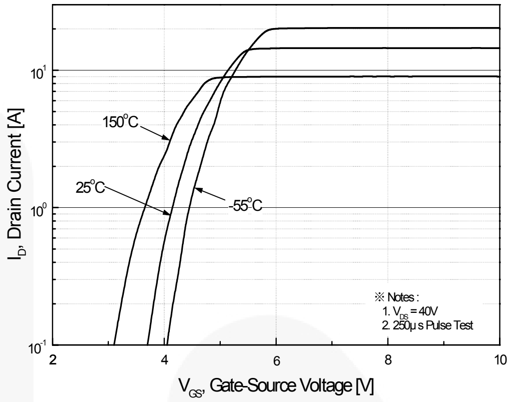


Figure 3. On-Resistance Variation vs. Drain Current and Gate Voltage

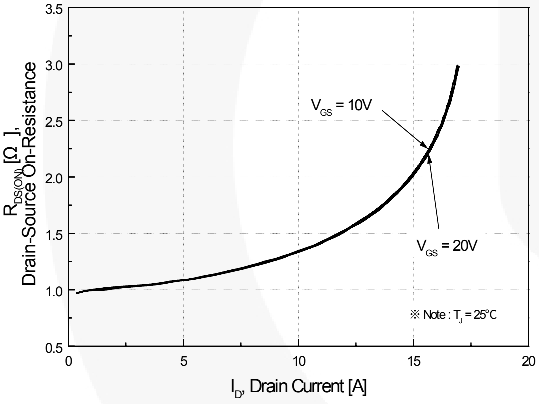


Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperatue

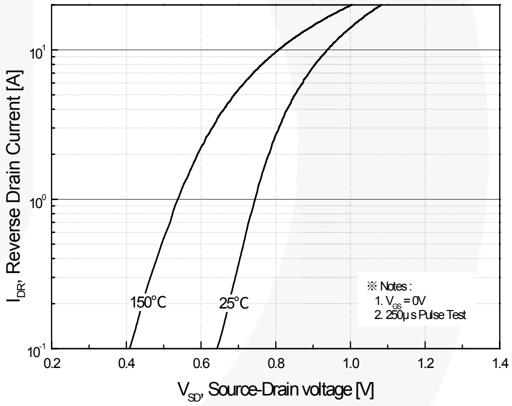


Figure 5. Capacitance Characteristics

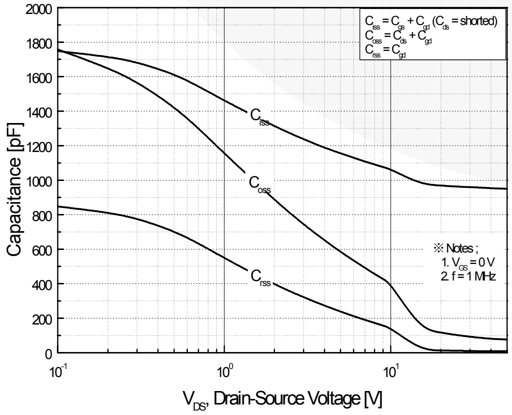
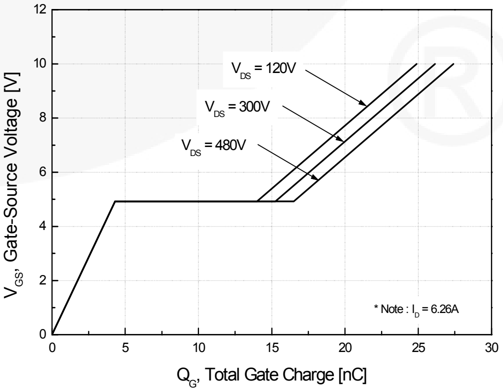


Figure 6. Gate Charge Characteristics



Typical Performance Characteristics (Continued)

Figure 7. Breakdown Voltage Variation vs. Temperature

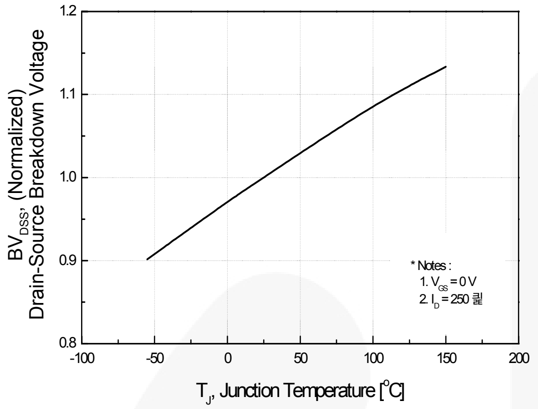


Figure 8. On-Resistance Variation vs. Temperature

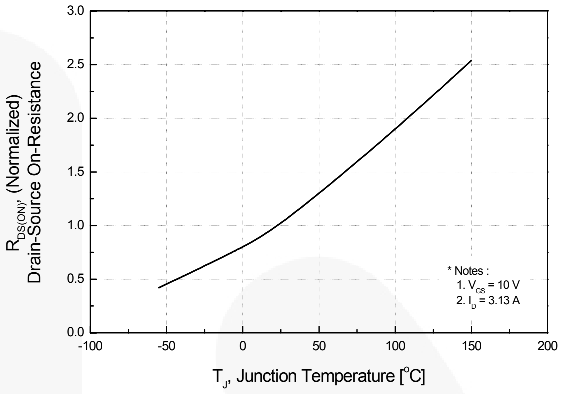


Figure 9. Maximum Safe Operating Area

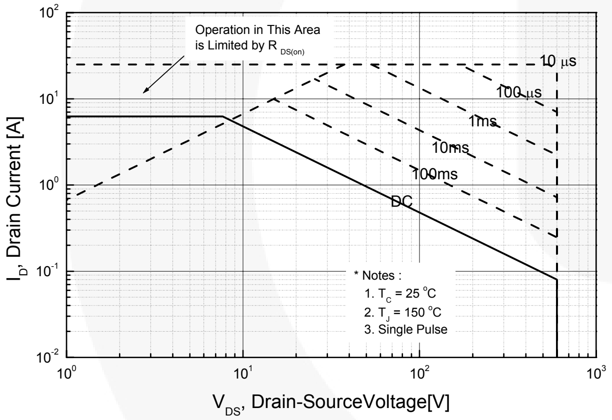


Figure 10. Maximum Drain Current vs. Case Temperature

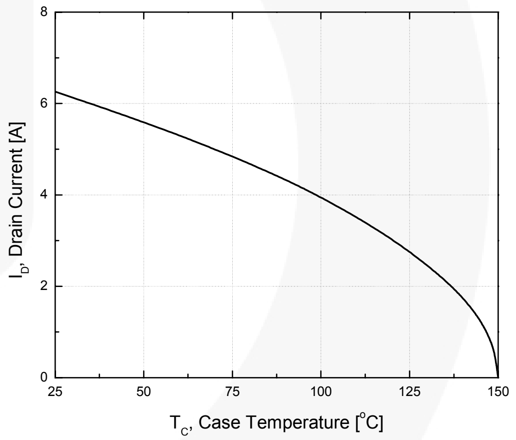
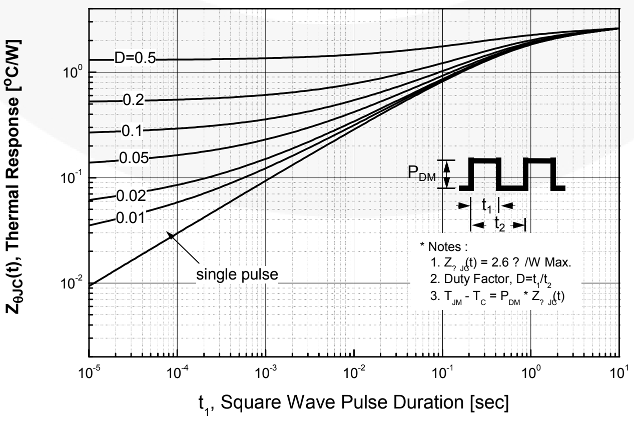


Figure 11. Transient Thermal Response Curve



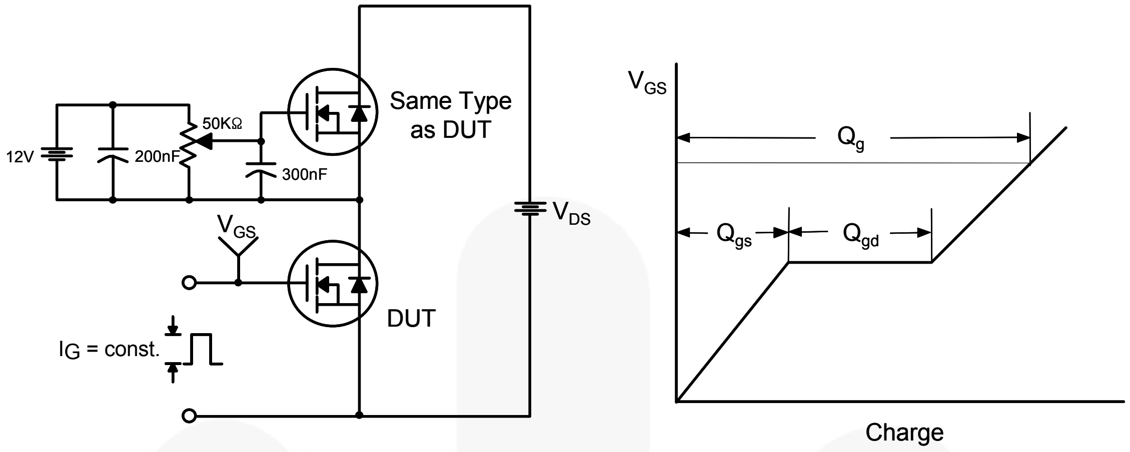


Figure 12. Gate Charge Test Circuit & Waveform

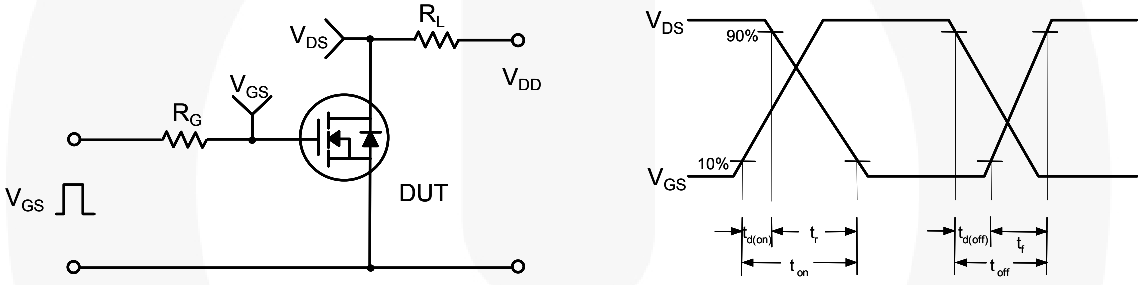


Figure 13. Resistive Switching Test Circuit & Waveforms

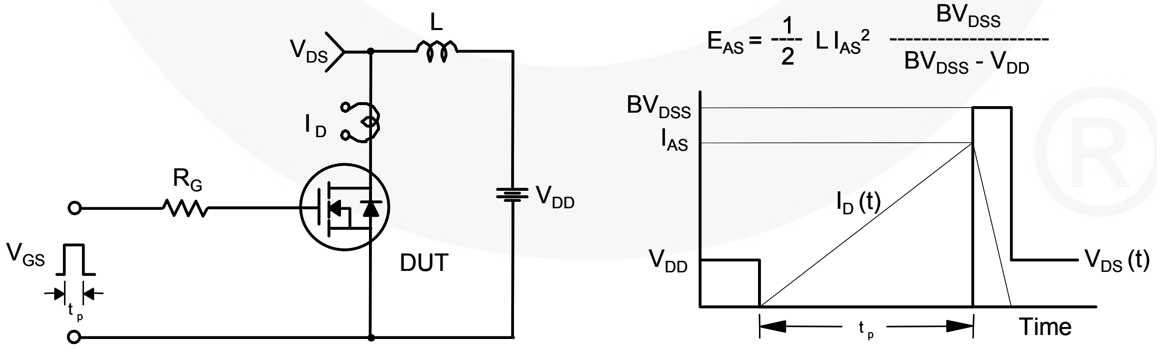


Figure 14. Unclamped Inductive Switching Test Circuit & Waveforms

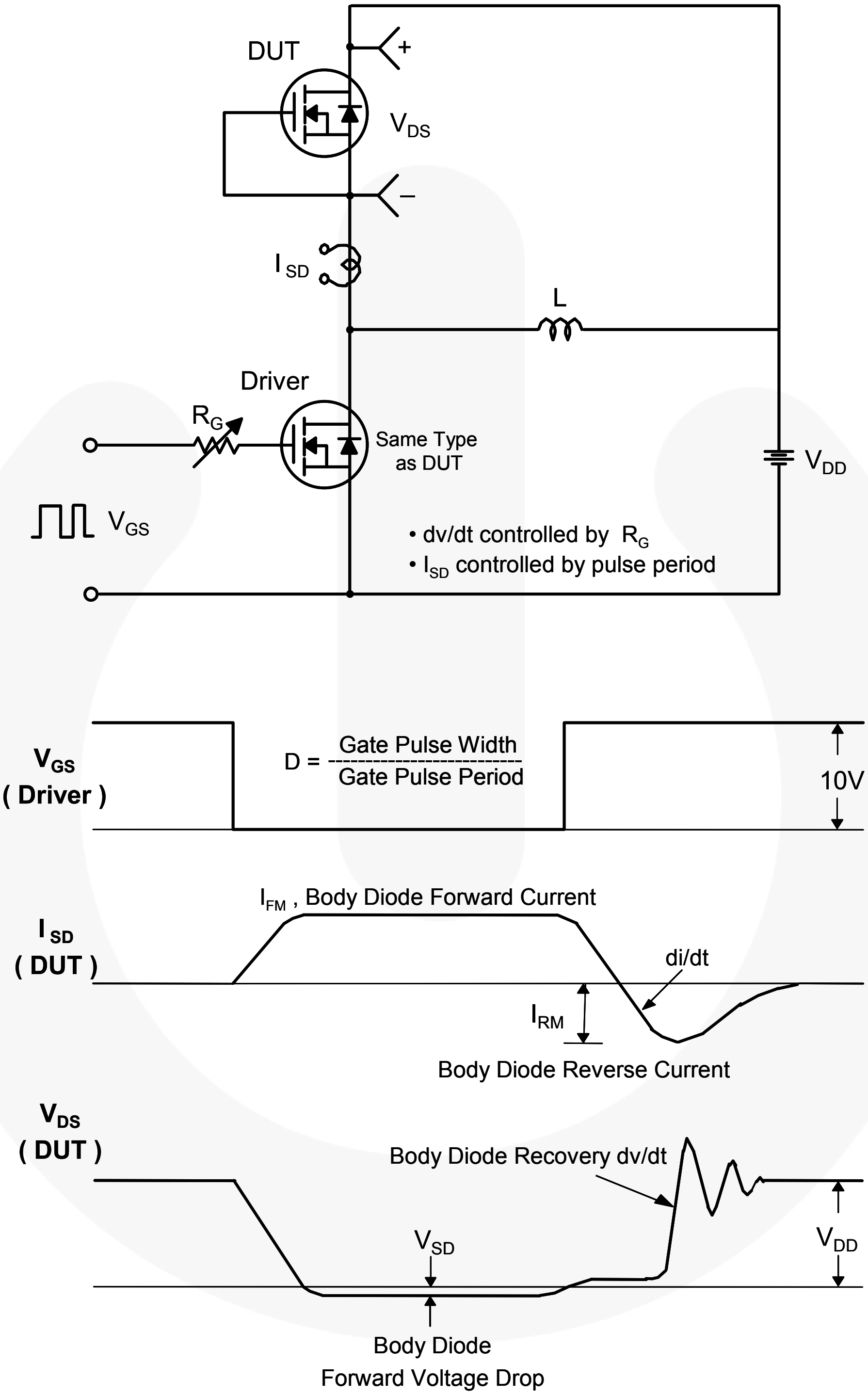
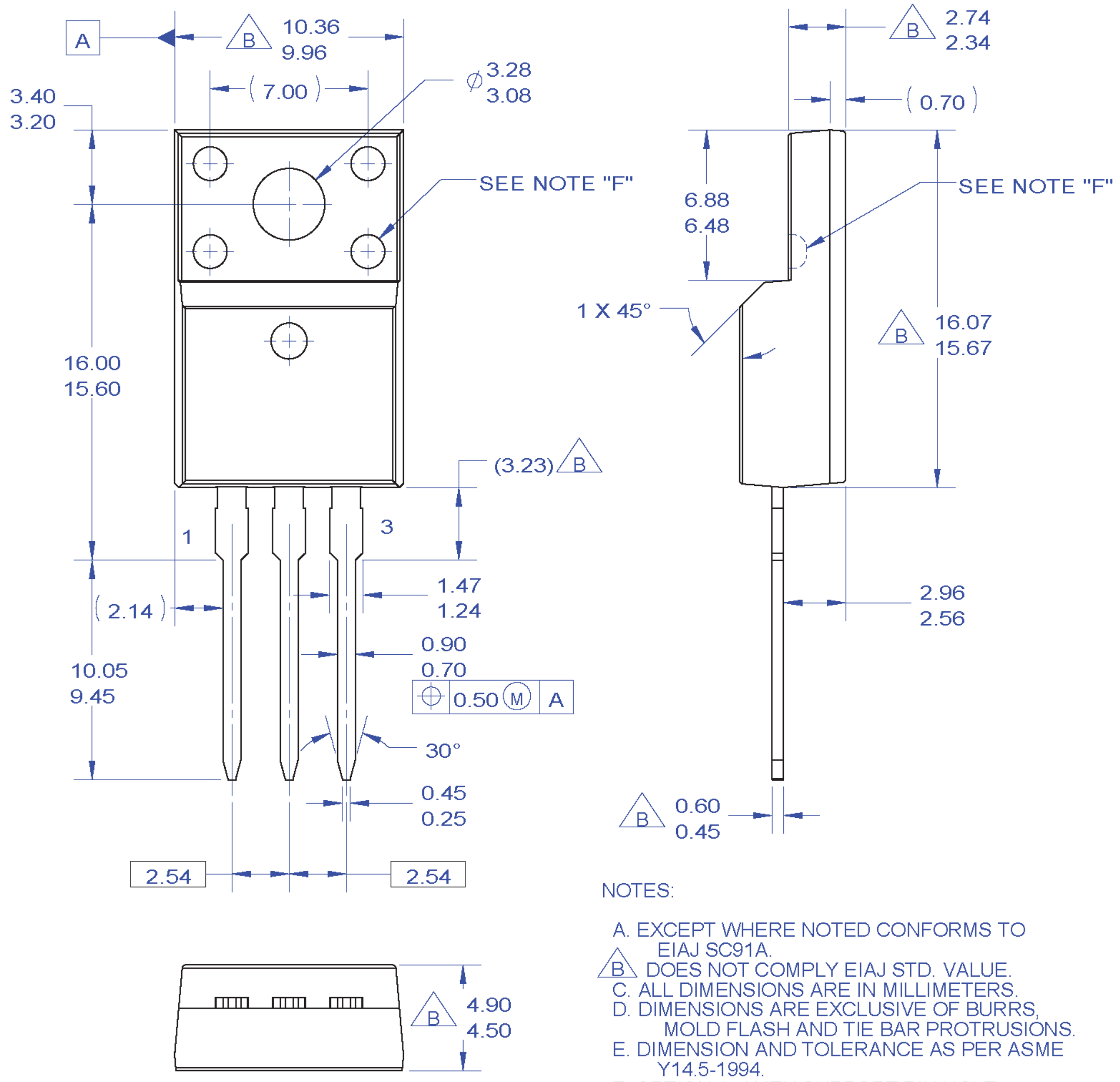


Figure 15. Peak Diode Recovery dv/dt Test Circuit & Waveforms

Mechanical Dimensions



NOTES:

A. EXCEPT WHERE NOTED CONFORMS TO EIAJ SC91A.
B DOES NOT COMPLY EIAJ STD. VALUE.
C. ALL DIMENSIONS ARE IN MILLIMETERS.
D. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH AND TIE BAR PROTRUSIONS.
E. DIMENSION AND TOLERANCE AS PER ASME Y14.5-1994.
F. OPTION 1 - WITH SUPPORT PIN HOLE.
OPTION 2 - NO SUPPORT PIN HOLE.
G. DRAWING FILE NAME: TO220M03REV3

Figure 16. TO220, Molded, 3-Lead, Full Pack, EIAJ SC91, Straight Lead

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