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December 2014

FCPF260N65FL1

N-Channel SuperFET® II FRFET® MOSFET

650 V, 15 A, 260 mΩ

Features

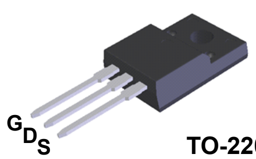
- 700 V @T_J = 150°C
- $R_{DS(on)}$ = 220 mΩ (Typ.)
- Ultra Low Gate Charge (Typ. Q_g = 46 nC)
- Low Effective Output Capacitance (Typ. $C_{oss(eff.)}$ = 223 pF)
- 100% Avalanche Tested
- RoHS Compliant

Applications

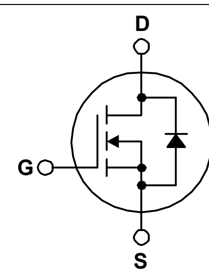
- LCD / LED / PDP TV
- Solar Inverter
- Telecom / Server Power Supplies
- AC - DC Power Supply

Description

SuperFET® II MOSFET is Fairchild Semiconductor's brand-new high voltage super-junction (SJ) MOSFET family that is utilizing charge balance technology for outstanding low on-resistance and lower gate charge performance. This technology is tailored to minimize conduction loss, provide superior switching performance, dv/dt rate and higher avalanche energy. Consequently, SuperFET II MOSFET is very suitable for the switching power applications such as PFC, server/telecom power, FPD TV power, ATX power and industrial power applications. SuperFET II FRFET® MOSFET's optimized body diode reverse recovery performance can remove additional component and improve system reliability.



TO-220F



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

Symbol	Parameter		FCPF260N65FL1	Unit
V_{DSS}	Drain to Source Voltage		650	V
V_{GSS}	Gate to Source Voltage	- DC	±20	V
		- AC (f > 1 Hz)	±30	
I_D	Drain Current	- Continuous (T_C = 25°C)	15	A
		- Continuous (T_C = 100°C)	9.5	
I_{DM}	Drain Current	- Pulsed (Note 1)	45	A
E_{AS}	Single Pulsed Avalanche Energy (Note 2)		293	mJ
I_{AR}	Avalanche Current (Note 1)		3	A
E_{AR}	Repetitive Avalanche Energy (Note 1)		0.36	mJ
dv/dt	MOSFET dv/dt		100	V/ns
	Peak Diode Recovery dv/dt (Note 3)		50	
P_D	Power Dissipation	(T_C = 25°C)	36	W
		- Derate Above 25°C	0.29	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

Thermal Characteristics

Symbol	Parameter	FCPF260N65FL1	Unit
$R_{\theta JC}$	Thermal Resistance, Junction to Case, Max.	3.5	°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
FCPF260N65FL1	FCPF260N65F	TO-220F	Tube	N/A	N/A	50 units

Electrical Characteristics T_C = 25^{o}C unless otherwise noted.

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
BV_{DSS}	Drain to Source Breakdown Voltage	V_{GS} = 0 V, I_D = 10 mA, T_J = 25°C	650	-	-	V
		V_{GS} = 0 V, I_D = 10 mA, T_J = 150°C	700	-	-	V
ΔBV_{DSS} / ΔT_J	Breakdown Voltage Temperature Coefficient	I_D = 10 mA, Referenced to 25^{o}C	-	0.72	-	V/^{o}C
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 650 V, V_{GS} = 0 V	-	-	10	μA
		V_{DS} = 520 V, V_{GS} = 0 V, T_C = 125^{o}C	-	40	-	
I_{GSS}	Gate to Body Leakage Current	V_{GS} = ±20 V, V_{DS} = 0 V	-	-	±100	μA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS} = V_{DS}, I_D = 1.5 mA	3	-	5	V
$R_{DS(on)}$	Static Drain to Source On Resistance	V_{GS} = 10 V, I_D = 7.5 A	-	220	260	mΩ
g_{FS}	Forward Transconductance	V_{DS} = 20 V, I_D = 7.5 A	-	14.2	-	S
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS} = 100 V, V_{GS} = 0 V, f = 1 MHz	-	1760	2340	pF
C_{oss}	Output Capacitance		-	59	80	pF
C_{rss}	Reverse Transfer Capacitance		-	1.0	-	pF
C_{oss}	Output Capacitance	V_{DS} = 380 V, V_{GS} = 0 V, f = 1 MHz	-	34	-	pF
$C_{oss(eff.)}$	Effective Output Capacitance	V_{DS} = 0 V to 400 V, V_{GS} = 0 V	-	223	-	pF
$Q_{g(tot)}$	Total Gate Charge at 10V	V_{DS} = 380 V, I_D = 7.5 A, V_{GS} = 10 V (Note 4)	-	46	60	nC
Q_{gs}	Gate to Source Gate Charge		-	9.6	-	nC
Q_{gd}	Gate to Drain “Miller” Charge		-	20	-	nC
ESR	Equivalent Series Resistance	f = 1 MHz	-	0.52	-	Ω
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	V_{DD} = 380 V, I_D = 7.5 A, V_{GS} = 10 V, R_g = 4.7 Ω (Note 4)	-	21.7	54	ns
t_r	Turn-On Rise Time		-	10.5	32	ns
$t_{d(off)}$	Turn-Off Delay Time		-	54	118	ns
t_f	Turn-Off Fall Time		-	5.8	22	ns
Drain-Source Diode Characteristics						
I_S	Maximum Continuous Drain to Source Diode Forward Current		-	-	15	A
I_{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	45	A
V_{SD}	Drain to Source Diode Forward Voltage	V_{GS} = 0 V, I_{SD} = 7.5 A	-	-	1.2	V
t_{rr}	Reverse Recovery Time	V_{GS} = 0 V, I_{SD} = 7.5 A, dI_F/dt = 100 A/μs	-	98	-	ns
Q_{rr}	Reverse Recovery Charge		-	450	-	nC

Notes:

1. Repetitive rating: pulse width limited by maximum junction temperature.
2. I_{AS} = 3 A, R_G = 25 Ω, Starting T_J = 25°C
3. I_{SD} ≤ 7.5 A, di/dt ≤ 200 A/μs, V_{DD} ≤ 380 V, Starting T_J = 25°C
4. Essentially independent of operating temperature.

Typical Performance Characteristics

Figure 1. On-Region Characteristics

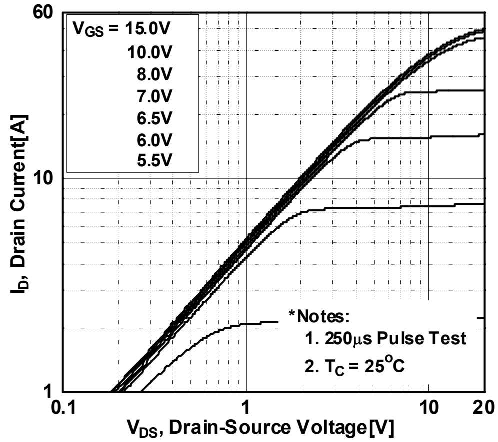


Figure 2. Transfer Characteristics

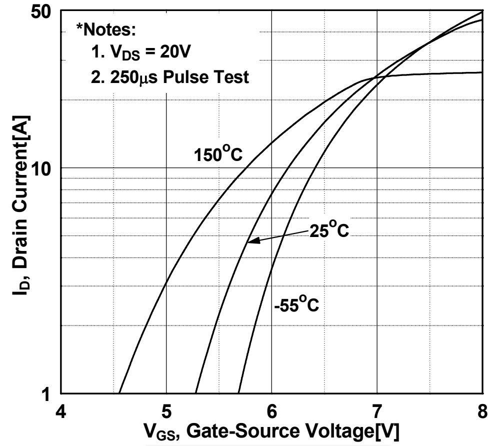


Figure 3. On-Resistance Variation vs. Drain Current and Gate Voltage

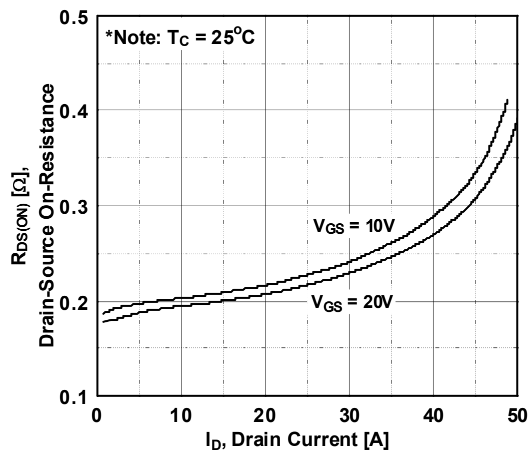


Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature

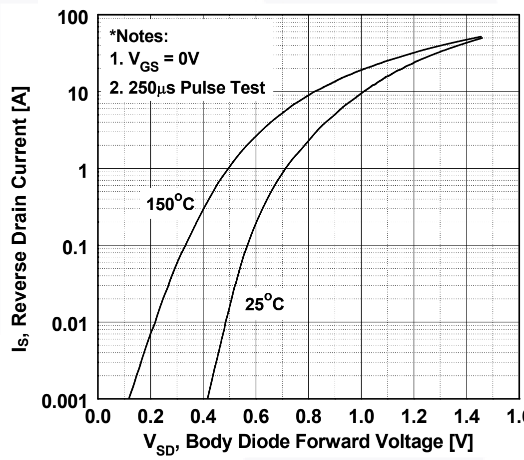


Figure 5. Capacitance Characteristics

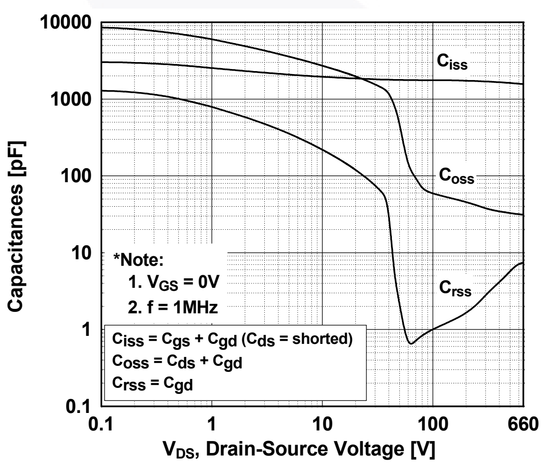
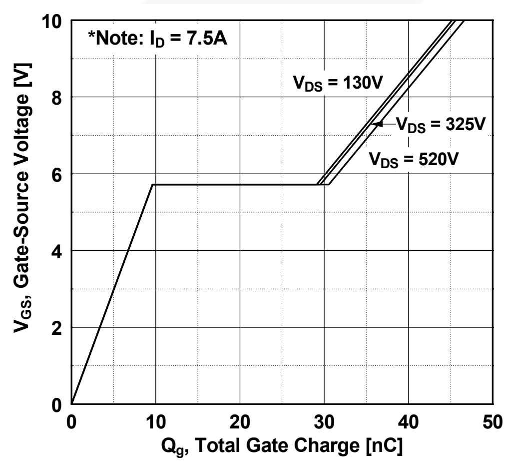


Figure 6. Gate Charge Characteristics



Typical Performance Characteristics (Continued)

Figure 7. Breakdown Voltage Variation vs. Temperature

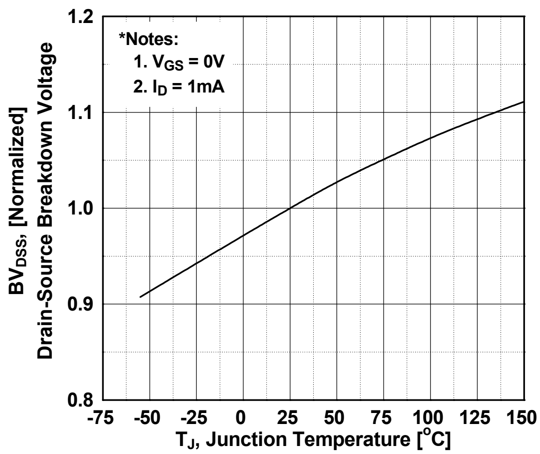


Figure 8. On-Resistance Variation vs. Temperature

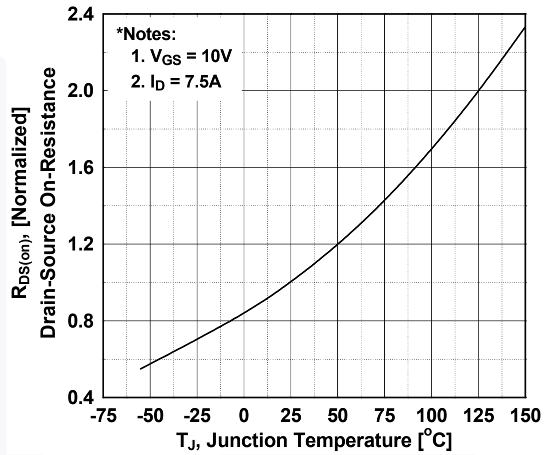


Figure 9. Maximum Safe Operating Area

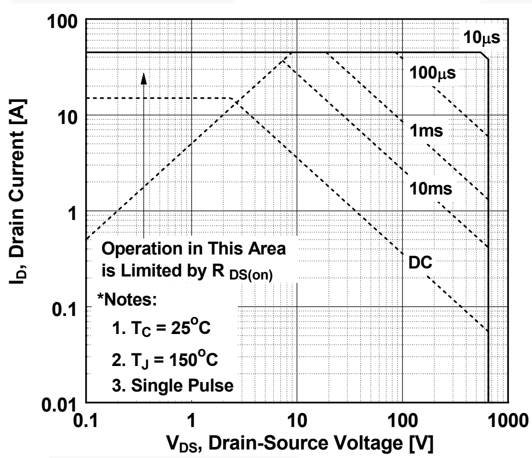


Figure 10. Maximum Drain Current vs. Case Temperature

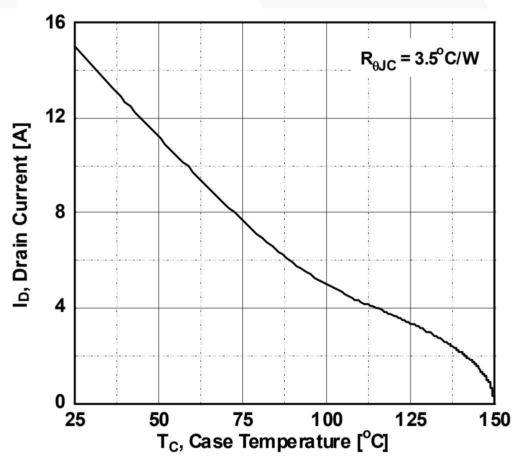
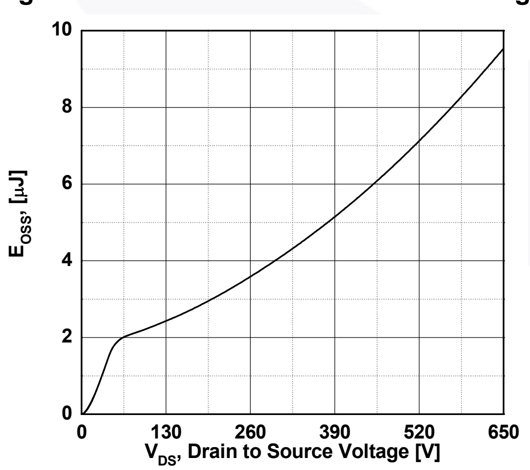
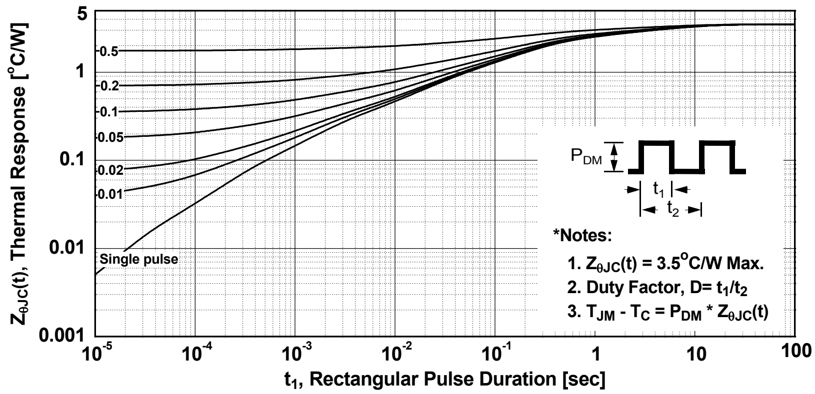


Figure 11. Eoss vs. Drain to Source Voltage



Typical Performance Characteristics (Continued)

Figure 12. Transient Thermal Response Curve



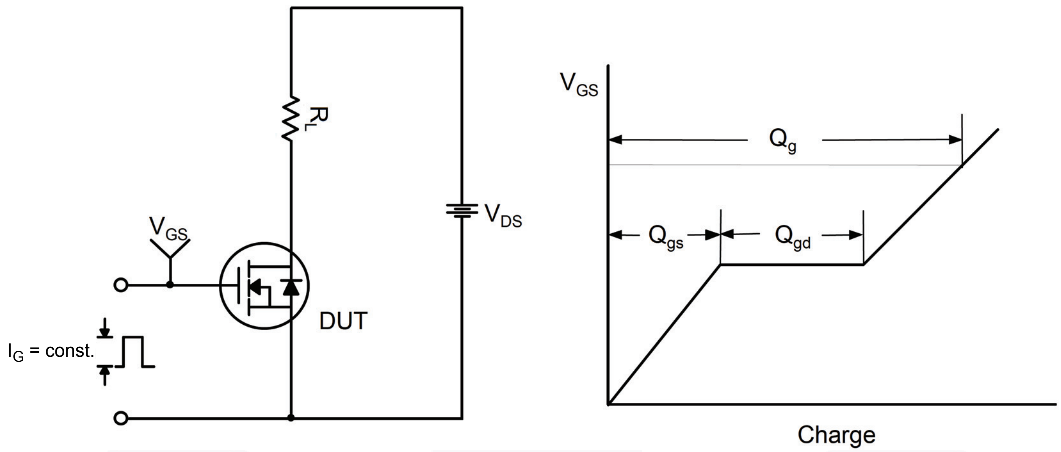


Figure 13. Gate Charge Test Circuit & Waveform

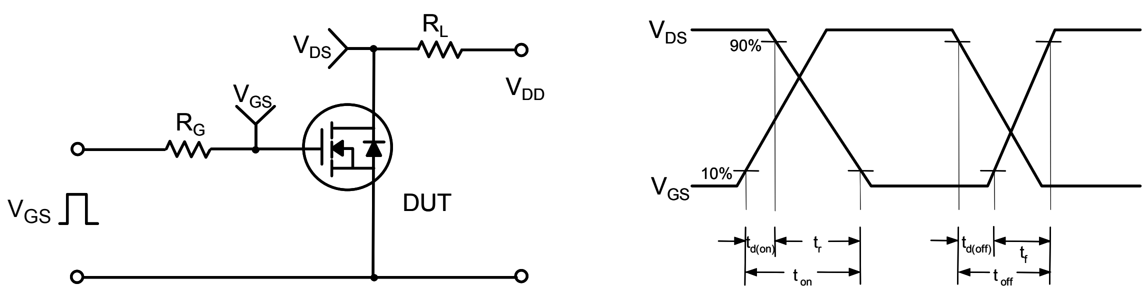


Figure 14. Resistive Switching Test Circuit & Waveforms

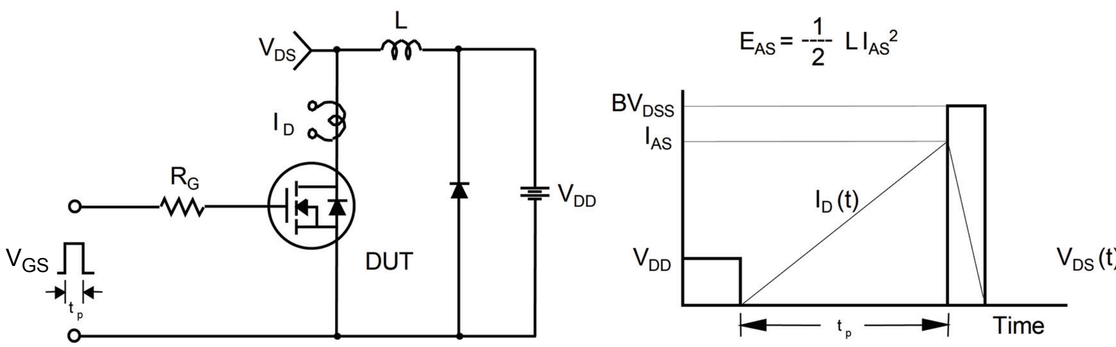


Figure 15. Unclamped Inductive Switching Test Circuit & Waveforms

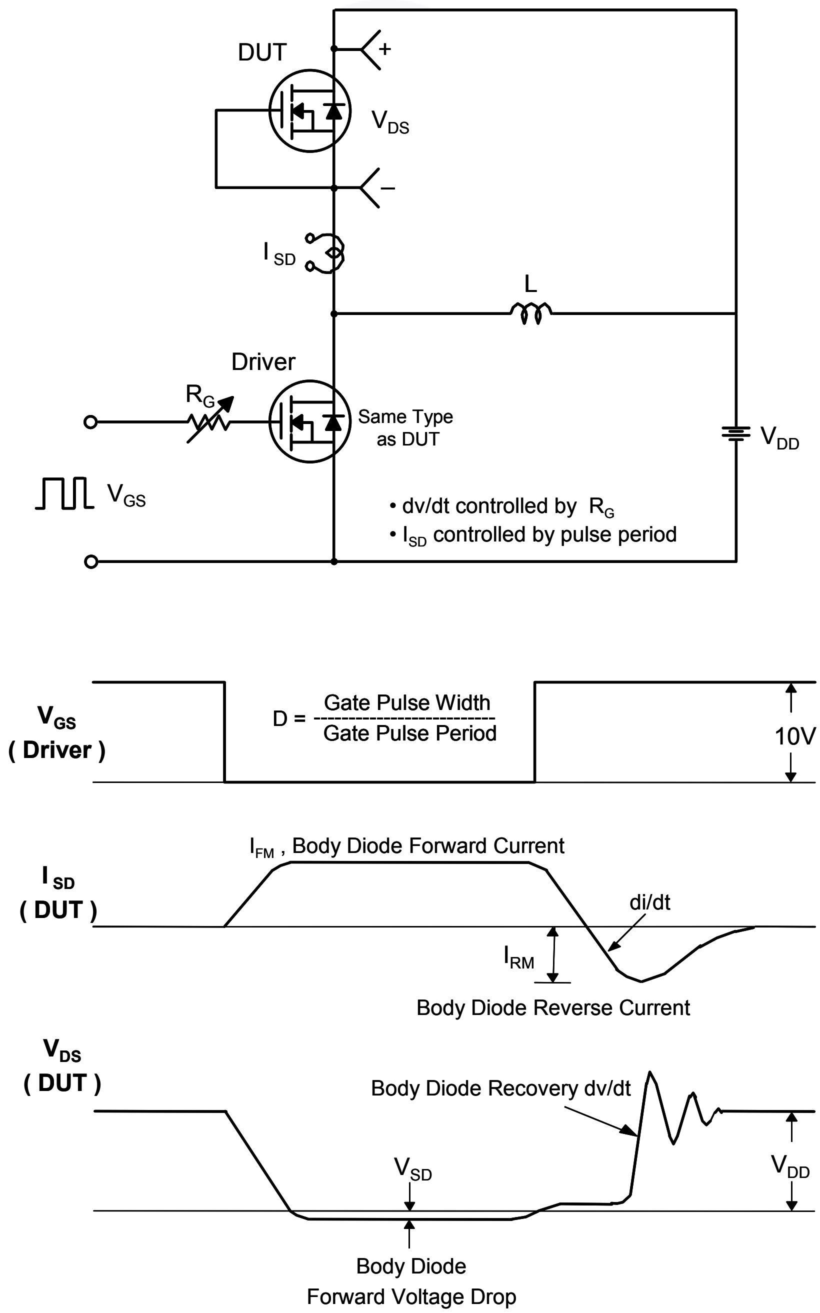


Figure 16. Peak Diode Recovery dv/dt Test Circuit & Waveforms

Mechanical Dimensions

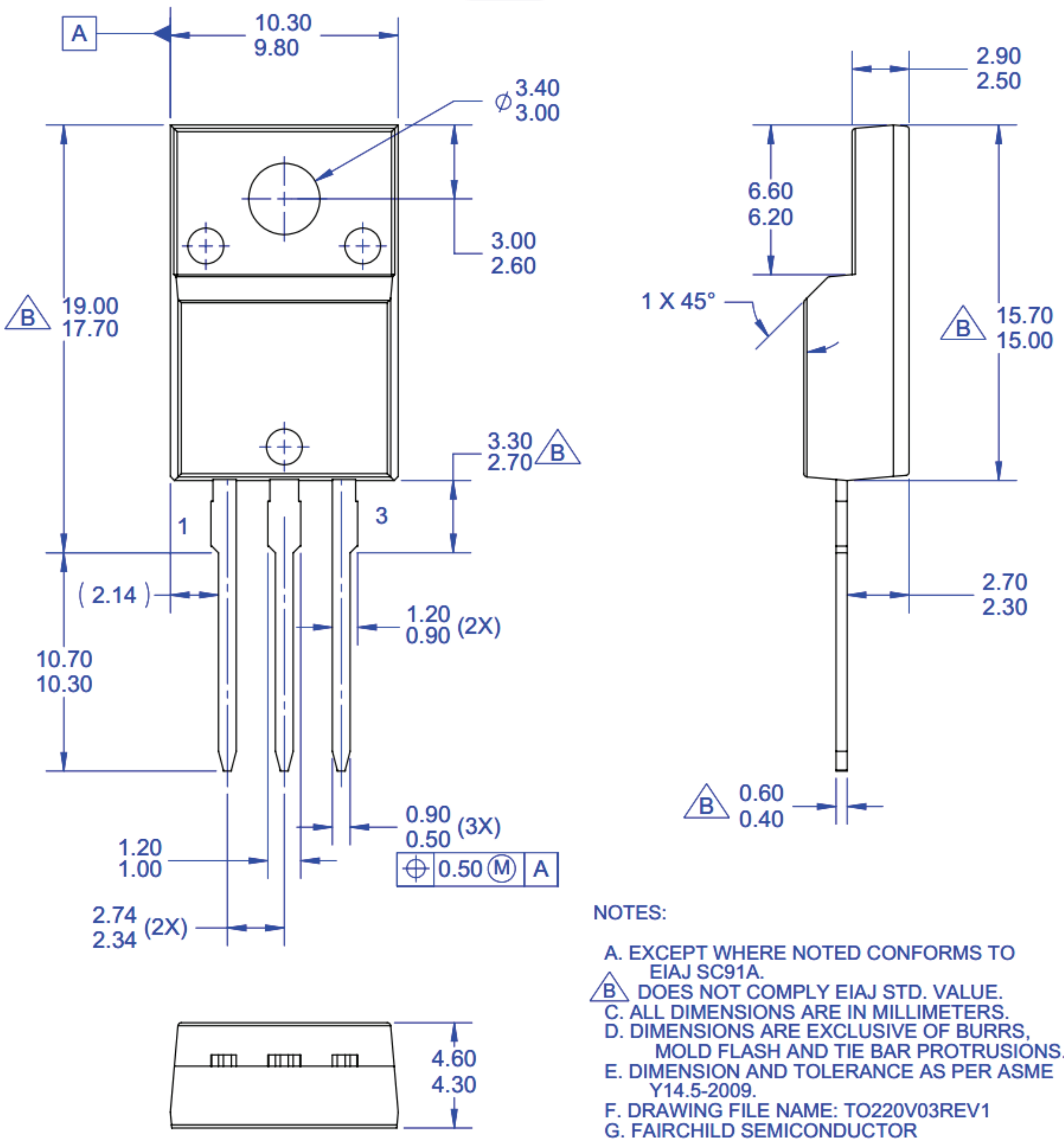


Figure 17. TO220, Molded, 3LD, Full Pack, EIAJ SC91, Takcheong

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Datasheet Identification	Product Status	Definition
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Preliminary	First Production	Datasheet contains preliminary data; supplementary data will be published at a later date. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve design.
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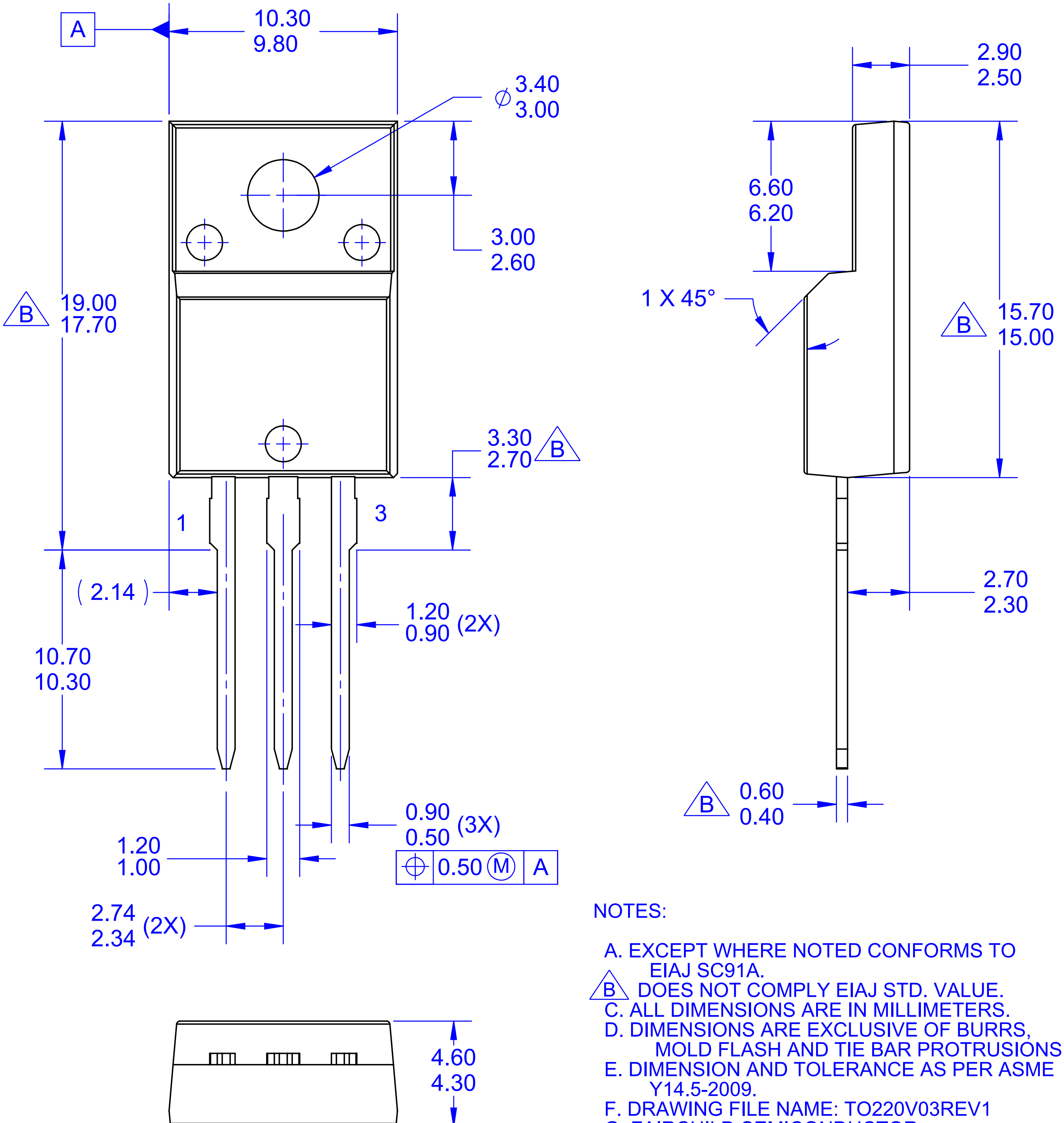
Obsolete	Not In Production	Datasheet contains specifications on a product that is discontinued by Fairchild Semiconductor. The datasheet is for reference information only.

Rev. I73



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 Y14.5-2009.

F. DRAWING FILE NAME: TO220V03REV1

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«FORSTAR» (основан в 1998 г.)

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