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December 2014

FCP150N65F

N-Channel SuperFET® II FRFET® MOSFET

650 V, 24 A, 150 mΩ

Features

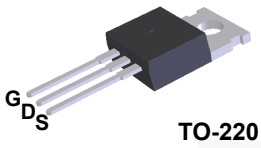
- 700 V @ T_J = 150°C
- Typ. $R_{DS(on)}$ = 133 mΩ
- Ultra Low Gate Charge (Typ. Q_g = 72 nC)
- Low Effective Output Capacitance (Typ. $C_{oss(eff.)}$ = 361 pF)
- 100% Avalanche Tested
- RoHS Compliant

Applications

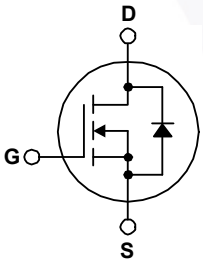
- LCD / LED / PDP TV
- Telecom / Server Power Supplies
- Solar Inverter
- AC - DC Power Supply

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-220



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

Symbol	Parameter		FCP150N65F	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)	24	A
		- Continuous (T_C = 100°C)	14.9	
I_{DM}	Drain Current	- Pulsed (Note 1)	72	A
E_{AS}	Single Pulsed Avalanche Energy	(Note 2)	663	mJ
I_{AR}	Avalanche Current	(Note 1)	4.7	A
E_{AR}	Repetitive Avalanche Energy	(Note 1)	2.98	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)	298	W
		- Derate Above 25°C	2.38	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

Thermal Characteristics

Symbol	Parameter	FCP150N65F	Unit
$R_{\theta JC}$	Thermal Resistance, Junction to Case, Max.	0.42	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient, Max.	62.5	

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Package Marking and Ordering Information

Part Number	Top Mark	Package	Packing Method	Reel Size	Tape Width	Quantity
FCP150N65F	FCP150N65F	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 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	-	-	
ΔBV_{DSS} / ΔT_J	Breakdown Voltage Temperature Coefficient	I_D = 10 mA, Referenced to 25°C	-	0.72	-	V/°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°C	-	86	-	
I_{GSS}	Gate to Body Leakage Current	V_{GS} = ±20 V, V_{DS} = 0 V	-	-	±100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS} = V_{DS}, I_D = 2.4 mA	3	-	5	V
$R_{DS(on)}$	Static Drain to Source On Resistance	V_{GS} = 10 V, I_D = 12 A	-	133	150	mΩ
g_{FS}	Forward Transconductance	V_{DS} = 20 V, I_D = 12 A	-	22	-	S
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS} = 100 V, V_{GS} = 0 V, f = 1 MHz	-	2810	3737	pF
C_{oss}	Output Capacitance		-	91	121	pF
C_{rss}	Reverse Transfer Capacitance		-	0.77	-	pF
C_{oss}	Output Capacitance	V_{DS} = 380 V, V_{GS} = 0 V, f = 1 MHz	-	54	-	pF
C_{oss} eff.	Effective Output Capacitance	V_{DS} = 0 V to 400 V, V_{GS} = 0 V	-	361	-	pF
$Q_{g(tot)}$	Total Gate Charge at 10V	V_{DS} = 380 V, I_D = 12 A, V_{GS} = 10 V (Note 4)	-	72	94	nC
Q_{gs}	Gate to Source Gate Charge		-	15	-	nC
Q_{gd}	Gate to Drain “Miller” Charge		-	31	-	nC
ESR	Equivalent Series Resistance	f = 1 MHz	-	0.69	-	Ω
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	V_{DD} = 380 V, I_D = 12 A, V_{GS} = 10 V, R_g = 4.7 Ω (Note 4)	-	28	66	ns
t_r	Turn-On Rise Time		-	15	40	ns
$t_{d(off)}$	Turn-Off Delay Time		-	73	156	ns
t_f	Turn-Off Fall Time		-	6	22	ns
Drain-Source Diode Characteristics						
I_S	Maximum Continuous Drain to Source Diode Forward Current		-	-	24	A
I_{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	72	A
V_{SD}	Drain to Source Diode Forward Voltage	V_{GS} = 0 V, I_{SD} = 12 A	-	-	1.2	V
t_{rr}	Reverse Recovery Time	V_{GS} = 0 V, I_{SD} = 12 A, dI_F/dt = 100 A/μs	-	123	-	ns
Q_{rr}	Reverse Recovery Charge		-	597	-	nC

Notes:

1. Repetitive rating: pulse width limited by maximum junction temperature.
2. I_{AS} = 4.7 A, R_G = 25 Ω, Starting T_J = 25°C.
3. I_{SD} ≤ 12 A, di/dt ≤ 200 A/μs, V_{DD} ≤ 380 V, Starting T_J = 25°C.
4. Essentially independent of operating temperature.

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Typical Performance Characteristics

Figure 1. On-Region Characteristics

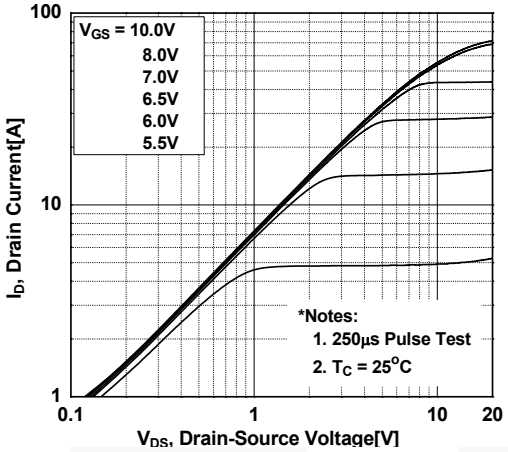


Figure 2. Transfer Characteristics

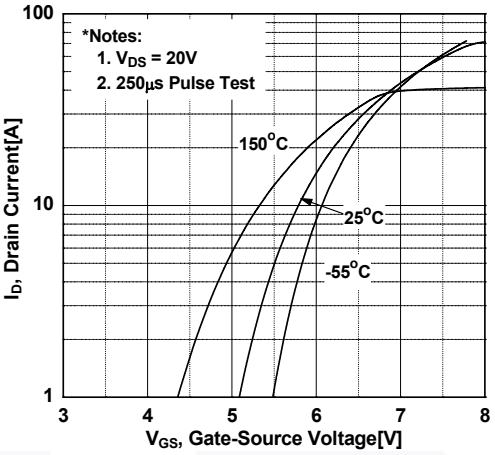


Figure 3. On-Resistance Variation vs. Drain Current and Gate Voltage

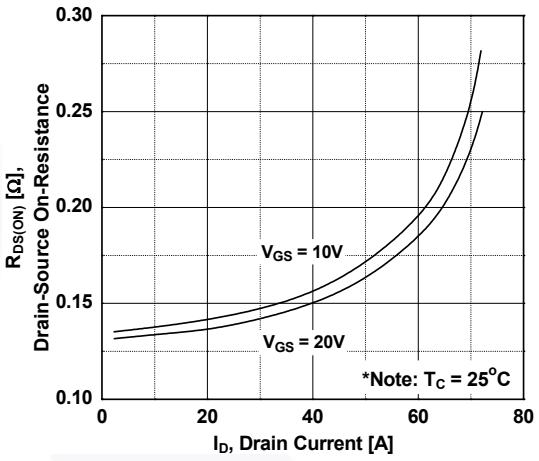


Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature

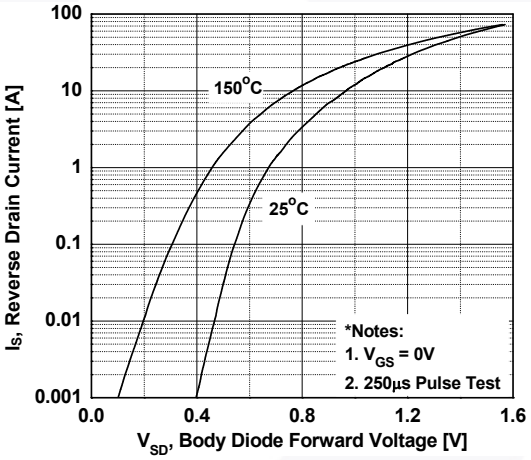


Figure 5. Capacitance Characteristics

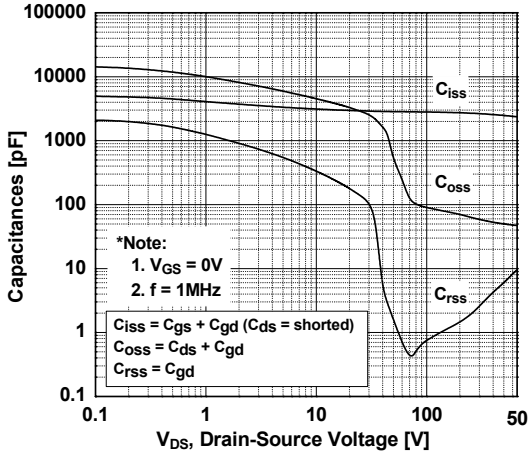
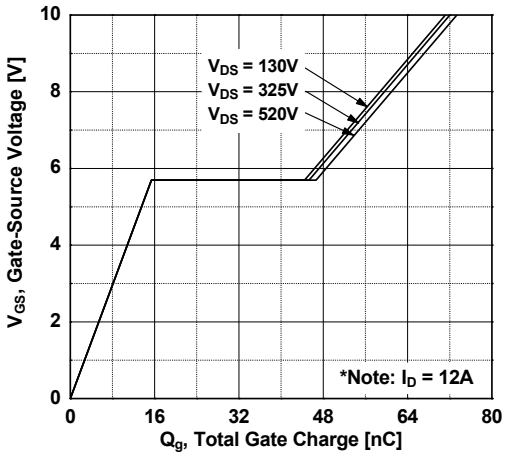


Figure 6. Gate Charge Characteristics



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Typical Performance Characteristics (Continued)

Figure 7. Breakdown Voltage Variation vs. Temperature

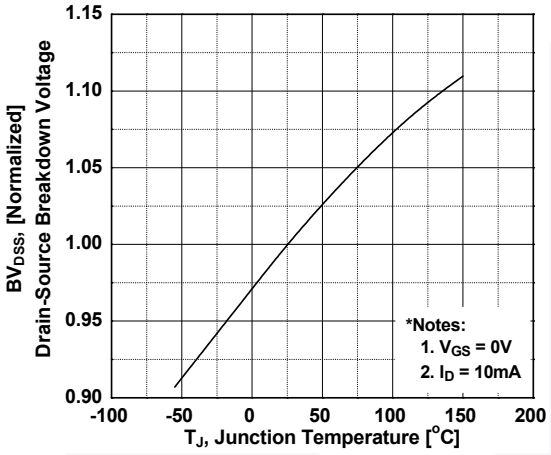


Figure 8. On-Resistance Variation vs. Temperature

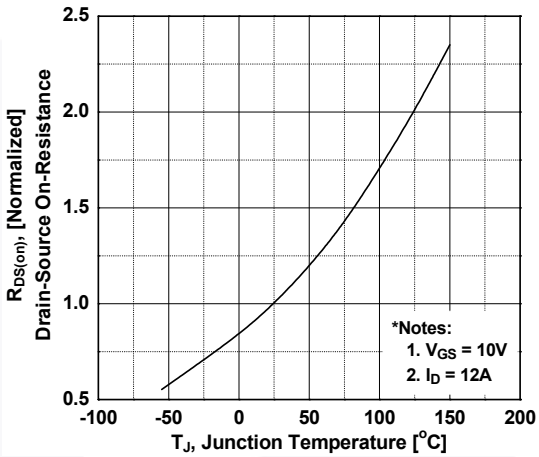


Figure 9. Maximum Safe Operating Area

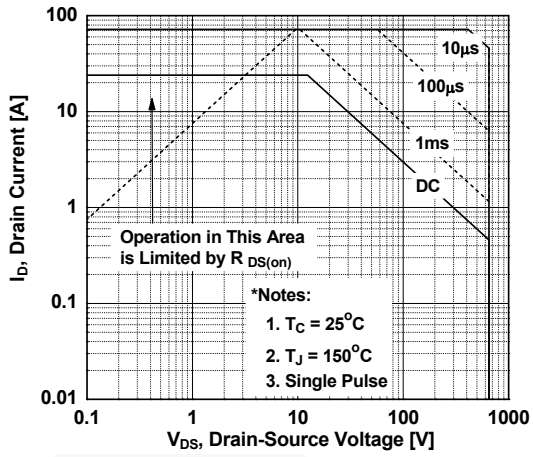


Figure 10. Maximum Drain Current vs. Case Temperature

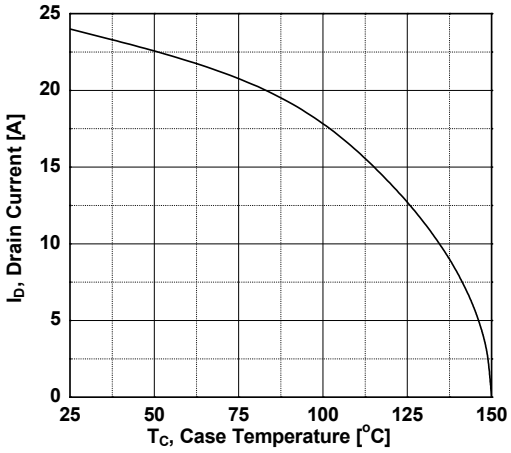
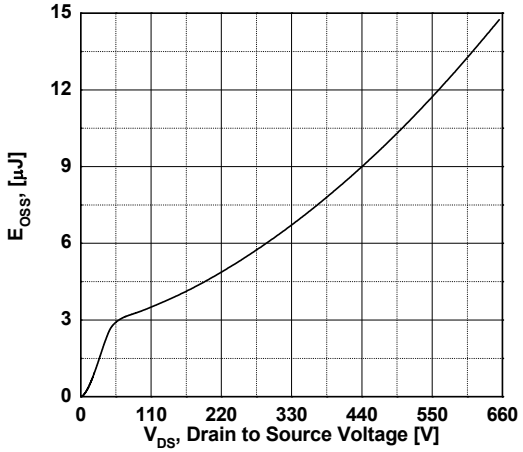
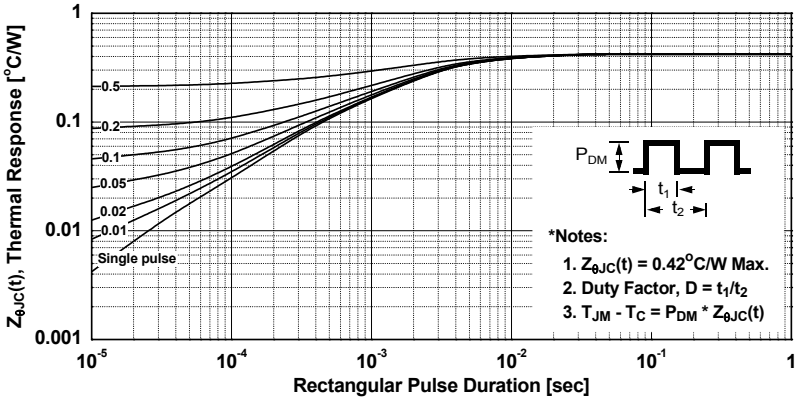


Figure 11. Eoss vs. Drain to Source Voltage



Typical Performance Characteristics (Continued)

Figure 12. Transient Thermal Response Curve



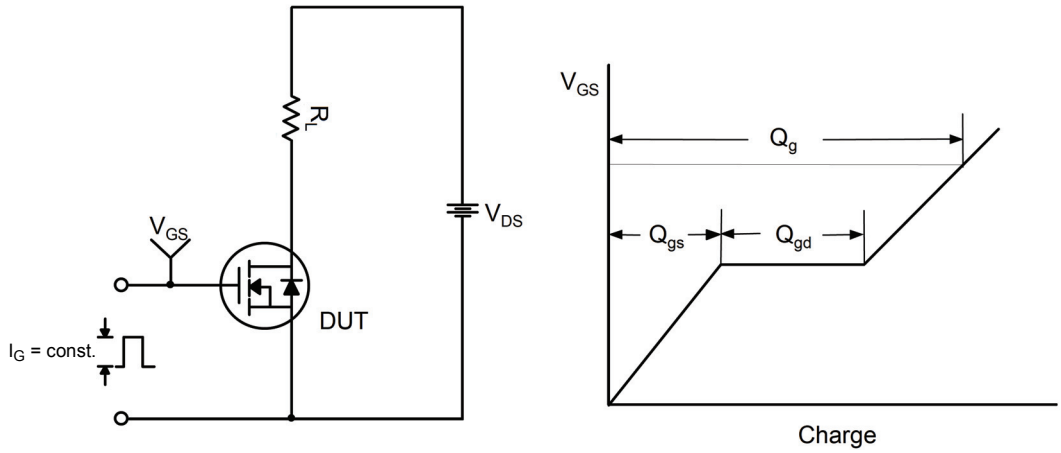


Figure 13. Gate Charge Test Circuit & Waveform

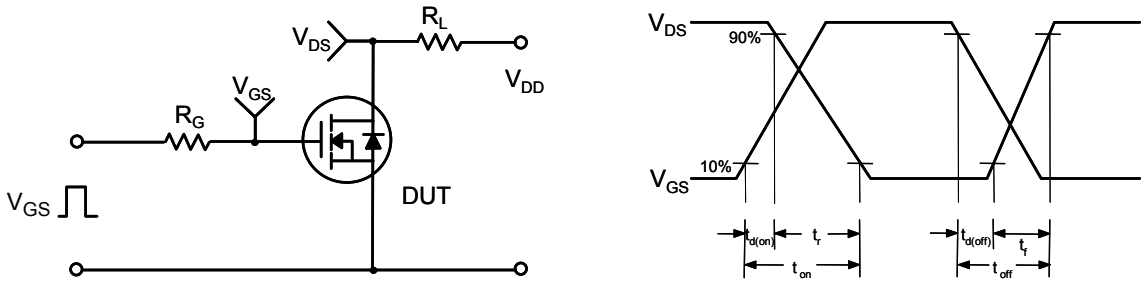


Figure 14. Resistive Switching Test Circuit & Waveforms

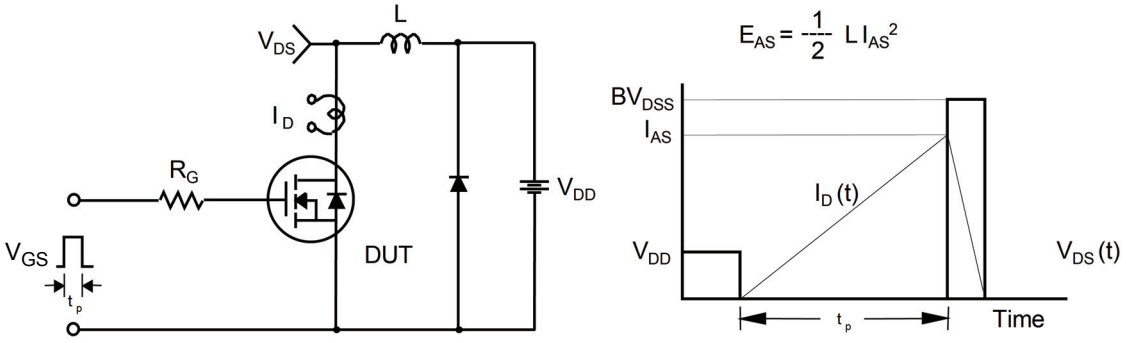


Figure 15. Unclamped Inductive Switching Test Circuit & Waveforms

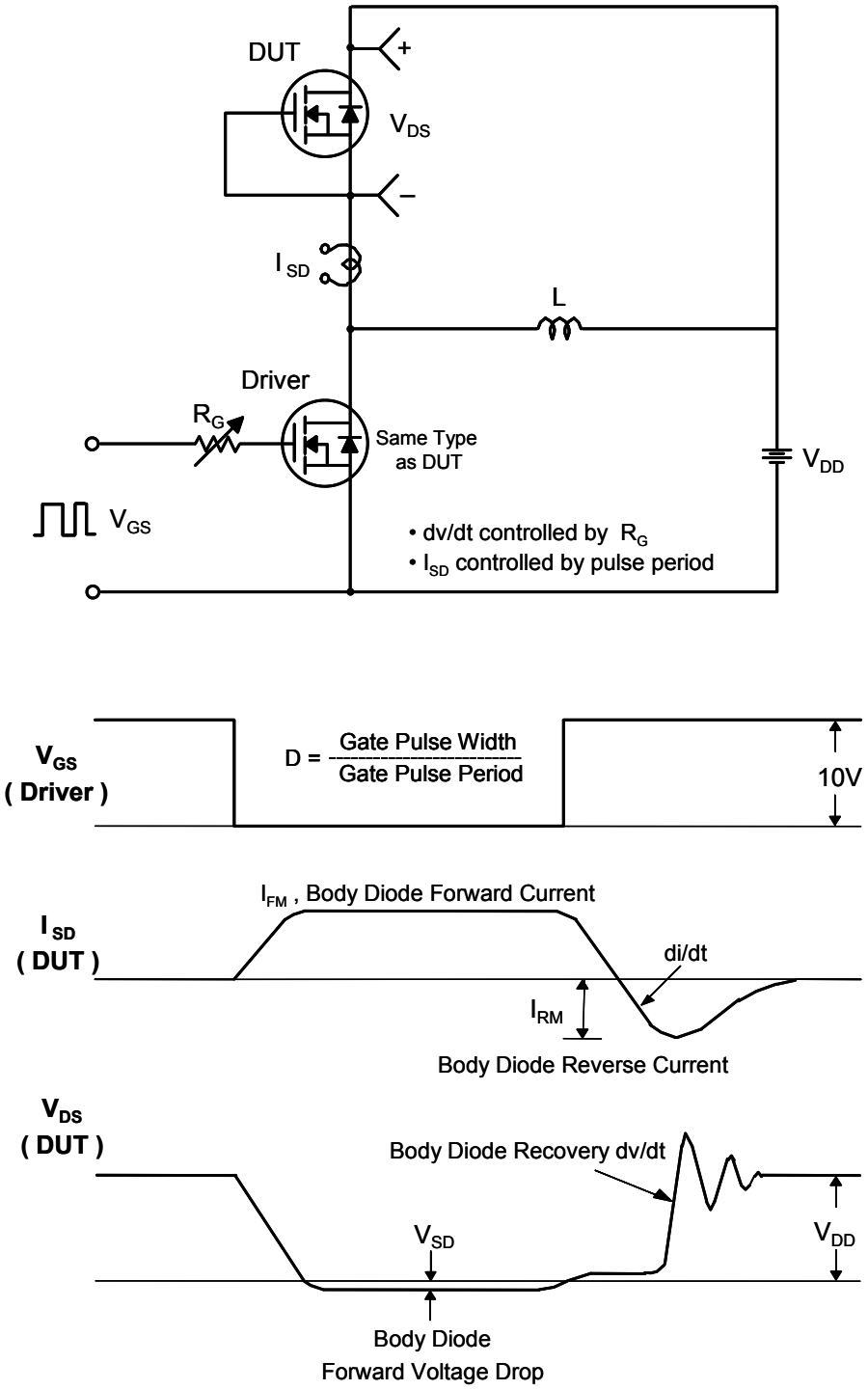


Figure 16. Peak Diode Recovery dv/dt Test Circuit & Waveforms

Mechanical Dimensions

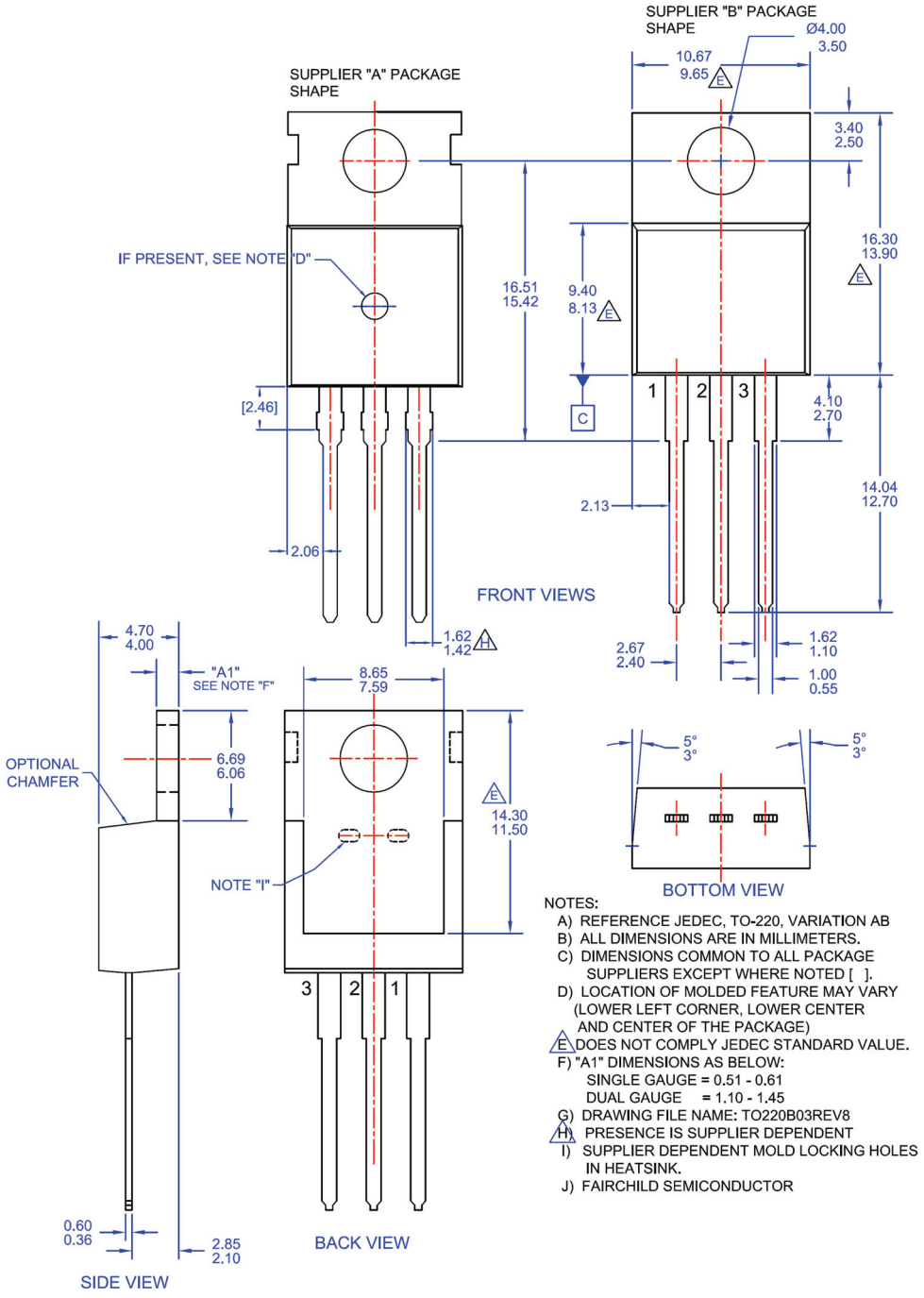


Figure 17. TO-220, Molded, 3-Lead, Jedec Variation AB

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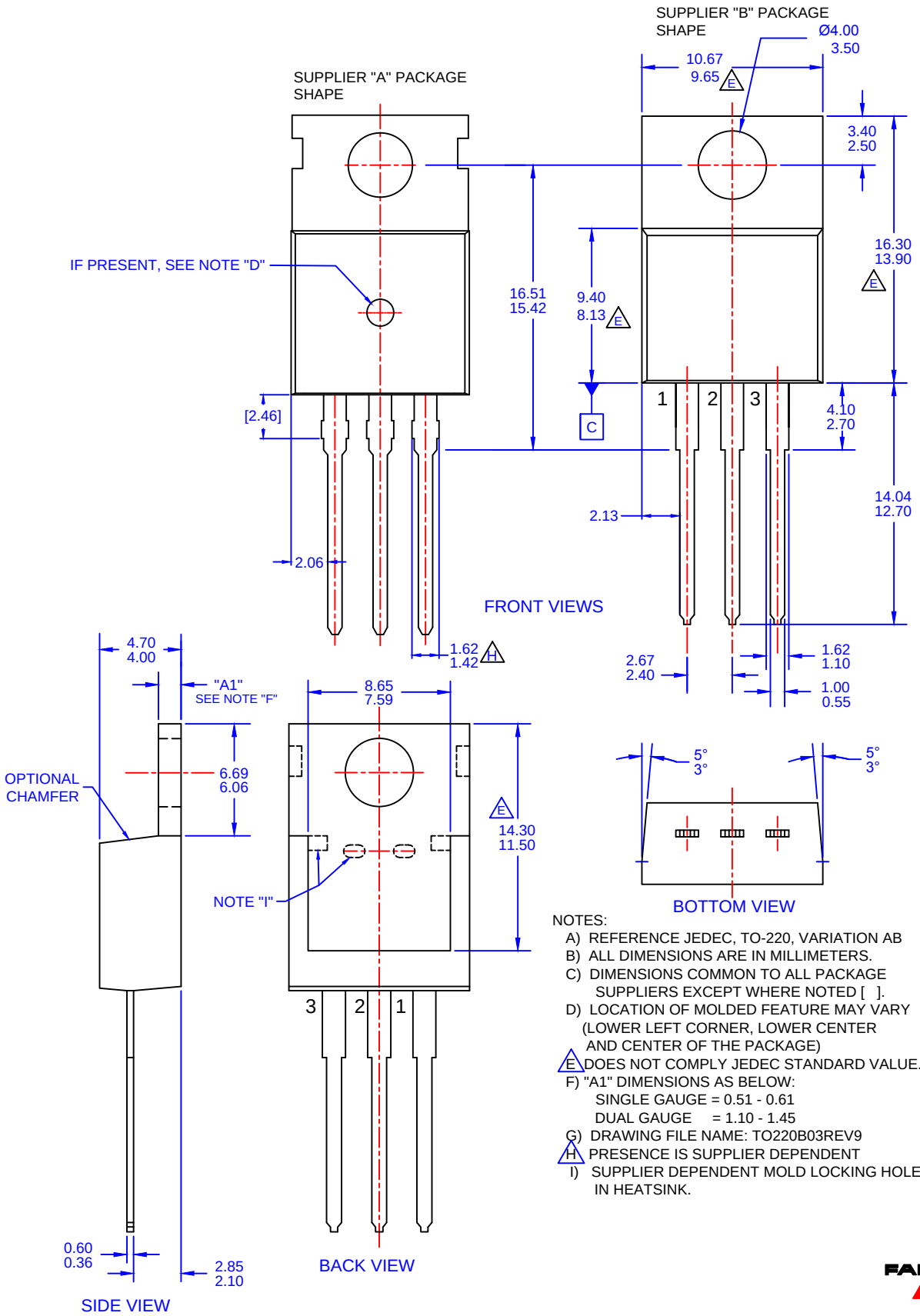
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No Identification Needed	Full Production	Datasheet contains final specifications. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve the design.
Obsolete	Not In Production	Datasheet contains specifications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

Rev. I73



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Elektronik komponent tedarikinde Entegreci

Entegreci, Eskişehir merkezli, Türkiye geneline satış yapan bir elektronik komponent mağazasıdır. Entegreler (IC), mikrodenetleyiciler, transistörler, diyotlar, pasif elemanlar, konnektörler, modüller ve geliştirme kartları tek adetten seri üretim adetlerine kadar satılır. Ürün sayfalarında güncel stok durumunu, fiyatı ve datasheet bağlantısını bulabilirsiniz.

Parça koduyla arama

Üretici parça numarasını yazın; stok ve fiyatı hemen görün.

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Ürün kategorileri

Entegreden kapasitöre tüm elektronik komponent kategorileri.

Kategorilere göz atın

Üreticiler

Aradığınız üreticinin ürünlerini tek sayfada inceleyin.

Üreticileri görün

Toplu alım ve teklif

Listede olmayan ya da yüksek adetli parçalar için teklif isteyin.

Teklif isteyin

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Entegreci is an online electronic components store based in Türkiye. Search by manufacturer part number to see stock, prices and datasheets for integrated circuits, microcontrollers, transistors, passive components and connectors, or request a quote for parts that are not listed.

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