

November 2013

FDP030N06B_F102 N-Channel PowerTrench[®] MOSFET 60 V, 195 A, 3.1 mΩ

Features

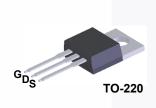
- $R_{DS(on)}$ = 2.67 m Ω (Typ.) @ V_{GS} = 10 V, I_D = 100 A
- Low FOM R_{DS(on)} * Q_G
- Low Reverse-Recovery Charge, Q_{rr} = 78 nC
- Soft Reverse-Recovery Body Diode
- Enables High Efficiency in Synchronous Rectification
- Fast Switching Speed
- 100% UIL Tested
- RoHS Compliant

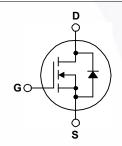
Description

This N-Channel MOSFET is produced using Fairchild Semiconductor's advanced PowerTrench[®] process that has been tailored to minimize the on-state resistance while maintaining superior switching performance.

Applications

- Synchronous Rectification for ATX / Server / Telecom PSU
- Battery Protection Circuit
- Motor Drives and Uninterruptible Power Supplies
- Renewable System





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

Symbol		Parameter	FDP030N06B_F102	Unit	
V _{DSS}	Drain to Source Voltage		60	V	
V _{GSS}	Gate to Source Voltage		±20	V	
		- Continuous (T _C = 25°C, Silicon Limited)	195*		
I _D C	Drain Current	- Continuous (T _C = 100 ^o C, Silicon Limited)	138*	Α	
		- Continuous (T _C = 25°C, Package Limited)	120	ĺ	
I _{DM}	Drain Current	- Pulsed (Note 1)	780	Α	
E _{AS}	Single Pulsed Avalanche Energy (Note 2)		600	mJ	
dv/dt	Peak Diode Recovery dv/dt (Note 3)		6.0	V/ns	
P _D	Power Discipation	$(T_{\rm C} = 25^{\rm o}{\rm C})$	205	W	
	Power Dissipation	- Derate Above 25°C	1.37	W/ºC	
T _J , T _{STG}	Operating and Storage Temperature Range		-55 to +175	°C	
TL	Maximum Lead Temperature for S	Soldering, 1/8" from Case for 5 Seconds	300	°C	

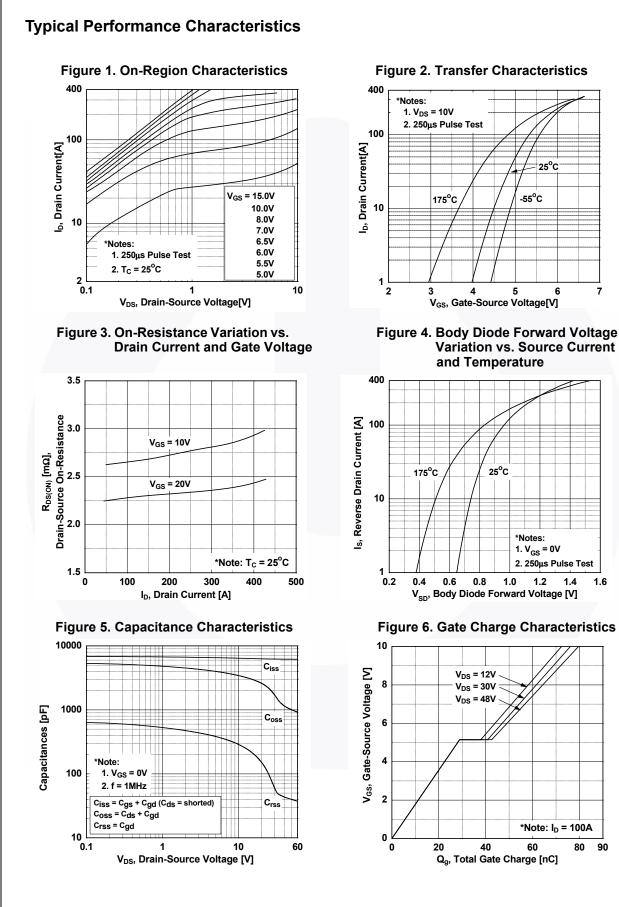
* Package limitation current is 120A.

Thermal Characteristics

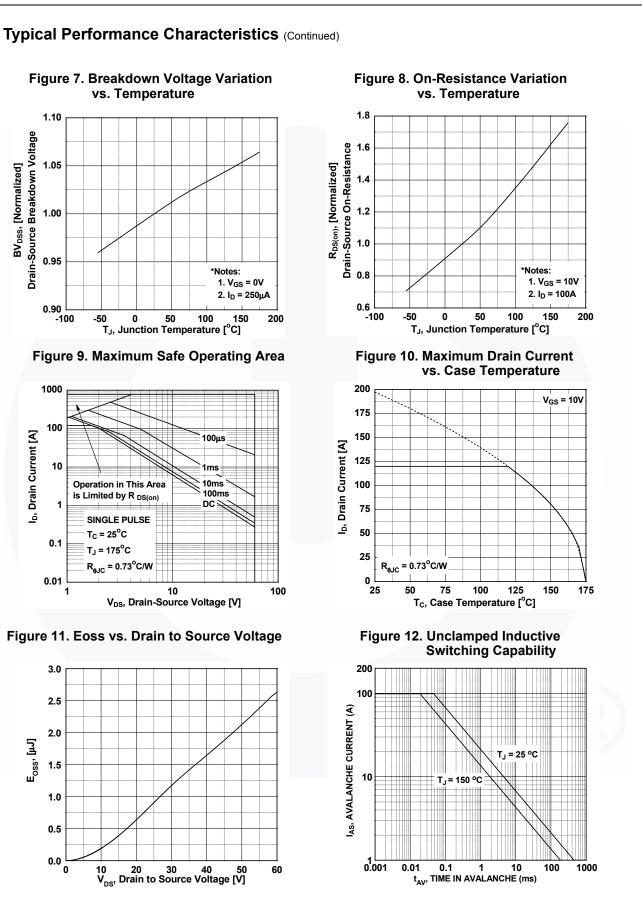
Symbol	Parameter	FDP030N06B_F102	Unit
$R_{\theta JC}$	Thermal Resistance, Junction to Case, Max.	0.73	°C/W
R_{\thetaJA}	Thermal Resistance, Junction to Ambient, Max.		

	Top Mark	Package	e Packing Meth	nod Reel Size	Ta	pe Width	Qu	antity
_F102	FDP030N06B	TO-220) Tube	N/A		N/A	50	units
Chara	stariation -							
Charac		25°C unless						1
	Parameter		Test Co	nditions	Min.	Тур.	Max.	Unit
eristics								
Drain to So	ource Breakdown Vo	Itage	I _D = 250 μA, V _{GS} :	= 0 V	60	-	-	V
	U 1	re	I _D = 250 μA, Refe	renced to 25°C	-	0.03	-	V/ºC
Zero Gate Voltage Drain Current		nt	V _{DS} = 48 V, V _{GS} = 0 V		-	-	1	μA
Gate to Body Leakage Current			$V_{GS} = \pm 20 V, V_{DS} = 0 V$		-	-	±100	nA
eristics								
Gate Thre	shold Voltage		$V_{GS} = V_{DS}, I_{D} = 2$	50 μΑ	2	-	4	V
	ů.	stance			-	2.67	3.1	mΩ
Forward T	ransconductance				-	206	-	S
aracteri	stics							4
						6035	8030	pF
			V _{DS} = 30 V, V _{GS} = 0 V, f = 1 MHz		-			pF
•					-		-	p. pF
			V _{DS} = 30 V. V _{CS} =	= 0 V	-	2619	-	pF
0,	te Charge at 10V		$V_{DS} = 30 \text{ V}, \text{ I}_{D} = 100 \text{ A},$	-	76	99	nC	
				-	29	-	nC	
	ů.		V _{GS} = 10 V	-	12	-	nC	
	ů.				-	5.2	-	V
	t Charge		$V_{DS} = 30V, V_{CS} =$	· · · ·	-	92.4	-	nC
			f = 1 MHz		-	2.0	-	Ω
haracte	ristics			I				
						32	74	ns
	urn-On Rise Time		V_{DD} = 30 V, I _D = 100 A, V _{GS} = 10 V, R _G = 4.7 Ω					ns
							-	ns
	,		_	(Note 4)	-	23	56	ns
				(
			le Forward Current		-	-	195*	A
Maximum I	Pulsed Drain to Sour	ce Diode Fo	prward Current		-	-	780	Α
Drain to Sc	ource Diode Forward	Voltage	V _{GS} = 0V, I _{SD} = 100 A		-	-	1.25	V
Reverse R	ecovery Time				-	71	-	ns
Reverse R	· · · · · · · · · · · · · · · · · · ·		$dI_F/dt = 100A/\mu s$		-	78	-	nC
	eristics Drain to Si Breakdown Coefficient Zero Gate Gate to Bco eristics Gate Thre Static Drai Forward T aracteri Input Capa Output Ca Reverse T Energy Re Total Gate Gate to Dr Gate to Dr Gate to Dr Gate to Dr Gate To Plate Output Ch Equivalent haracter Turn-On D Turn-On R Turn-Off D Turn-Off Fa e Diode Maximum I Drain to Sc Reverse R	Parameter Pristics Drain to Source Breakdown Vol Breakdown Voltage Temperatur Coefficient Zero Gate Voltage Drain Currer Gate to Body Leakage Current Pristics Gate Threshold Voltage Static Drain to Source On Resis Forward Transconductance aracteristics Input Capacitance Output Capacitance Reverse Transfer Capacitance Energy Related Output Capacit Total Gate Charge at 10V Gate to Source Gate Charge Gate Plateau Volatge Output Charge Equivalent Series Resistance (0 haracteristics Turn-On Delay Time Turn-Off Delay Time Turn-Off Fall Time B Diode Characteristics Maximum Continuous Drain to S	Parameter Pristics Drain to Source Breakdown Voltage Breakdown 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I_D = 17 \ V_{DS} = 10 \ V, I_D = 17 \ V_{DS} = 10 \ V, I_D = 17 \ V_{DS} = 10 \ V, I_D = 17 \ V_{DS} = 30 \ V, V_{GS} = 57 \ V_{DS} = 10 \ V, I_D = 17 \ V_{DS} = 30 \ V, V_{GS} = 10 \ V_{DS} = 30 \ V, V_{GS} = 10 \ V_{DS} = 30 \ V, V_{GS} = 10 \ V_{DS} = 30 \ V, V_{GS} = 10 \ V_{DS} = 10 \ V_{DS} = 30 \ V, V_{GS} = 10 \ V_{DS} = 10 \ V_{DS} = 30 \ V, V_{GS} = 10 \ V_{DS} = 10 \ V_{DS} = 30 \ V, V_{GS} = 10 \ V_{DS} = 10 \ V_{DS} = 30 \ V, V_{GS} = 10 \ V_{DS} = 10 \ V_{DS} = 30 \ V, V_{GS} = 10 \ V_{DS} = 10 \ V, R_{GS} = 10 \ V_{DS} = 10 \ V, R_{GS} = 10 \ V_{DS} = 10 \ V_{DS} = 10 \ V, R_{S} = 10 \ V_{DS} = 10 \ V, R_{S} = 10 \ V_{CS} = 10 \ V, R_{S} = 10 \ V_{CS} = 10 \ V, R_{S} = 10 \ V, R_{S} = 10 \ V, R_{S} = 10 \ V_{SS} = 10 \ V, R_{S} = 0 \ V, I_{SD} = 10 \ V_{S} = 10 \ V, R_{S} = 10 \ V_{S} = 10 \ $	ParameterTest ConditionsperisticsDrain to Source Breakdown Voltage $I_D = 250 \ \mu$ A, $V_{GS} = 0 \ V$ Breakdown Voltage Temperature Coefficient $I_D = 250 \ \mu$ A, Referenced to 25° CZero Gate Voltage Drain Current $V_{DS} = 48 \ V, V_{GS} = 0 \ V$ Gate to Body Leakage Current $V_{GS} = \pm 20 \ V, V_{DS} = 0 \ V$ Static Drain to Source On Resistance $V_{GS} = 10 \ V, I_D = 100 \ A$ Forward Transconductance $V_{DS} = 10 \ V, I_D = 100 \ A$ ProtecteristicsInput CapacitanceInput Capacitance $V_{DS} = 30 \ V, V_{GS} = 0 \ V, f = 1 \ MHz$ Reverse Transfer Capacitance $V_{DS} = 30 \ V, V_{GS} = 0 \ V$ Gate to Drain "Miller" Charge $V_{DS} = 30 \ V, V_{GS} = 0 \ V$ Gate Drain "Miller" Charge $V_{DS} = 30 \ V, V_{GS} = 0 \ V$ Gate Plateau Volatge $V_{DS} = 30 \ V, V_{GS} = 0 \ V$ Gate to Drain "Miller" Charge $V_{DS} = 30 \ V, V_{GS} = 0 \ V$ Gate to Drain "Miller" Charge $V_{DS} = 30 \ V, V_{GS} = 0 \ V$ Gate to Drain "Miller" Charge $V_{DS} = 30 \ V, V_{GS} = 0 \ V$ Gate to Drain "Miller" Charge $V_{DS} = 30 \ V, V_{GS} = 0 \ V$ Equivalent Series Resistance (G-S)f = 1 \ MHzharacteristicsTurn-On Delay Time $V_{DS} = 30 \ V, R_G = 4.7 \ \Omega$ Turn-Off Delay Time $V_{OS} = 10 \ V, R_G = 4.7 \ \Omega$ Turn-Off Fall Time $V_{OS} = 0 \ V, R_G = 100 \ A, \ V_{GS} = 10 \ V, R_G = 100 \ A, \ V_{GS} = 10 \ V, R_G = 100 \ A, \ V_{GS} = 10 \ V, R_G = 4.7 \ \Omega$ Poide CharacteristicsMaximum Continuous Drain to Source Diode Forward Current <tr< td=""><td>ParameterTest ConditionsMin.eristicsDrain to Source Breakdown Voltage$I_D = 250 \ \mu$A, $V_{GS} = 0 \ V$60Breakdown Voltage Temperature$I_D = 250 \ \mu$A, Referenced to $25^{\circ}C$-Coefficient$V_{DS} = 48 \ V, V_{GS} = 0 \ V$-Gate to Body Leakage Current$V_{DS} = 48 \ V, V_{DS} = 0 \ V$-Gate to Body Leakage Current$V_{GS} = 10 \ V, I_D = 100 \ A$-eristicsStatic Drain to Source On Resistance$V_{GS} = 10 \ V, I_D = 100 \ A$-Gate Threshold Voltage$V_{GS} = 10 \ V, I_D = 100 \ A$-Forward Transconductance$V_{DS} = 30 \ V, V_{GS} = 0 \ V, f = 1 \ MHz$-Input Capacitance$V_{DS} = 30 \ V, V_{GS} = 0 \ V, f = 1 \ MHz$-Reverse Transfer Capacitance$V_{DS} = 30 \ V, V_{GS} = 0 \ V, f = 1 \ MHz$-Gate to Source Gate Charge$V_{DS} = 30 \ V, V_{GS} = 0 \ V, f = 100 \ A, f = 1 \ MHz$-Gate to Drain "Miller" Charge$V_{CS} = 10 \ V, I_D = 100 \ A, f = 1 \ MHz$-Gate Drain Miller" Charge$V_{DS} = 30 \ V, V_{GS} = 0 \ V, f = 100 \ A, f = 1 \ MHz$-Output Charge$V_{DS} = 30 \ V, V_{CS} = 0 \ V, f = 100 \ A, f = 1 \ MHz$-Turn-On Rise Time$V_{DD} = 30 \ V, I_D = 100 \ A, f = 1 \ MHz$-Iturn-On Delay Time$V_{DD} = 30 \ V, I_D = 100 \ A, f = 1 \ MHz$-Turn-Off Fall Time$V_{DD} = 30 \ V, I_D = 100 \ A, f = 1 \ MHz$-Turn-Off Fall Time$V_{DD} = 30 \ V, I_D = 100 \ A, f = 1 \ MHz$-Turn-Off Kise Time$V_{DD} = 30 \ V, I_D = 100 \$</td><td>ParameterTest ConditionsMin.Typ.pristicsDrain to Source Breakdown Voltage$_D = 250 \mu$A, $V_{GS} = 0 \vee$60-Breakdown Voltage Temperature$_D = 250 \mu$A, Referenced to 25°C-0.03Zero Gate Voltage Drain Current$V_{DS} = 48 \vee$, $V_{GS} = 0 \vee$Gate to Body Leakage Current$V_{GS} = \pm 20 \vee$, $V_{DS} = 0 \vee$eristicsGate to Body Leakage Current$V_{GS} = \pm 20 \vee$, $V_{DS} 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= 0 \ V$1Zero Gate Voltage Drain Current$V_{DS} = 48 \ V, V_{GS} = 0 \ V$1Gate Threshold Voltage$V_{GS} = \pm 20 \ V, V_{DS} = 0 \ V$4Static Drain to Source On Resistance$V_{GS} = 10 \ V, I_D = 100 \ A$-2.6773.1Forward Transconductance$V_{DS} = 30 \ V, V_{GS} = 0 \ V$-60358030Output Capacitance$V_{DS} = 30 \ V, V_{GS} = 0 \ V$-66358030Output Capacitance$V_{DS} = 30 \ V, V_{GS} = 0 \ V$-2619-Total Gate Charge at 10V$V_{DS} = 30 \ V, V_{GS} = 0 \ V$-2619-Gate to Source Gate Charge$V_{DS} = 30 \ V, V_{GS} = 0 \ V$-2619-Total Gate Charge at 10V$V_{DS} = 30 \ V, V_{GS} = 0 \ V$-2619-Gate to Drain "Miller" Charge$V_{DS} = 30 \ V, V_{GS} = 0 \ V$-262-Gate Plateau Volatge$V_{DS} = 30 \ V, V_{GS} = 0 \ V$-262-Output Charge$V_{DS} = 30 \ V, V_{GS} = 0 \ V$-264-Cate Plateau Volatge$V_{DS} = 30 \ V, V_{GS} = 0 \ V$-264-Turn-On Rise Time$V_{DD} = 30 \ V,$</td></tr<>	ParameterTest ConditionsMin.eristicsDrain to Source Breakdown Voltage $I_D = 250 \ \mu$ A, $V_{GS} = 0 \ V$ 60Breakdown Voltage 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$V_{DD} = 30 \ V, I_D = 100 \ A, f = 1 \ MHz$ -Turn-Off Fall Time $V_{DD} = 30 \ V, I_D = 100 \ A, f = 1 \ MHz$ -Turn-Off Fall Time $V_{DD} = 30 \ V, I_D = 100 \ A, f = 1 \ MHz$ -Turn-Off Kise Time $V_{DD} = 30 \ V, I_D = 100 \ $	ParameterTest ConditionsMin.Typ.pristicsDrain to Source Breakdown Voltage $ _D = 250 \mu$ A, $V_{GS} = 0 \vee$ 60-Breakdown Voltage Temperature $ _D = 250 \mu$ A, Referenced to 25° C-0.03Zero Gate Voltage Drain Current $V_{DS} = 48 \vee$, $V_{GS} = 0 \vee$ Gate to Body Leakage Current $V_{GS} = \pm 20 \vee$, $V_{DS} = 0 \vee$ eristicsGate to Body Leakage Current $V_{GS} = \pm 20 \vee$, $V_{DS} = 0 \vee$ eristicsGate Threshold Voltage $V_{CS} = V_{DS}$, $I_D = 250 \mu$ A2-Static Drain to Source On Resistance $V_{CS} = 10 \vee$, $I_D = 100 A$ -2.67Forward Transconductance $V_{DS} = 10 \vee$, $I_D = 100 A$ -2.67Input Capacitance $V_{DS} = 30 \vee$, $V_{GS} = 0 \vee$, $= 10 \vee$ -6035Output Capacitance $V_{DS} = 30 \vee$, $V_{GS} = 0 \vee$ -2619Total Gate Charge 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-66358030Output Capacitance $V_{DS} = 30 \ V, V_{GS} = 0 \ V$ -2619-Total Gate Charge at 10V $V_{DS} = 30 \ V, V_{GS} = 0 \ V$ -2619-Gate to Source Gate Charge $V_{DS} = 30 \ V, V_{GS} = 0 \ V$ -2619-Total Gate Charge at 10V $V_{DS} = 30 \ V, V_{GS} = 0 \ V$ -2619-Gate to Drain "Miller" Charge $V_{DS} = 30 \ V, V_{GS} = 0 \ V$ -262-Gate Plateau Volatge $V_{DS} = 30 \ V, V_{GS} = 0 \ V$ -262-Output Charge $V_{DS} = 30 \ V, V_{GS} = 0 \ V$ -264-Cate Plateau Volatge $V_{DS} = 30 \ V, V_{GS} = 0 \ V$ -264-Turn-On Rise Time $V_{DD} = 30 \ V,$





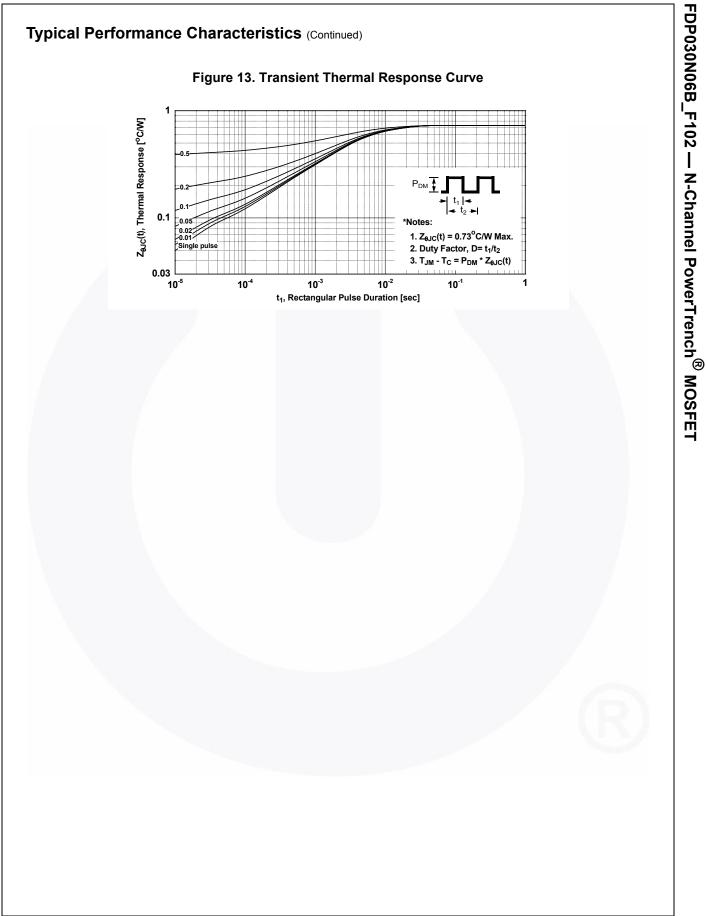
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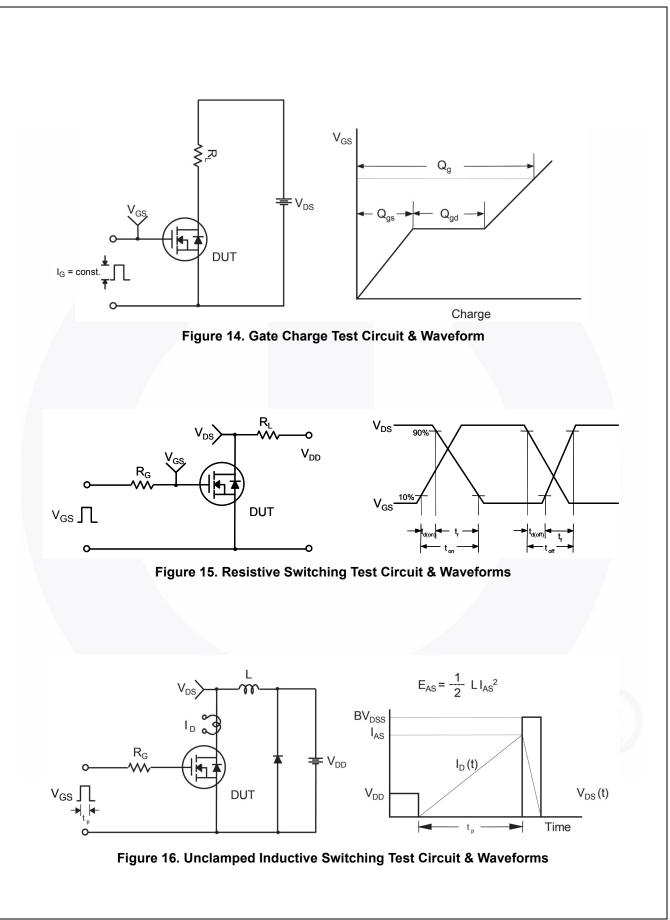


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BV_{DSS}, [Normalized]

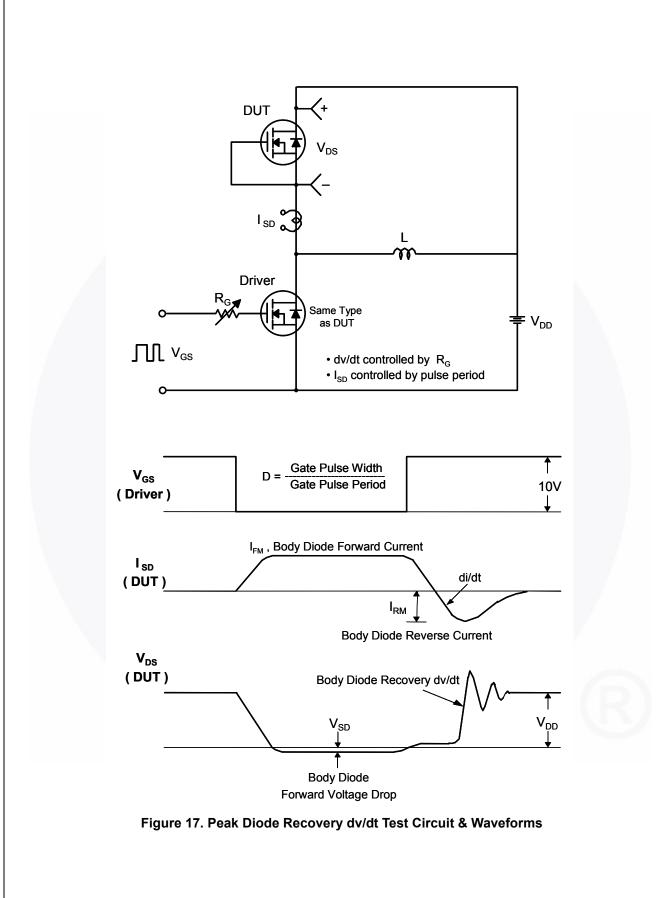
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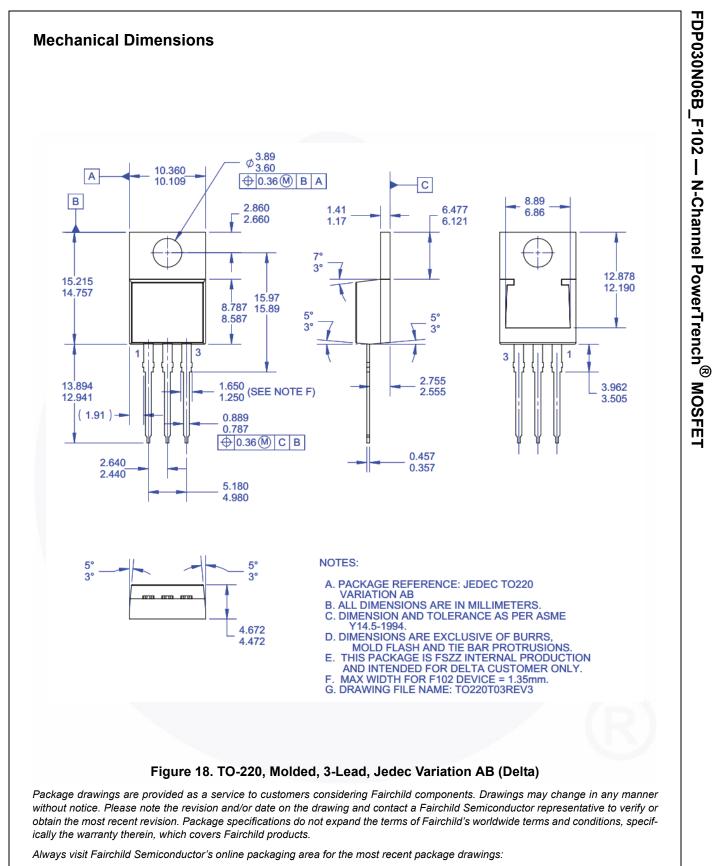




FDP030N06B_F102 — N-Channel PowerTrench[®] MOSFET

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SEMICONDUCTOR

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FastvCore™	OPTOLOGIC®	SuperSOT™-8	VCX™
FETBench™	OPTOPLANAR®	SupreMOS®	VisualMax™
FPS™		SyncFET™	VoltagePlus™
			XS™

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- 2. A critical component in any component of a life support, device, or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

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