

MOSFET - N-Channel, POWERTRENCH®

100 V, 57 A, 16 m Ω

FDI150N10

Description

This N-Channel MOSFET is produced using **onsemi**'s advanced POWERTRENCH process that has been tailored to minimize the on-state resistance while maintaining superior switching performance.

Features

- $R_{DS(on)} = 12 \text{ m}\Omega \text{ (Typ.)} @ V_{GS} = 10 \text{ V}, I_D = 49 \text{ A}$
- Fast Switching Speed
- Low Gate Charge
- High Performance Trench Technology for Extremely Low R_{DS(on)}
- High Power and Current Handling Capability
- RoHS Compliant

Applications

- Synchronous Rectification for ATX / Server / Telecom PSU
- Battery Protection Circuit
- Motor Drives and Uninterruptible Power Supplies
- Micor Solar Inverter

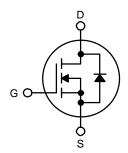
MOSFET MAXIMUM RATINGS (T_C = 25°C, unless otherwise noted)

Symbol		Parameter	FDI150N10	Unit
V_{DSS}	Drain to Source	Voltage	100	V
V_{GSS}	Gate to Source	Voltage	±20	V
I _D	Drain Current	– Continuous (T _C = 25°C)	57	Α
		– Continuous (T _C = 100°C)	40	Α
I _{DM}	Drain Current	- Pulsed (Note 1)	228	Α
E _{AS}	Single Pulsed A	valanche Energy (Note 2)	132	mJ
dv/dt	Peak Diode Re	covery dv/dt (Note 3)	7.5	V/ns
P_{D}	Power	$(T_C = 25^{\circ}C)$	57 40 228 132	W
	Dissipation	– Derate Above 25°C	0.88	W/°C
T_J , T_{STG}	Operating and S	Storage Temperature Range	-55 to +150	°C
TL	Maximum Lead 1/8" from Case	Temperature for Soldering, for 5 Seconds	300	°C

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

- 1. Repetitive rating: pulse–width limited by maximum junction temperature.
- 2. L = 0.11 mH, I_{AS} = 49 A, V_{DD} = 50 V, R_G = 25 Ω , starting T_J = 25°C.
- 3. $I_{SD} \le 49$ A, di/dt ≤ 200 A/ μ s, $V_{DD} \le BV_{DSS}$, starting $T_J = 25^{\circ}C$.

V _{DSS}	R _{DS(on)} MAX	I _D MAX
100 V	16 mΩ @ 10 V	57 A

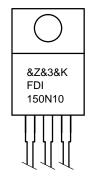


P-Channel MOSFET



I2PAK CASE 418AV

MARKING DIAGRAM



&Z = Assembly Plant Code &3 = 3-Digit Plant Code

&K = 2-Digits Lot Run Traceability Code

FDI150N10 = Specific Device Code

ORDERING INFORMATION

Device	Package	Shipping
FDI150N10	I2PAK	800 Units / Tube

THERMAL CHARACTERISTICS

Symbol	Parameter	FDI150N10	Unit
$R_{\theta JC}$	Thermal Resistance, Junction to Case, Max.	1.13	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient, Max.	62.5	

FLECTRICAL CHARACTERISTICS /Ta

Symbol	Parameter	Test Conditions	Min	Тур	Max	Unit
OFF CHAR	ACTERISTICS	•				
BV _{DSS}	Drain to Source Breakdown Voltage	$I_D = 250 \mu A, V_{GS} = 0 V, T_C = 25^{\circ}C$	100	_	_	V
$\Delta BV_{DSS} / \Delta T_{J}$	Breakdown Voltage Temperature Coefficient	I_D = 250 μ A, Referenced to 25°C	-	0.1	_	V/°C
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 100 V, V _{GS} = 0 V	-	-	1	μΑ
		V _{DS} = 100 V, V _{GS} = 0 V, T _C = 150°C	-	-	500	
I _{GSS}	Gate to Body Leakage Current	$V_{GS} = \pm 20 \text{ V}, V_{DS} = 0 \text{ V}$	-	-	±100	nA
ON CHARA	ACTERISTICS	•				
V _{GS(th)}	Gate Threshold Voltage	$V_{GS} = V_{DS}, I_D = 250 \mu A$	2.5	_	4.5	V
R _{DS(on)}	Static Drain to Source On Resistance	V _{GS} = 10 V, I _D = 49 A	-	12	16	mΩ
9FS	Forward Transconductance	V _{DS} = 20 V, I _D = 49 A	_	156	_	S
DYNAMIC	CHARACTERISTICS	•				
C _{iss}	Input Capacitance	V _{DS} = 25 V, V _{GS} = 0 V, f = 1 MHz	-	3580	4760	pF
C _{oss}	Output Capacitance		_	340	450	pF
C _{rss}	Reverse Transfer Capacitance	1 1	_	140	210	pF
SWITCHIN	G CHARACTERISTICS	•				
t _{d(on)}	Turn-On Delay Time	$V_{DD} = 50 \text{ V}, I_D = 49 \text{ A}, V_{GS} = 10 \text{ V},$	-	47	104	ns
t _r	Turn-On Rise Time	$R_G = 25 \Omega$ (Note 4)	-	164	338	ns
t _{d(off)}	Turn-Off Delay Time	$V_{GS} = \pm 20 \text{ V}, V_{DS} = 0 \text{ V}$ $V_{GS} = V_{DS}, I_D = 250 \mu\text{A}$ $V_{GS} = 10 \text{ V}, I_D = 49 \text{ A}$ $V_{DS} = 20 \text{ V}, I_D = 49 \text{ A}$ $V_{DS} = 25 \text{ V}, V_{GS} = 0 \text{ V}, f = 1 \text{ MHz}$ $V_{DS} = 50 \text{ V}, I_D = 49 \text{ A}, V_{GS} = 10 \text{ V}, R_G = 25 \Omega \text{ (Note 4)}$ $V_{DS} = 80 \text{ V}, I_D = 49 \text{ A}, V_{GS} = 10 \text{ V}$ $V_{DS} = 80 \text{ V}, I_D = 49 \text{ A}, V_{GS} = 10 \text{ V}$ $V_{DS} = 80 \text{ V}, I_D = 49 \text{ A}, V_{GS} = 10 \text{ V}$ $V_{DS} = 80 \text{ V}, I_D = 49 \text{ A}, V_{GS} = 10 \text{ V}$ $V_{DS} = 80 \text{ V}, I_D = 49 \text{ A}, V_{GS} = 10 \text{ V}$ $V_{DS} = 80 \text{ V}, I_D = 49 \text{ A}, V_{GS} = 10 \text{ V}$ $V_{DS} = 80 \text{ V}, I_D = 49 \text{ A}, V_{GS} = 10 \text{ V}$ $V_{DS} = 80 \text{ V}, I_D = 49 \text{ A}, V_{GS} = 10 \text{ V}$ $V_{DS} = 80 \text{ V}, I_D = 49 \text{ A}, V_{GS} = 10 \text{ V}$ $V_{DS} = 80 \text{ V}, I_D = 49 \text{ A}, V_{GS} = 10 \text{ V}$ $V_{DS} = 80 \text{ V}, I_D = 49 \text{ A}, V_{GS} = 10 \text{ V}$ $V_{DS} = 80 \text{ V}, I_D = 49 \text{ A}, V_{GS} = 10 \text{ V}$ $V_{DS} = 80 \text{ V}, I_D = 49 \text{ A}, V_{GS} = 10 \text{ V}$ $V_{DS} = 80 \text{ V}, I_D = 49 \text{ A}, V_{GS} = 10 \text{ V}$ $V_{DS} = 80 \text{ V}, I_D = 49 \text{ A}, V_{GS} = 10 \text{ V}$	-	86	182	ns
t _f	Turn-Off Fall Time]	-	83	176	ns
Q _{g(tot)}	Total Gate Charge at 10 V		-	53	69	nC
Q _{gs}	Gate to Source Gate Charge	(Note 4)	-	19	_	nC
Q _{gd}	Gate to Drain "Miller" Charge]	-	15	_	nC
DRAIN-SO	URCE DIODE CHARACTERISTICS	•				
IS	Maximum Continuous Drain to Source Diode	Diode Forward Current		_	57	Α
I _{SM}	Maximum Pulsed Drain to Source Diode Forw	ard Current	_	-	228	Α
V _{SD}	Drain to Source Diode Forward Voltage	V _{GS} = 0 V, I _{SD} = 49 A	_	-	1.3	V
t _{rr}	Reverse Recovery Time		-	41	_	ns
Q _{rr}	Reverse Recovery Charge	aι _F /at = 100 Α/μs	_	70	-	nC

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

4. Essentially independent of operating temperature typical characteristics.

TYPICAL PERFORMANCE CHARACTERISTICS

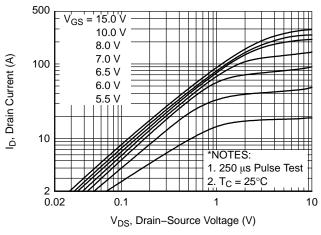


Figure 1. On-Region Characteristics

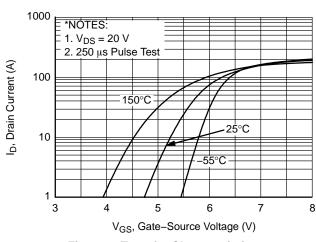


Figure 2. Transfer Characteristics

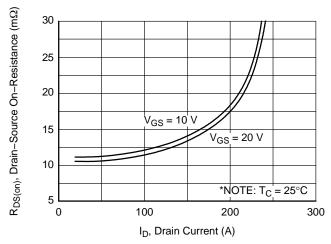


Figure 3. On–Resistance Variation vs. Drain Current and Gate Voltage

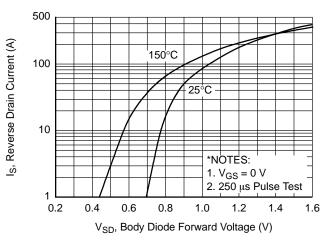


Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature

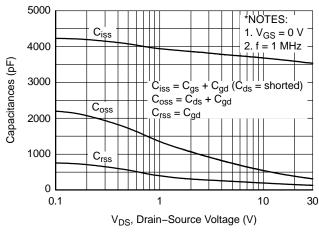


Figure 5. Capacitance Characteristics

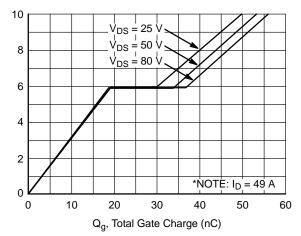
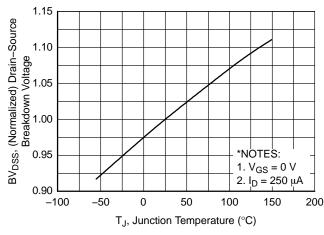


Figure 6. Gate Charge Characteristics

V_{GS}, Gate-Source Voltage (V)

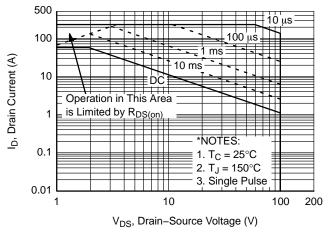
TYPICAL PERFORMANCE CHARACTERISTICS (CONTINUED)



2.4 R_{DS(on)}, (Normalized) Drain-Source 2.0 On-Resistance 1.6 1.2 *NÖTES: 8.0 1. $V_{GS} = 10 V$ 2. I_D = 49 A 0.0 100 -100 -50 50 150 200 T_J, Junction Temperature (°C)

Figure 7. Breakdown Voltage Variation vs. Temperature

Figure 8. On-Resistance Variation vs. Temperature



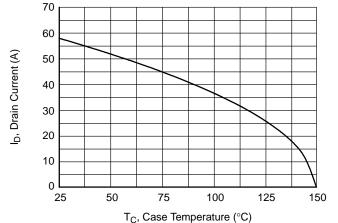


Figure 9. Maximum Safe Operating Area

Figure 10. Maximum Drain Current vs.

Case Temperature

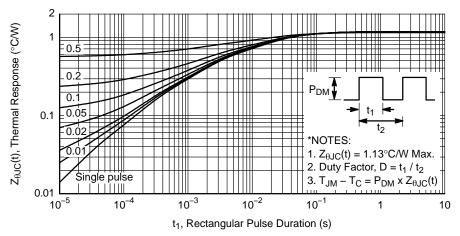


Figure 11. Transient Thermal Response Curve

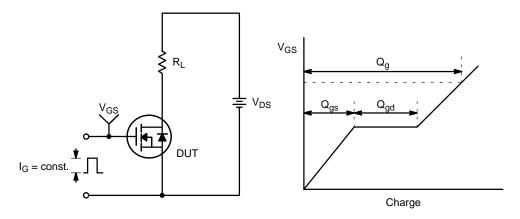


Figure 12. Gate Charge Test Circuit & Waveform

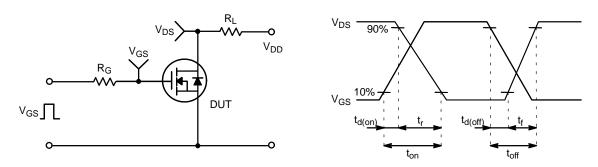


Figure 13. Resistive Switching Test Circuit & Waveforms

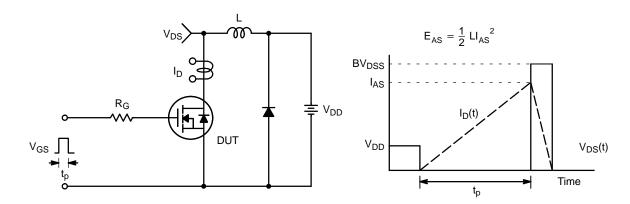


Figure 14. Unclamped Inductive Switching Test Circuit & Waveforms

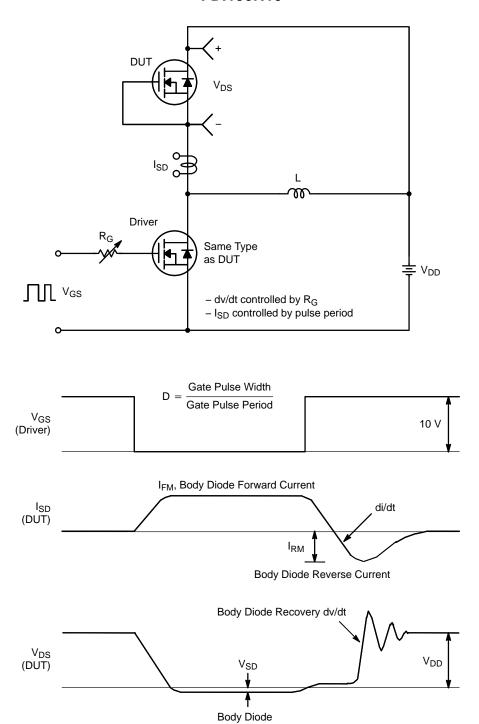


Figure 15. Peak Diode Recovery dv/dt Test Circuit & Waveforms

Forward Voltage Drop

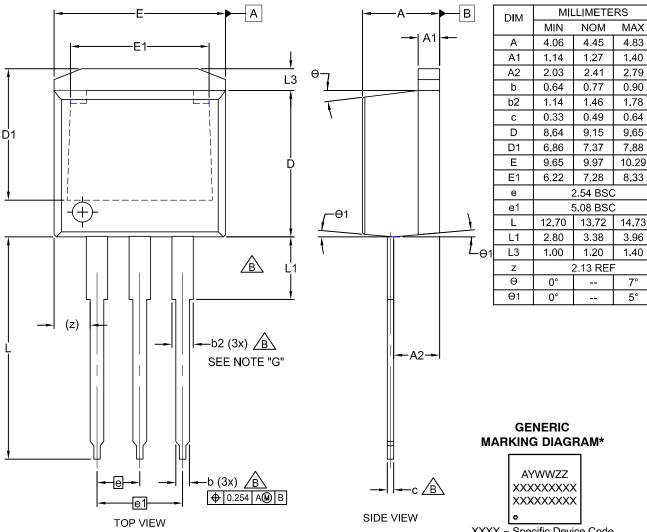
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I2PAK (TO-262 3 LD) CASE 418AV ISSUE A

DATE 30 AUG 2022



NOTES:

A. EXCEPT WHERE NOTED CONFORMS TO TO262 JEDEC VARIATION AA.

- C. ALL DIMENSIONS ARE IN MILLIMETERS.
- D. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH AND TIE BAR PROTRUSIONS.
- E. DIMENSION AND TOLERANCE AS PER ANSI Y14.5-1994.
- F. LOCATION OF PIN HOLE MAY VARY (LOWER LEFT CORNER, LOWER CENTER AND CENTER OF PACKAGE)
- G. MAXIMUM WIDTH FOR F102 DEVICE = 1.35 MAX.

XXXX = Specific Device Code

A = Assembly Location Y = Year WW = Work Week

WW = Work WeekZZ = Assembly Lot Code

*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "•", may or may not be present. Some products may not follow the Generic Marking.

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