



Is Now Part of



ON Semiconductor®

To learn more about ON Semiconductor, please visit our website at
www.onsemi.com

Please note: As part of the Fairchild Semiconductor integration, some of the Fairchild orderable part numbers will need to change in order to meet ON Semiconductor's system requirements. Since the ON Semiconductor product management systems do not have the ability to manage part nomenclature that utilizes an underscore (_), the underscore (_) in the Fairchild part numbers will be changed to a dash (-). This document may contain device numbers with an underscore (_). Please check the ON Semiconductor website to verify the updated device numbers. The most current and up-to-date ordering information can be found at www.onsemi.com. Please email any questions regarding the system integration to Fairchild_questions@onsemi.com.

ON Semiconductor and the ON Semiconductor logo are trademarks of Semiconductor Components Industries, LLC dba ON Semiconductor or its subsidiaries in the United States and/or other countries. ON Semiconductor owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of ON Semiconductor's product/patent coverage may be accessed at www.onsemi.com/site/pdf/Patent-Marking.pdf. ON Semiconductor reserves the right to make changes without further notice to any products herein. ON Semiconductor makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does ON Semiconductor assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. Buyer is responsible for its products and applications using ON Semiconductor products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by ON Semiconductor. "Typical" parameters which may be provided in ON Semiconductor data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. ON Semiconductor does not convey any license under its patent rights nor the rights of others. ON Semiconductor products are not designed, intended, or authorized for use as a critical component in life support systems or any FDA Class 3 medical devices or medical devices with a same or similar classification in a foreign jurisdiction or any devices intended for implantation in the human body. Should Buyer purchase or use ON Semiconductor products for any such unintended or unauthorized application, Buyer shall indemnify and hold ON Semiconductor and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that ON Semiconductor was negligent regarding the design or manufacture of the part. ON Semiconductor is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.



FDP2D3N10C / FDPF2D3N10C

N-Channel Shielded Gate PowerTrench® MOSFET

100 V, 222 A, 2.3 mΩ

Features

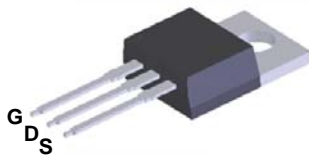
- Max $r_{DS(on)}$ = 2.3 mΩ at $V_{GS} = 10$ V, $I_D = 100$ A
- Extremely Low Reverse Recovery Charge, Q_{rr}
- 100% UIL Tested
- RoHS Compliant

General Description

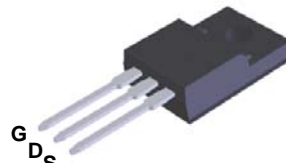
This N-Channel MV MOSFET is produced using ON Semiconductor's advanced PowerTrench® process that incorporates Shielded Gate technology. This process has been optimized to minimize on-state resistance and yet maintain superior switching performance with best in class soft body diode.

Applications

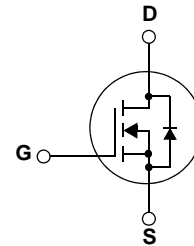
- Synchronous Rectification for ATX / Server / Telecom PSU
- Motor drives and Uninterruptible Power Supplies
- Micro Solar Inverter



TO-220



TO-220F



MOSFET Maximum Ratings $T_C = 25^\circ\text{C}$ unless otherwise noted.

Symbol	Parameter	Ratings		Units
		FDP2D3N10C	FDPF2D3N10C	
V_{DS}	Drain to Source Voltage	100	100	V
V_{GS}	Gate to Source Voltage	±20	±20	V
I_D	Drain Current -Continuous $T_C = 25^\circ\text{C}$ (Note 3)	222*	222*	A
	-Continuous $T_C = 100^\circ\text{C}$ (Note 3)	157*	157*	
	-Pulsed (Note 1)	888	888	
E_{AS}	Single Pulse Avalanche Energy (Note 2)	1176		mJ
P_D	Power Dissipation $T_C = 25^\circ\text{C}$	214	45	W
	Power Dissipation $T_A = 25^\circ\text{C}$	2.4	2.4	
T_J, T_{STG}	Operating and Storage Junction Temperature Range	-55 to +175		°C

* Drain current limited by maximum junction temperature. Package limitation current is 120A.

Thermal Characteristics

Symbol	Parameter	FDP2D3N10C	FDPF2D3N10C	Units
$R_{\theta JC}$	Thermal Resistance, Junction to Case, Max.	0.7	3.3	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient, Max.	62.5	62.5	

Package Marking and Ordering Information

Device Marking	Device	Package	Packing Method	Quantity
FDP2D3N10C	FDP2D3N10C	TO-220	Tube	50 units
FDPF2D3N10C	FDPF2D3N10C	TO-220F	Tube	50 units

Electrical Characteristics $T_J = 25\text{ }^\circ\text{C}$ unless otherwise noted.

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
--------	-----------	-----------------	------	------	------	-------

Off Characteristics

BV_{DSS}	Drain to Source Breakdown Voltage	$I_D = 250\text{ }\mu\text{A}, V_{GS} = 0\text{ V}$	100			V
$\frac{\Delta BV_{DSS}}{\Delta T_J}$	Breakdown Voltage Temperature Coefficient	$I_D = 250\text{ }\mu\text{A}$, referenced to $25\text{ }^\circ\text{C}$		70		mV/ $^\circ\text{C}$
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 80\text{ V}, V_{GS} = 0\text{ V}$ $V_{DS} = 80\text{ V}, T_J = 150\text{ }^\circ\text{C}$			1 500	μA μA
I_{GSS}	Gate to Source Leakage Current	$V_{GS} = \pm 20\text{ V}, V_{DS} = 0\text{ V}$			± 100	nA

On Characteristics

$V_{GS(th)}$	Gate to Source Threshold Voltage	$V_{GS} = V_{DS}, I_D = 700\text{ }\mu\text{A}$	2.0	3.0	4.0	V
$r_{DS(on)}$	Static Drain to Source On Resistance	$V_{GS} = 10\text{ V}, I_D = 100\text{ A}$		2.1	2.3	m Ω
g_{FS}	Forward Transconductance	$V_{DS} = 5\text{ V}, I_D = 100\text{ A}$		222		S

Dynamic Characteristics

C_{iss}	Input Capacitance	$V_{DS} = 50\text{ V}, V_{GS} = 0\text{ V},$ $f = 1\text{ MHz}$		7980	11180	pF
C_{oss}	Output Capacitance			4490	6290	pF
C_{rss}	Reverse Transfer Capacitance			40	75	pF
R_g	Gate Resistance		0.1	0.8	1.8	Ω

Switching Characteristics

$t_{d(on)}$	Turn-On Delay Time	$V_{DD} = 50\text{ V}, I_D = 100\text{ A},$ $V_{GS} = 10\text{ V}, R_{GEN} = 6\text{ }\Omega$		42	67	ns
t_r	Rise Time			35	56	ns
$t_{d(off)}$	Turn-Off Delay Time			74	118	ns
t_f	Fall Time			32	57	ns
Q_g	Total Gate Charge	$V_{GS} = 0\text{ V to } 10\text{ V}$ $V_{DD} = 50\text{ V},$ $I_D = 100\text{ A}$		108	152	nC
Q_{gs}	Gate to Source Gate Charge			36		nC
Q_{gd}	Gate to Drain "Miller" Charge			22		nC
Q_{oss}	Output Charge	$V_{DD} = 50\text{ V}, V_{GS} = 0\text{ V}$		297		nC

Drain-Source Diode Characteristic

I_S	Maximum Continuous Drain to Source Diode Forward Current		-	-	222	A
I_{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	888	A
V_{SD}	Source to Drain Diode Forward Voltage	$V_{GS} = 0\text{ V}, I_{SD} = 100\text{ A}$		0.9	1.3	V
t_{rr}	Reverse Recovery Time	$V_{GS} = 0\text{ V}, V_{DD} = 50\text{ V},$		107	172	ns
Q_{rr}	Reverse Recovery Charge	$I_F = 100\text{ A}, di_F/dt = 100\text{ A}/\mu\text{s}$		191	306	nC
t_{rr}	Reverse Recovery Time	$V_{GS} = 0\text{ V}, V_{DD} = 50\text{ V},$		97	155	ns
Q_{rr}	Reverse Recovery Charge	$I_F = 100\text{ A}, di_F/dt = 300\text{ A}/\mu\text{s}$		492	788	nC

Notes:

1. Pulsed I_D please refer to Figure.11 and Figure.12 "Forward Bias Safe Operating Area" for more details.
2. E_{AS} of 1176 mJ is based on starting $T_J = 25\text{ }^\circ\text{C}$, $L = 3\text{ mH}$, $I_{AS} = 28\text{ A}$, $V_{DD} = 90\text{ V}$, $V_{GS} = 10\text{ V}$. 100% test at $L = 0.1\text{ mH}$, $I_{AS} = 89\text{ A}$.
3. Computed continuous current limited to Max Junction Temperature only, actual continuous current will be limited by thermal & electro-mechanical application board design.

Typical Characteristics $T_J = 25\text{ }^\circ\text{C}$ unless otherwise noted.

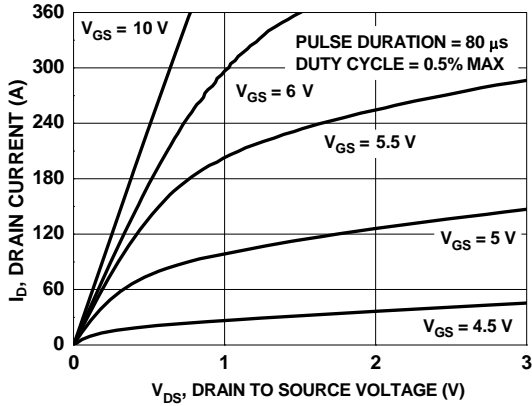


Figure 1. On-Region Characteristics

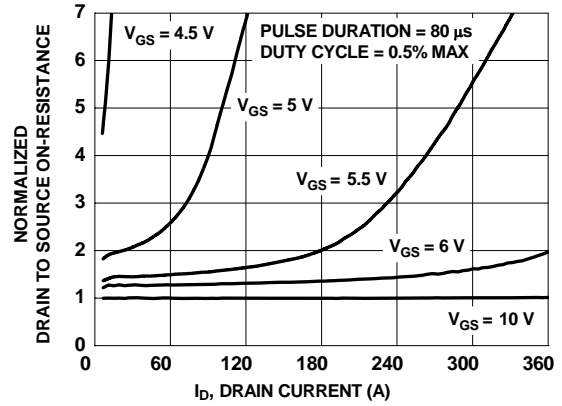


Figure 2. Normalized On-Resistance vs. Drain Current and Gate Voltage

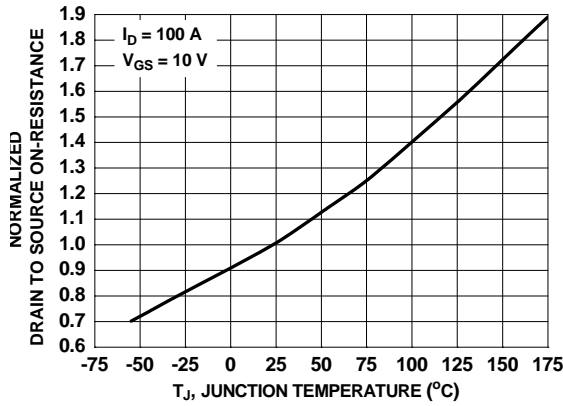


Figure 3. Normalized On-Resistance vs. Junction Temperature

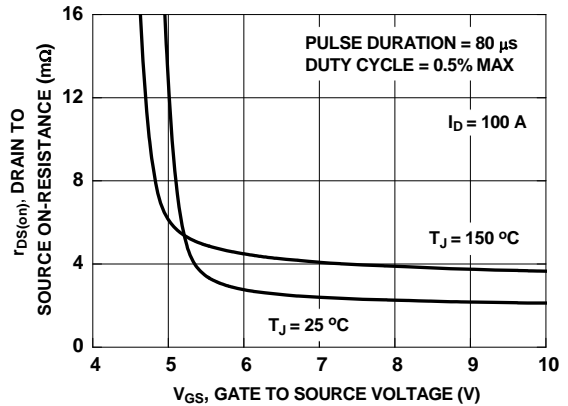


Figure 4. On-Resistance vs. Gate to Source Voltage

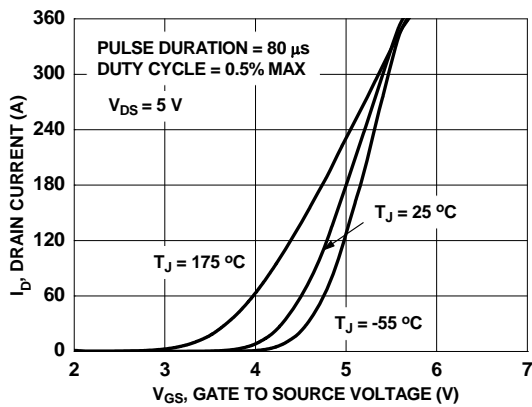


Figure 5. Transfer Characteristics

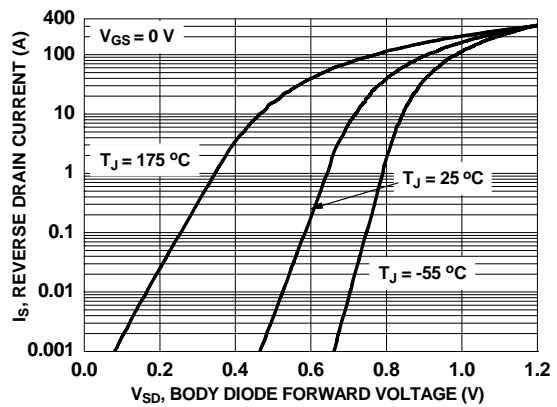


Figure 6. Source to Drain Diode Forward Voltage vs. Source Current

Typical Characteristics $T_J = 25\text{ }^\circ\text{C}$ unless otherwise noted.

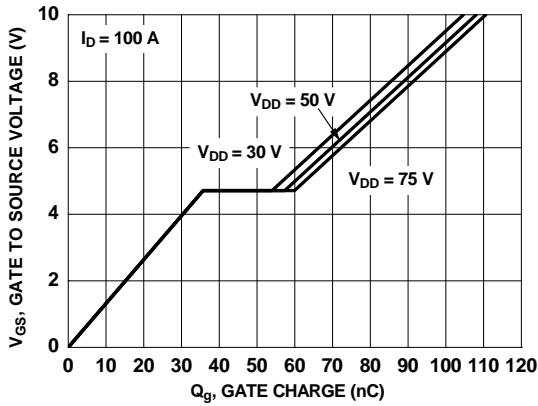


Figure 7. Gate Charge Characteristics

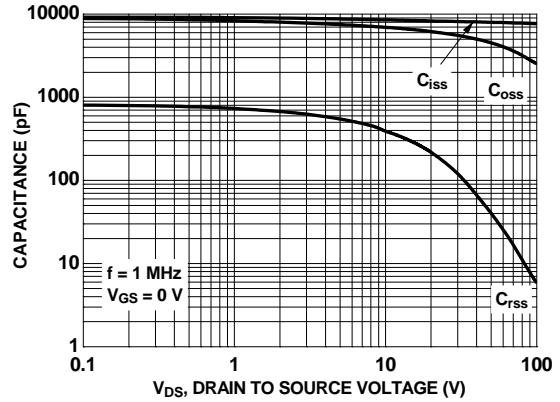


Figure 8. Capacitance vs. Drain to Source Voltage

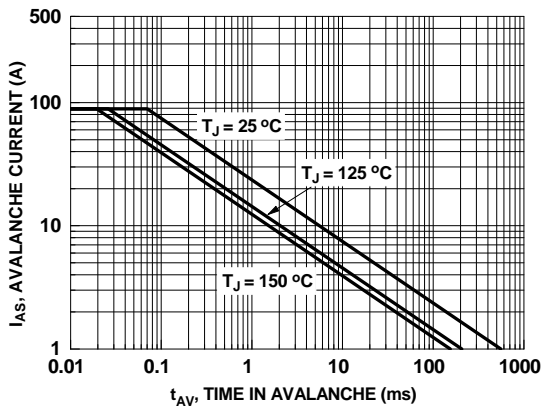


Figure 9. Unclamped Inductive Switching Capability

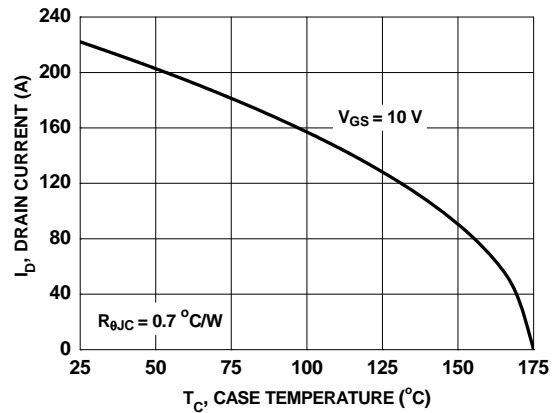


Figure 10. Maximum Continuous Drain Current vs. Case Temperature

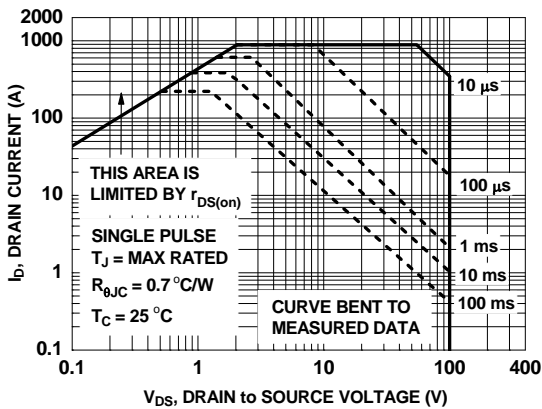


Figure 11. Forward Bias Safe Operating Area for FDP2D3N10C

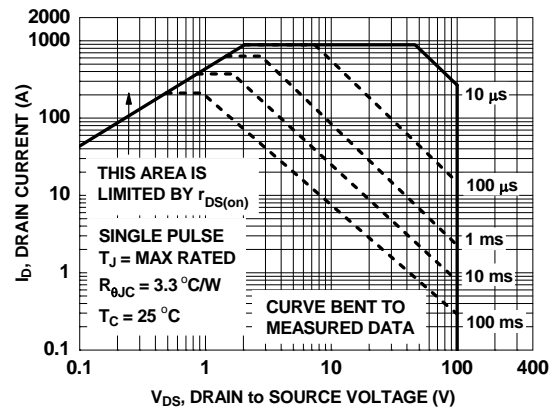


Figure 12. Forward Bias Safe Operating Area for FDPF2D3N10C

Typical Characteristics $T_J = 25\text{ }^\circ\text{C}$ unless otherwise noted.

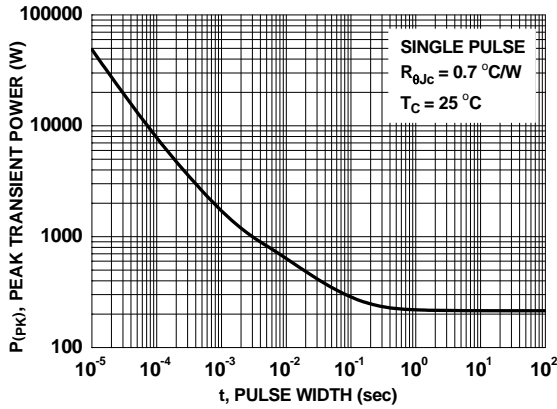


Figure 13. Single Pulse Maximum Power Dissipation for FDP2D3N10C

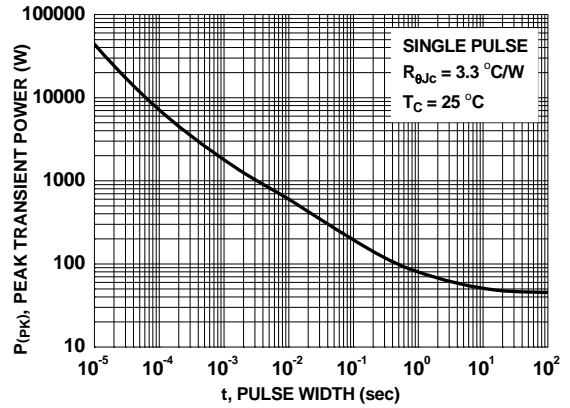


Figure 14. Single Pulse Maximum Power Dissipation for FDPF2D3N10C

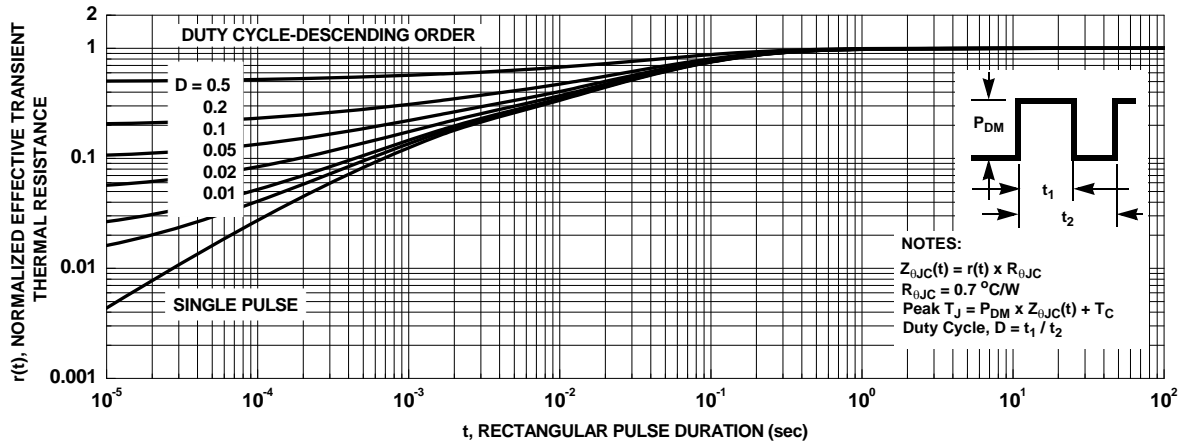


Figure 15. Junction-to-Case Transient Thermal Response Curve for FDP2D3N10C

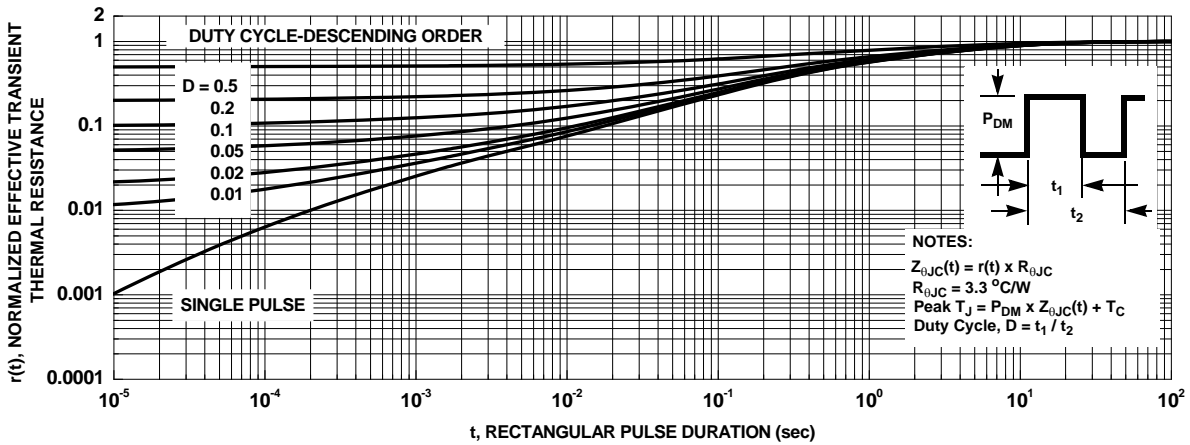
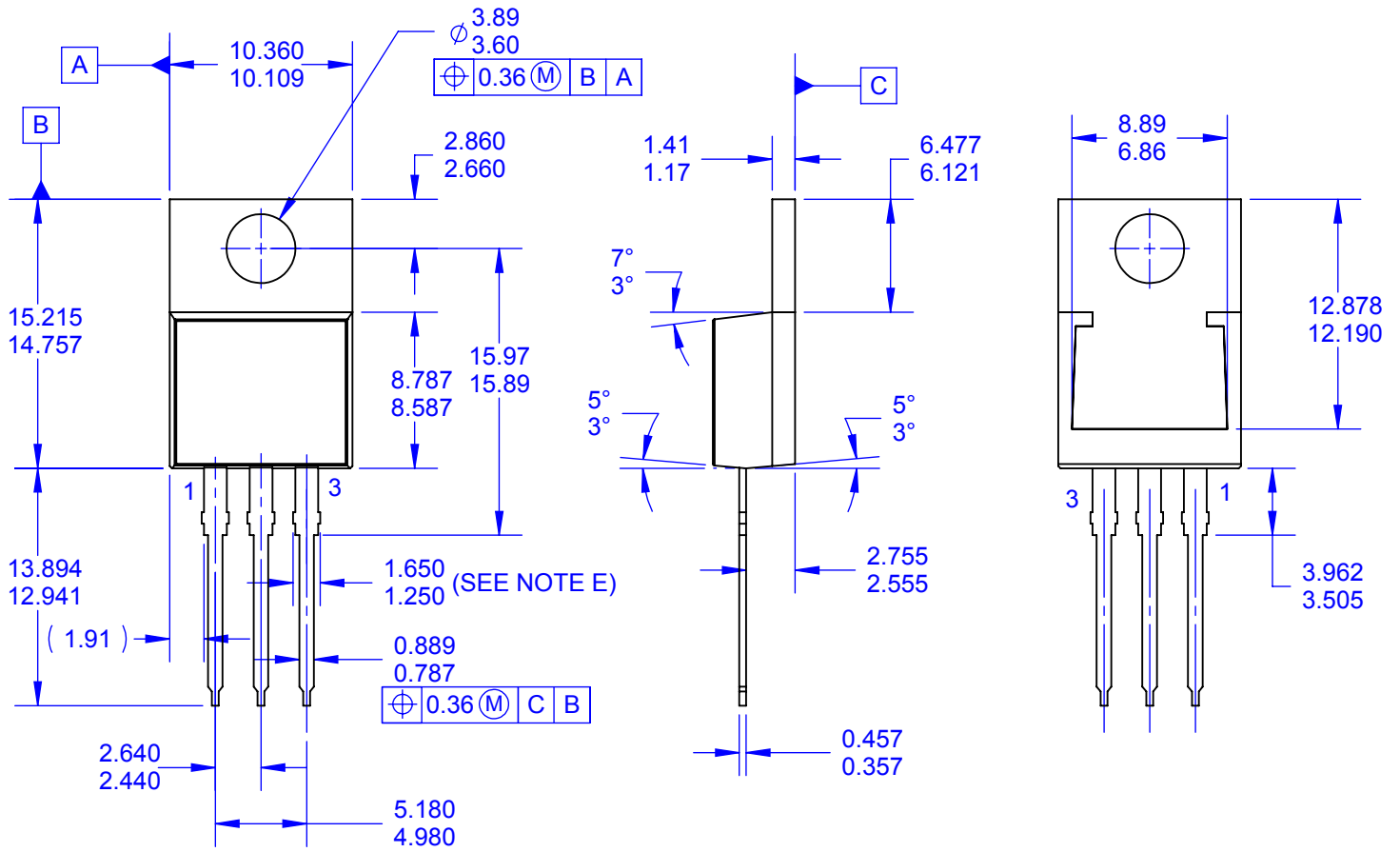


Figure 16. Junction-to-Case Transient Thermal Response Curve for FDPF2D3N10C



NOTES:

- A. PACKAGE REFERENCE: JEDEC TO220 VARIATION AB
- B. ALL DIMENSIONS ARE IN MILLIMETERS.
- C. DIMENSION AND TOLERANCE AS PER ASME Y14.5-2009.
- D. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH AND TIE BAR PROTRUSIONS.
- E. MAX WIDTH FOR F102 DEVICE = 1.35mm.
- F. DRAWING FILE NAME: TO220T03REV4.
- G. FAIRCHILD SEMICONDUCTOR.

ON Semiconductor and  are trademarks of Semiconductor Components Industries, LLC dba ON Semiconductor or its subsidiaries in the United States and/or other countries. ON Semiconductor owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of ON Semiconductor's product/patent coverage may be accessed at www.onsemi.com/site/pdf/Patent-Marking.pdf. ON Semiconductor reserves the right to make changes without further notice to any products herein. ON Semiconductor makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does ON Semiconductor assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. Buyer is responsible for its products and applications using ON Semiconductor products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by ON Semiconductor. "Typical" parameters which may be provided in ON Semiconductor data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. ON Semiconductor does not convey any license under its patent rights nor the rights of others. ON Semiconductor products are not designed, intended, or authorized for use as a critical component in life support systems or any FDA Class 3 medical devices or medical devices with a same or similar classification in a foreign jurisdiction or any devices intended for implantation in the human body. Should Buyer purchase or use ON Semiconductor products for any such unintended or unauthorized application, Buyer shall indemnify and hold ON Semiconductor and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that ON Semiconductor was negligent regarding the design or manufacture of the part. ON Semiconductor is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:

Literature Distribution Center for ON Semiconductor
19521 E. 32nd Pkwy, Aurora, Colorado 80011 USA
Phone: 303-675-2175 or 800-344-3860 Toll Free USA/Canada
Fax: 303-675-2176 or 800-344-3867 Toll Free USA/Canada
Email: orderlit@onsemi.com

N. American Technical Support: 800-282-9855 Toll Free
USA/Canada
Europe, Middle East and Africa Technical Support:
Phone: 421 33 790 2910
Japan Customer Focus Center
Phone: 81-3-5817-1050

ON Semiconductor Website: www.onsemi.com
Order Literature: <http://www.onsemi.com/orderlit>
For additional information, please contact your local
Sales Representative

X-ON Electronics

Largest Supplier of Electrical and Electronic Components

Click to view similar products for [MOSFET](#) category:

Click to view products by [ON Semiconductor](#) manufacturer:

Other Similar products are found below :

[614233C](#) [648584F](#) [IRFD120](#) [JANTX2N5237](#) [FCA20N60_F109](#) [FDZ595PZ](#) [2SK2545\(Q,T\)](#) [405094E](#) [423220D](#) [TPCC8103,L1Q\(CM](#)
[MIC4420CM-TR](#) [VN1206L](#) [SBVS138LT1G](#) [614234A](#) [715780A](#) [NTNS3166NZT5G](#) [SSM6J414TU,LF\(T](#) [751625C](#) [BUK954R8-60E](#)
[NTE6400](#) [SQJ402EP-T1-GE3](#) [2SK2614\(TE16L1,Q\)](#) [2N7002KW-FAI](#) [DMN1017UCP3-7](#) [EFC2J004NUZTDG](#) [ECH8691-TL-W](#)
[FCAB21350L1](#) [P85W28HP2F-7071](#) [DMN1053UCP4-7](#) [NTE221](#) [NTE222](#) [NTE2384](#) [NTE2903](#) [NTE2941](#) [NTE2945](#) [NTE2946](#) [NTE2960](#)
[NTE2967](#) [NTE2969](#) [NTE2976](#) [NTE455](#) [NTE6400A](#) [NTE2910](#) [NTE2916](#) [NTE2956](#) [NTE2911](#) [DMN2080UCB4-7](#) [TK10A80W,S4X\(S](#)
[SSM6P69NU,LF](#) [DMP22D4UFO-7B](#)