



ON Semiconductor®

FDV304P Digital FET, P-Channel

General Description

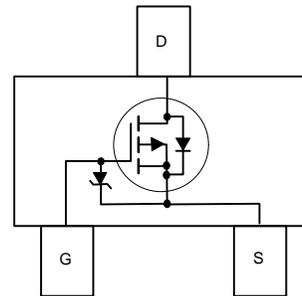
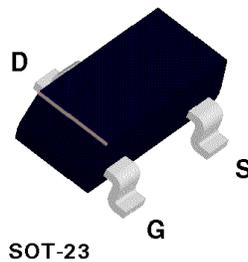
This P-Channel enhancement mode field effect transistors is produced using ON Semiconductor's proprietary, high cell density, DMOS technology. This very high density process is tailored to minimize on-state resistance at low gate drive conditions. This device is designed especially for application in battery power applications such as notebook computers and cellular phones. This device has excellent on-state resistance even at gate drive voltages as low as 2.5 volts.

Features

- 25 V, -0.46 A continuous, -1.5 A Peak.
 $R_{DS(ON)} = 1.1 \Omega @ V_{GS} = -4.5 V$
 $R_{DS(ON)} = 1.5 \Omega @ V_{GS} = -2.7 V.$
- Very low level gate drive requirements allowing direct operation in 3V circuits. $V_{GS(th)} < 1.5V.$
- Gate-Source Zener for ESD ruggedness.
>6kV Human Body Model
- Compact industry standard SOT-23 surface mount package.



Mark:304



Absolute Maximum Ratings $T_A = 25^\circ C$ unless other wise noted

Symbol	Parameter	FDV304P	Units
V_{DSS}	Drain-Source Voltage	-25	V
V_{GSS}	Gate-Source Voltage	-8	V
I_D	Drain Current	- Continuous	-0.46
		- Pulsed	-1.5
P_D	Maximum Power Dissipation	0.35	W
T_J, T_{STG}	Operating and Storage Temperature Range	-55 to 150	$^\circ C$
ESD	Electrostatic Discharge Rating MIL-STD-883D Human Body Model (100pf / 1500 Ohm)	6.0	kV

THERMAL CHARACTERISTICS

$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	357	$^\circ C/W$
-----------------	---	-----	--------------

Electrical Characteristics ($T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
OFF CHARACTERISTICS						
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS} = 0\text{ V}$, $I_D = -250\text{ }\mu\text{A}$	-25			V
$\Delta BV_{DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	$I_D = -250\text{ }\mu\text{A}$, Referenced to $25\text{ }^\circ\text{C}$		-22		mV/ $^\circ\text{C}$
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = -20\text{ V}$, $V_{GS} = 0\text{ V}$			-1	μA
		$T_J = 55\text{ }^\circ\text{C}$			-10	μA
I_{GSS}	Gate - Body Leakage Current	$V_{GS} = -8\text{ V}$, $V_{DS} = 0\text{ V}$			-100	nA
ON CHARACTERISTICS (Note)						
$\Delta V_{GS(th)}/\Delta T_J$	Gate Threshold Voltage Temp. Coefficient	$I_D = -250\text{ }\mu\text{A}$, Referenced to $25\text{ }^\circ\text{C}$		2.1		mV/ $^\circ\text{C}$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}$, $I_D = -250\text{ }\mu\text{A}$	-0.65	-0.86	-1.5	V
$R_{DS(on)}$	Static Drain-Source On-Resistance	$V_{GS} = -2.7\text{ V}$, $I_D = -0.25\text{ A}$		1.22	1.5	Ω
		$V_{GS} = -4.5\text{ V}$, $I_D = -0.5\text{ A}$		0.87	1.1	
		$T_J = 125\text{ }^\circ\text{C}$		1.21	2	
$I_{D(on)}$	On-State Drain Current	$V_{GS} = -2.7\text{ V}$, $V_{DS} = -5\text{ V}$	-0.5			A
		$V_{GS} = -4.5\text{ V}$, $V_{DS} = -5\text{ V}$	-1			
g_{FS}	Forward Transconductance	$V_{DS} = -5\text{ V}$, $I_D = -0.5\text{ A}$		0.8		S
DYNAMIC CHARACTERISTICS						
C_{iss}	Input Capacitance	$V_{DS} = -10\text{ V}$, $V_{GS} = 0\text{ V}$, $f = 1.0\text{ MHz}$		63		pF
C_{oss}	Output Capacitance			34		pF
C_{rss}	Reverse Transfer Capacitance			10		pF
SWITCHING CHARACTERISTICS (Note)						
$t_{D(on)}$	Turn - On Delay Time	$V_{DD} = -6\text{ V}$, $I_D = -0.5\text{ A}$, $V_{GS} = -4.5\text{ V}$, $R_{GEN} = 50\text{ }\Omega$		7	20	ns
t_r	Turn - On Rise Time			8	20	
$t_{D(off)}$	Turn - Off Delay Time			55	110	
t_f	Turn - Off Fall Time			35	70	
Q_g	Total Gate Charge	$V_{DS} = -5\text{ V}$, $I_D = -0.25\text{ A}$, $V_{GS} = -4.5\text{ V}$		1.1	1.5	nC
Q_{gs}	Gate-Source Charge			0.32		
Q_{gd}	Gate-Drain Charge			0.25		
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
I_S	Maximum Continuous Drain-Source Diode Forward Current				-0.5	A
V_{SD}	Drain-Source Diode Forward Voltage	$V_{GS} = 0\text{ V}$, $I_S = -0.5\text{ A}$ (Note)		-0.89	-1.2	V

Note:
Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2.0\%$.

Typical Electrical Characteristics

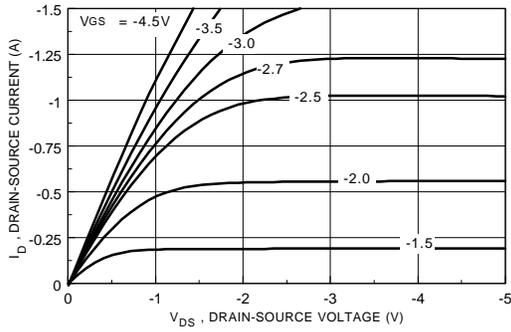


Figure 1. On-Region Characteristics.

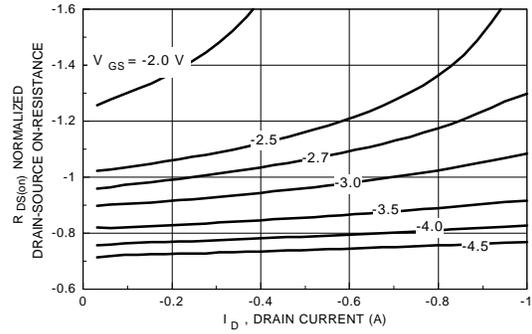


Figure 2. On-Resistance Variation with Drain Current and Gate Voltage.

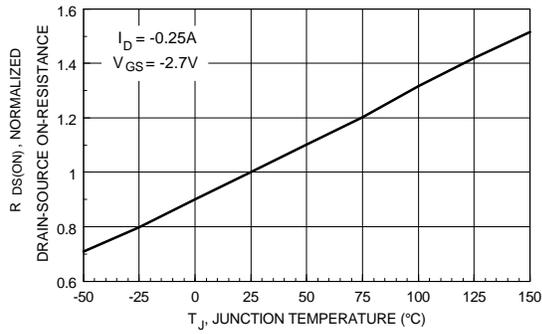


Figure 3. On-Resistance Variation with Temperature.

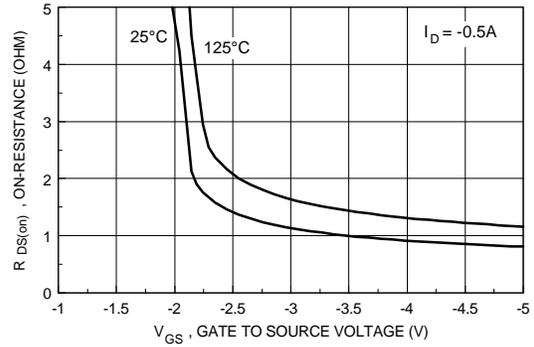


Figure 4. On Resistance Variation with Gate-To- Source Voltage.

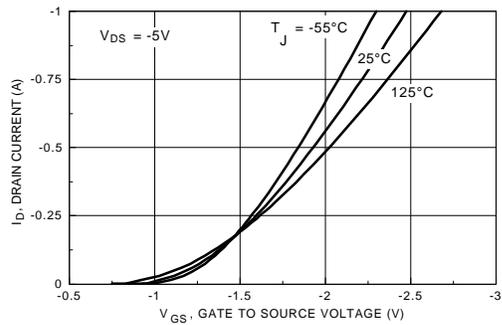


Figure 5. Transfer Characteristics.

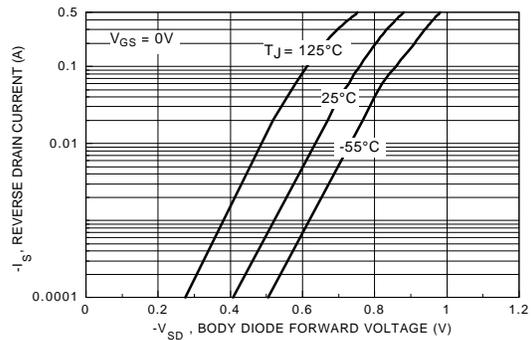


Figure 6. Body Diode Forward Voltage Variation with Source Current and Temperature.

Typical Electrical And Thermal Characteristics

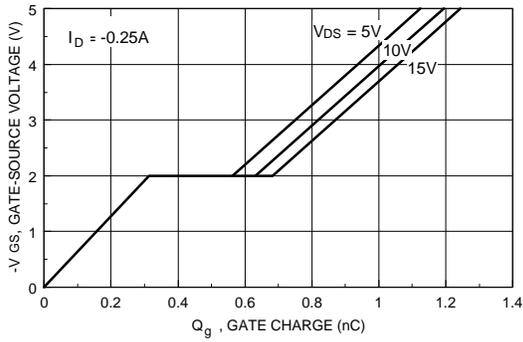


Figure 7. Gate Charge Characteristics.

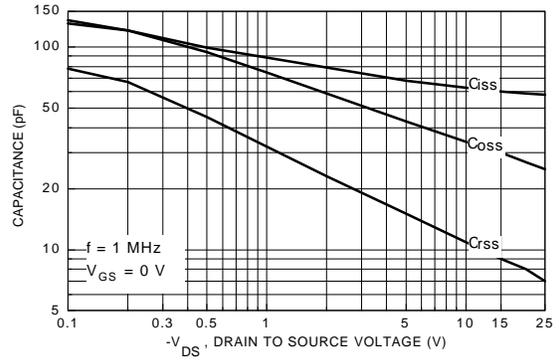


Figure 8. Capacitance Characteristics.

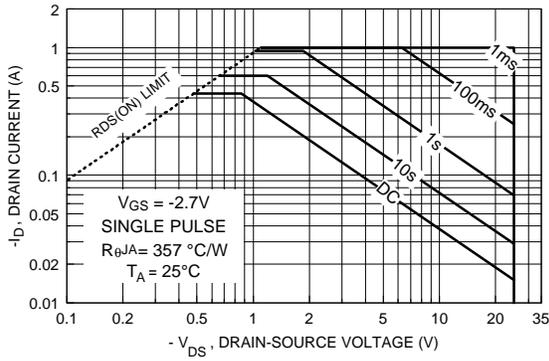


Figure 9. Maximum Safe Operating Area.

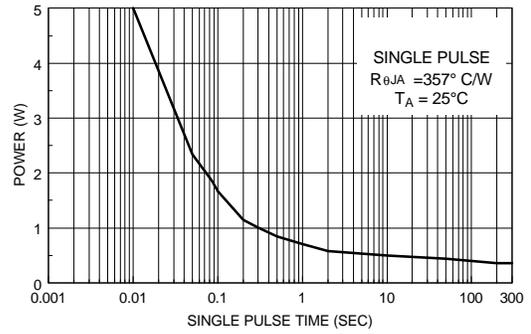


Figure 10. Single Pulse Maximum Power Dissipation.

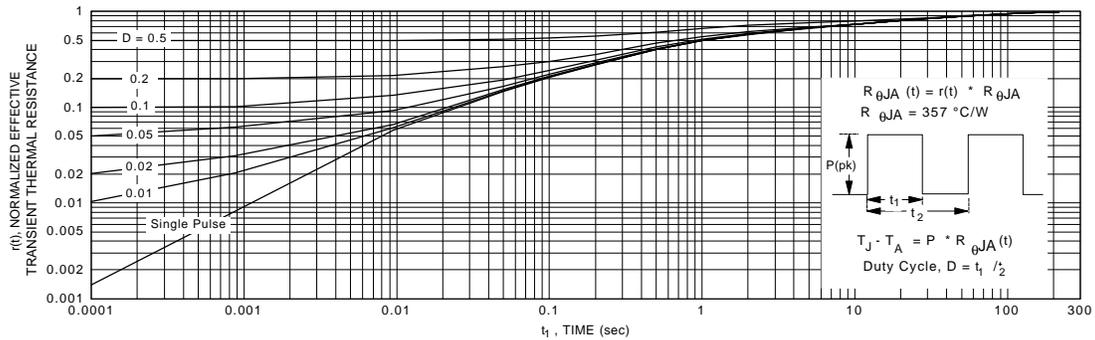


Figure 11. Transient Thermal Response Curve.

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