

FDD5202P

P-Channel, Logic Level, MOSFET

General Description

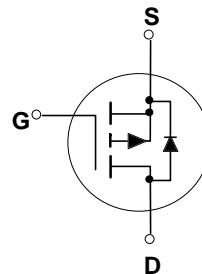
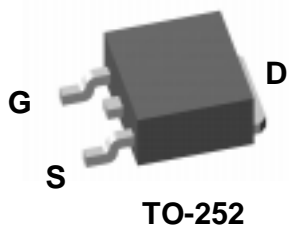
This P-Channel Logic level MOSFET is produced using Fairchild Semiconductor's advanced process that has been especially tailored to minimize the on state resistance and yet maintain low gate charge for superior switching performance.

Applications

- DC/DC converter
- Motor drives
- L.D.O.

Features

- -8 A, -60 V. $R_{DS(on)} = 0.3 \Omega @ V_{GS} = -10 V$
 $R_{DS(on)} = 0.5 \Omega @ V_{GS} = -4.5 V.$
- Low gate charge (15.5nC typical).
- Fast switching speed.



Absolute Maximum Ratings T_A=25°C unless otherwise noted

Symbol	Parameter	Ratings	Units
V _{DSS}	Drain-Source Voltage	-60	V
V _{GSS}	Gate-Source Voltage	±20	V
I _D	Drain Current - Continuous (Note 1)	-8	A
	(Note 1a)	-2.3	
	- Pulsed	-15	
P _D	Maximum Power Dissipation @ T _C = 25°C (Note 1)	39	W
	T _A = 25°C (Note 1a)	2.8	
	T _A = 25°C (Note 1b)	1.3	
T _J , T _{stg}	Operating and Storage Junction Temperature Range	-55 to +150	°C

Thermal Characteristics

R _{θJC}	Thermal Resistance, Junction-to- Case (Note 1)	3.2	°C/W
R _{θJA}	Thermal Resistance, Junction-to- Ambient (Note 1b)	96	°C/W

Package Marking and Ordering Information

Device Marking	Device	Reel Size	Tape width	Quantity
FDD5202P	FDD5202P	13"	16mm	2500

Electrical Characteristics T_A = 25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
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Off Characteristics

BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} = 0 V, I _D = -250 μA	-60			V
$\frac{\Delta BV_{DSS}}{\Delta T_J}$	Breakdown Voltage Temperature Coefficient	I _D = -250 μA, Referenced to 25°C		-60		mV/°C
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = -48 V, V _{GS} = 0 V			-1	μA
I _{GSSF}	Gate-Body Leakage Current, Forward	V _{GS} = 20V, V _{DS} = 0 V			100	nA
I _{GSSR}	Gate-Body Leakage Current, Reverse	V _{GS} = -20 V, V _{DS} = 0 V			-100	nA

On Characteristics (Note 2)

V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = -250 μA	-2	-2.3	-4	V
$\frac{\Delta V_{GS(th)}}{\Delta T_J}$	Gate Threshold Voltage Temperature Coefficient	I _D = -250 μA, Referenced to 25°C		3.2		mV/°C
R _{DS(on)}	Static Drain-Source On-Resistance	V _{GS} = -10 V, I _D = -2.3 A V _{GS} = -10 V, I _D = -2.3 A, T _J =125°C V _{GS} = -4.5 V, I _D = -1.8 A		0.205 0.340 0.313	0.300 0.510 0.500	Ω
I _{D(on)}	On-State Drain Current	V _{GS} = -10 V, V _{DS} = -5 V	-10			A
g _{FS}	Forward Transconductance	V _{DS} = -5 V, I _D = -2.3 A		3		S

Dynamic Characteristics

C _{iss}	Input Capacitance	V _{DS} = -30 V, V _{GS} = 0 V, f = 1.0 MHz		560		pF
C _{oss}	Output Capacitance			130		pF
C _{rss}	Reverse Transfer Capacitance			35		pF

Switching Characteristics (Note 2)

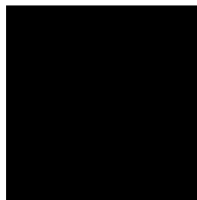
t _{d(on)}	Turn-On Delay Time	V _{DD} = -30 V, I _D = -1 A, V _{GS} = -10 V, R _{GEN} = 6 Ω		8	15	ns
t _r	Turn-On Rise Time			20	40	ns
t _{d(off)}	Turn-Off Delay Time			20	40	ns
t _f	Turn-Off Fall Time			5	20	ns
Q _g	Total Gate Charge	V _{DS} = -30 V, I _D = -2.3 A, V _{GS} = -10 V		15.5	22	nC
Q _{gs}	Gate-Source Charge			2.4		nC
Q _{gd}	Gate-Drain Charge			4.7		nC

Drain-Source Diode Characteristics and Maximum Ratings

I _S	Maximum Continuous Drain-Source Diode Forward Current			-2.2	A	
V _{SD}	Drain-Source Diode Forward Voltage	V _{GS} = 0 V, I _S = -2.2 A <small>(Note 2)</small>		-1	-1.3	V

Notes:

- R_{θJA} is the sum of the junction-to-case and case-to-ambient resistance where the case thermal reference is defined as the drain tab. R_{θJC} is guaranteed by design while R_{θJA} is determined by the user's board design.



■ a) R_{θJA} = 45°C/W when mounted on a 1 in² pad of 2oz copper.

■ b) R_{θJA} = 96°C/W when mounted on a 0.076 in² pad of 2oz copper.

Scale 1 : 1 on letter size paper

- Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2.0%

Typical Characteristics

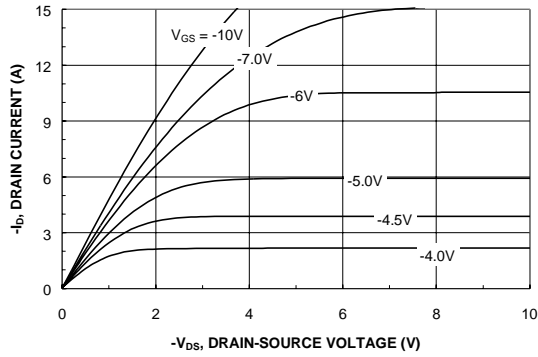


Figure 1. On-Region Characteristics.

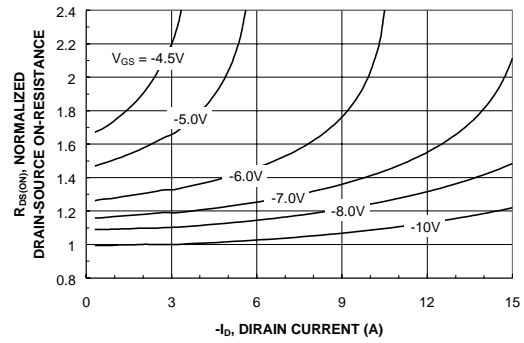


Figure 2. On-Resistance Variation with Drain Current and Gate Voltage.

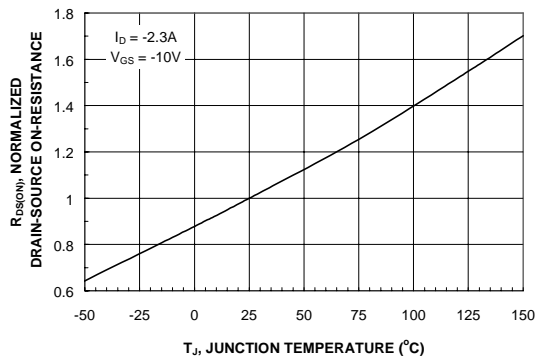


Figure 3. On-Resistance Variation with Temperature.

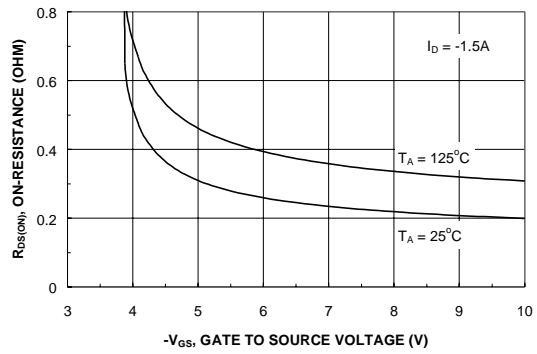


Figure 4. On-Resistance Variation with Gate-to-Source Voltage.

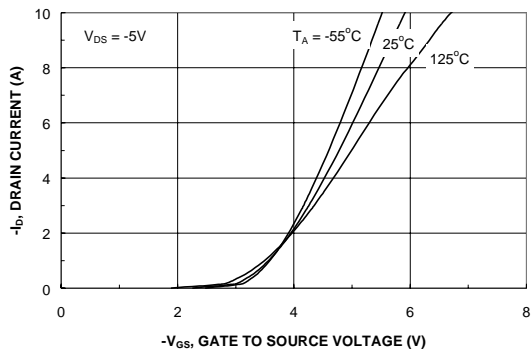


Figure 5. Transfer Characteristics.

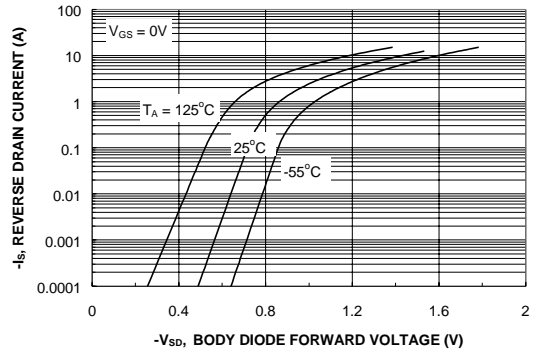


Figure 6. Body Diode Forward Voltage Variation with Source Current and Temperature.

Typical Characteristics (continued)

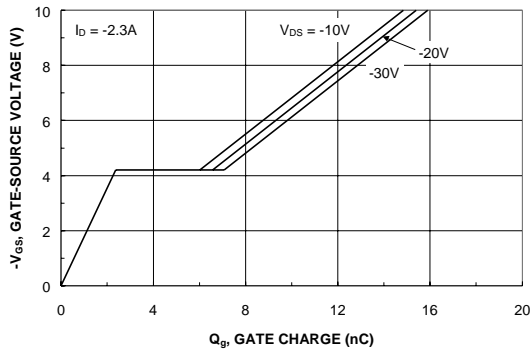


Figure 7. Gate-Charge Characteristics.

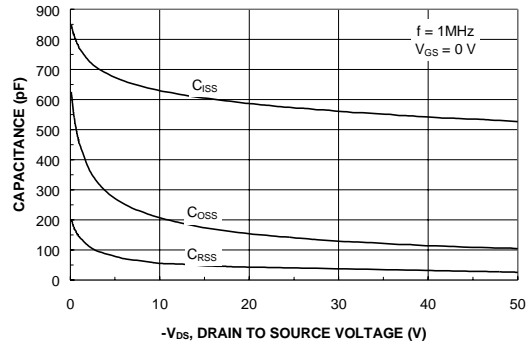


Figure 8. Capacitance Characteristics.

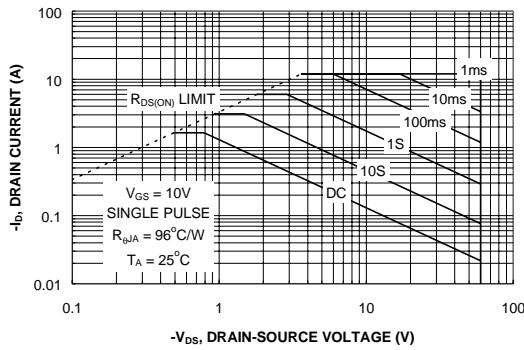


Figure 9. Maximum Safe Operating Area.

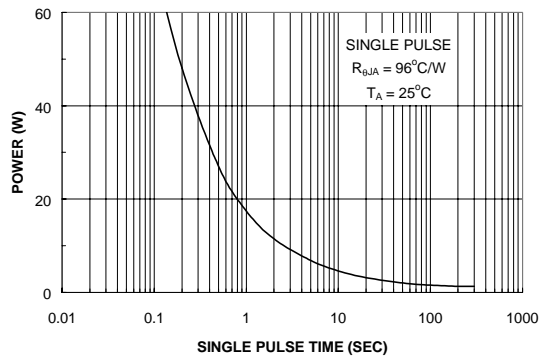


Figure 10. Single Pulse Maximum Power Dissipation.

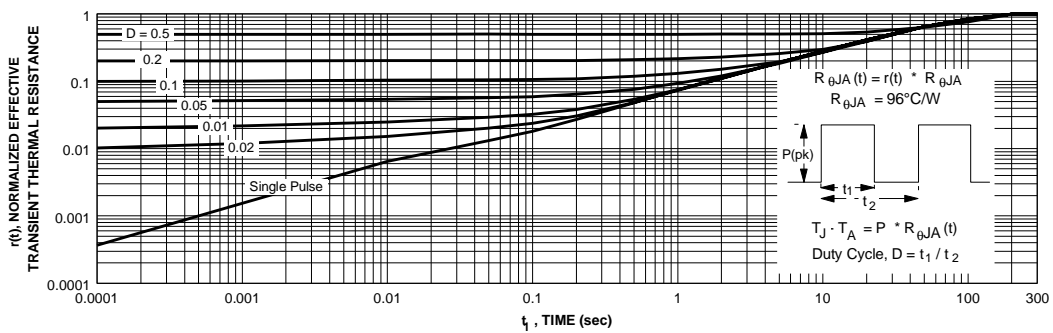


Figure 11. Transient Thermal Response Curve.

Thermal characterization performed using the conditions described in Note 1b.
 Transient thermal response will change depending on the circuit board design.

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