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February 1999

FDG312P P-Channel 2.5V Specified PowerTrench[™] MOSFET

General Description

This P-Channel MOSFET is produced using Fairchild Semiconductor's advanced PowerTrench process that has been especially tailored to minimize the on-state resistance and yet maintain low gate charge for superior switching performance. These devices are well suited for portable electronics applications.

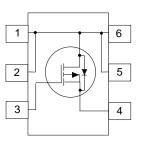
Applications

- Load switch
- Battery protection
- Power management

Features

- -1.2 A, -20 V. $R_{DS(on)} = 0.18 \ \Omega \ @ V_{GS} = -4.5 \ V$ $R_{DS(on)} = 0.25 \ \Omega \ @ V_{GS} = -2.5 \ V.$
- Low gate charge (3.3 nC typical).
- High performance trench technology for extremely low R_{DS(ON)}.
- Compact industry standard SC70-6 surface mount package.





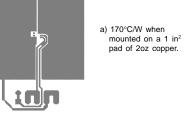
Absolute Maximum Ratings T_A = 25°C unless otherwise noted

Symbol	Parameter			Ratings	Units
V _{DSS}	Drain-Source Voltage			-20	V
V _{GSS}	Gate-Source Voltage		<u>±</u> 8	V	
I _D	Drain Current - Continuous (Note 1)		(Note 1)	-1.2	А
	- Pulsed			-6	
P _D	Power Dissipation for Single Operation (Note 1)		(Note 1a)	0.75	W
			(Note 1b)	0.55	
			(Note 1c)	0.48	
T _J , T _{stg}	Operating and Storage Junction Temperature Range			-55 to +150	°C
• 57, • 519			ure realige	00101100	Ŭ
Therma R _{θJA}	I Character	istics ance, Junction-to-Ambient	(Note 1)	260	•C/W
<u>Therma</u> _{R_{өл} Packag}	I Character Thermal Resista	istics ance, Junction-to-Ambient and Ordering Info	(Note 1)	260	∘C/W
<u>Therma</u> _{R_{өл} Packag}	I Character	istics ance, Junction-to-Ambient	(Note 1)		

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Symbol	Parameter	Test Conditions	Min	Тур	Max	Units
Off Char	acteristics					
BV _{DSS}	Drain-Source Breakdown Voltage	V_{GS} = 0 V, I_D = -250 μ A	-20			V
<u>A</u> BV⊡ss ∆Tj	Breakdown Voltage Temperature Coefficient	$I_D = -250 _{L}A$, Referenced to $25^{\circ}C$		-19		mV/∘C
DSS	Zero Gate Voltage Drain Current	$V_{DS} = -16 V, V_{GS} = 0 V$			-1	μA
	Gate-Body Leakage Current, Forward	$V_{GS} = 8 V, V_{DS} = 0 V$			100	nA
	Gate-Body Leakage Current, Reverse	$V_{GS} = -8 \ V, \ V_{DS} = 0 \ V$			-100	nA
On Char	acteristics (Note 2)					
V _{GS(th)}	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_{D} = -250 \ \mu A$	-0.4	-0.9	-1.5	V
<u>A</u> VGS(th) ΔTJ	Gate Threshold Voltage Temperature Coefficient	$I_D = -250 _{\text{L}}\text{A}$, Referenced to 25°C		2.5		mV/∘C
R _{DS(on)}	Static Drain-Source On-Resistance	$ \begin{array}{l} V_{GS}=-4.5 \ V, \ I_{D}=-1.2 \ A \\ V_{GS}=-4.5 \ V, \ I_{D}=-1.2 \ A \ @125^{\circ}C \\ V_{GS}=-2.5 \ V, \ I_{D}=-1 \ A \end{array} $		0.135 0.200 0.187	0.18 0.29 0.25	Ω
D(on)	On-State Drain Current	V_{GS} = -4.5 V, V_{DS} = -5 V	-3			А
Ĵfs	Forward Transconductance	V_{DS} = -5 V, I_{D} = -1.2 A		3.8		S
Dvnamic	Characteristics					
C _{iss}	Input Capacitance	$V_{DS} = -10 V, V_{GS} = 0 V,$		330		pF
Coss	Output Capacitance	f = 1.0 MHz		80		pF
C _{rss}	Reverse Transfer Capacitance			35		pF
Switchin	g Characteristics (Note 2)					
t _{d(on)}	Turn-On Delay Time	$V_{DD} = -5 V, I_{D} = -0.5 A,$		7	15	ns
t _r	Turn-On Rise Time	$V_{GS} = -4.5 \text{ V}, \text{ R}_{GEN} = 6 \Omega$		12	22	ns
t _{d(off)}	Turn-Off Delay Time			16	26	ns
t _f	Turn-Off Fall Time	1		5	12	ns
Q _g	Total Gate Charge	V _{DS} = -10 V, I _D = -1.2 A,		3.3	5	nC
Q _{gs}	Gate-Source Charge	V _{GS} = -4.5 V		0.8		nC
Q _{gd}	Gate-Drain Charge			0.7		nC
Drain So	ource Diode Characteristics and	Maximum Patings				
ls	Maximum Continuous Drain-Source Did				-0.6	А
V _{SD}	Drain-Source Diode Forward Voltage	$V_{GS} = 0 V, I_S = -0.6 A$ (Note 2)		-0.83	-1.2	V
Notes: 1. R _{eJA} is the	a) 170°C/W when mounted on a 1 in ²	sistance where the case thermal reference is d	lefined as	the solder c) 2		surface of

inn

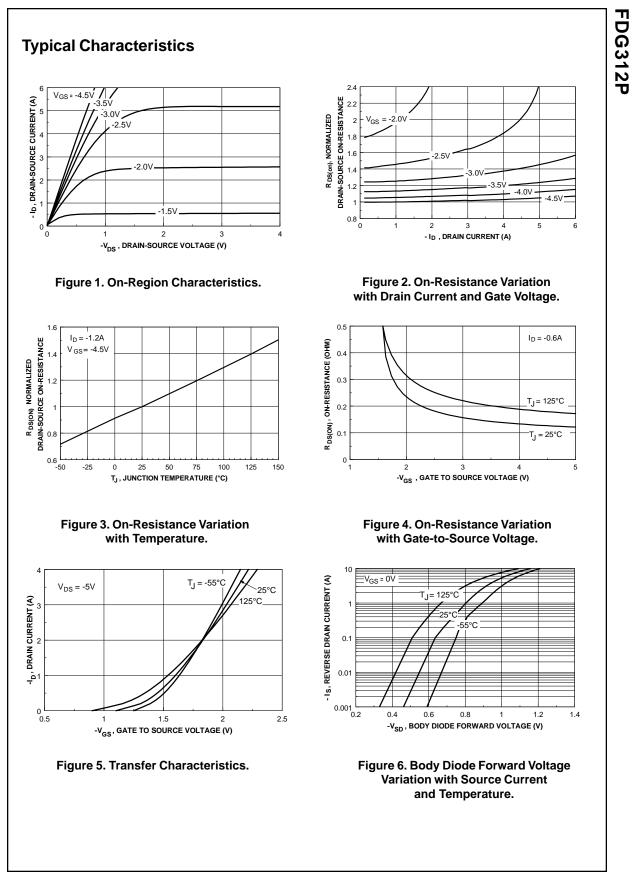


Scale 1 : 1 on letter size paper

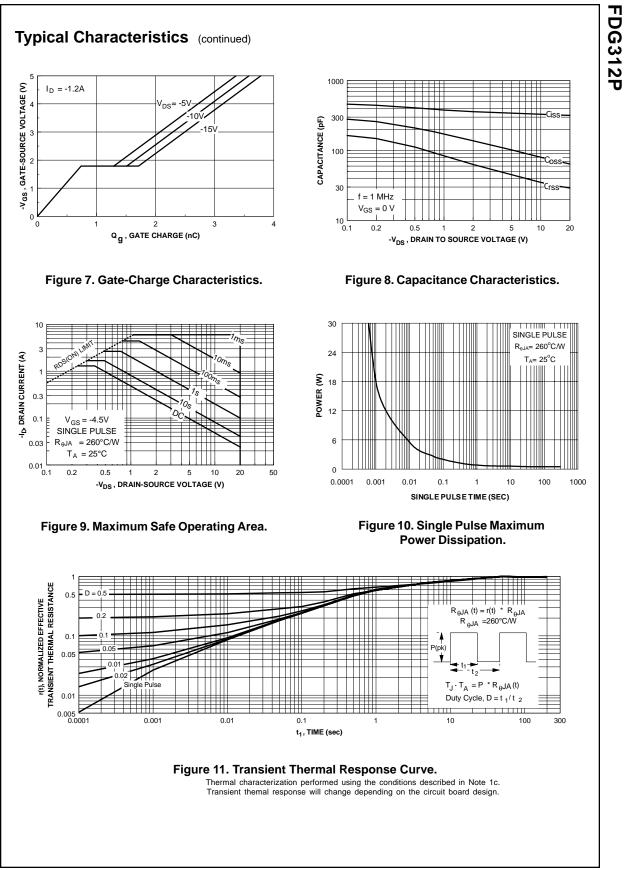
2. Pulse Test: Pulse Width \leq 300 µs, Duty Cycle \leq 2.0%

FDG312P Rev. C

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