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FDV305N

20V N-Channel PowerTrench® MOSFET

General Description

This 20V N-Channel MOSFET uses Fairchild's high voltage PowerTrench process. It has been optimized for power management applications.

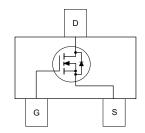
Applications

- Load switch
- Battery protection
- Power management

Features

- 0.9 A, 20 V $R_{DS(ON)}$ = 220 $m\Omega$ @ V_{GS} = 4.5 V $R_{DS(ON)}$ = 300 $m\Omega$ @ V_{GS} = 2.5 V
- Low gate charge
- · Fast switching speed
- High performance trench technology for extremely low R_{DS(ON)}





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	± 12	V
I _D	Drain Current - Continuous	0.9	Α
	– Pulsed	2	
P _D	Maximum Power Dissipation	0.35	W
T _J , T _{STG}	Operating and Storage Junction Temperature Range	-55 to +150	°C

Thermal Characteristics

$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	357	°C/W
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Package Marking and Ordering Information

_	Device Marking	Device	Reel Size	Tape width	Quantity
	305	FDV305N	7"	8mm	3000 units

Symbol	Parameter	Test Cond	litions	Min	Тур	Max	Units
Off Char	acteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	$V_{GS} = 0 V$, I_D	= 250 μΑ	20			V
$\frac{\Delta BV_{DSS}}{\Delta T_{J}}$	Breakdown Voltage Temperature Coefficient	I _D = 250 μA,Referer			15		mV/°C
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 16 V, V _G	s = 0 V			1	μΑ
I _{GSSF}	Gate-Body Leakage, Forward	V _{GS} = 12 V, V _D	s = 0 V			100	nA
I _{GSSR}	Gate-Body Leakage, Reverse	$V_{GS} = -12 \text{ V}, V_{D}$	s = 0 V			-100	nA
On Char	acteristics (Note 2)						
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_{D}$	= 250 μΑ	0.6	1	1.5	V
$\frac{\Delta V_{GS(th)}}{\Delta T_J}$	Gate Threshold Voltage Temperature Coefficient	I _D = 250 μA,Referer			-3		mV/°C
R _{DS(on)}	Static Drain–Source On–Resistance		= 0.9 A = 0.7 A A, T _J = 125°C		164 235 220	220 300 303	mΩ
I _{D(on)}	On-State Drain Current	V_{GS} = 4.5V, V_{D}	s = 5 V	1			Α
g _{FS}	Forward Transconductance		= 0.9 A		3		S
Dvnamio	Characteristics						
C _{iss}	Input Capacitance	V _{DS} = 10 V, V _G	V GS = 0 V.		109		pF
C _{oss}	Output Capacitance	f = 1.0 MHz			30		pF
C _{rss}	Reverse Transfer Capacitance				14		pF
Switchin	g Characteristics (Note 2)						
t _{d(on)}	Turn-On Delay Time	V _{DD} = 10 V, I _D :	= 1 A,		4.5	9	ns
t _r	Turn-On Rise Time	V_{GS} = 4.5 V, R_{G}	$_{\rm EN}$ = 6 Ω		7	14	ns
t _{d(off)}	Turn-Off Delay Time				8	16	ns
t _f	Turn-Off Fall Time				1.4	2.8	ns
Q _g	Total Gate Charge	V _{DS} = 10 V, I _D :	= 0.9 A,		1.1	1.5	nC
Q _{gs}	Gate-Source Charge	V _{GS} = 4.5 V			0.26		nC
Q_{gd}	Gate-Drain Charge				0.26		nC
Drain-S	ource Diode Characteristics	and Maximum R	atinas				
Is	Maximum Continuous Drain-Source					0.29	Α
V _{SD}	Drain–Source Diode Forward Voltage	$V_{GS} = 0 V$, I_{S} :	= 0.29 A		0.75	1.2	V
t _{rr}	Diode Reverse Recovery Time	I _F = 0.9 A,			7.4		nS
	Diode Reverse Recovery Charge	$d_{iF}/d_{t} = 100 \text{ A/}\mu\text{s}$			2.2		nC

Notes:

^{1.} Pulse Test: Pulse Width \leq 300 μ s, Duty Cycle \leq 2.0%

Typical Characteristics

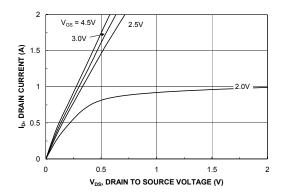


Figure 1. On-Region Characteristics.

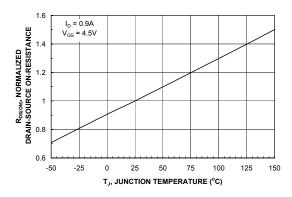


Figure 3. On-Resistance Variation with Temperature.

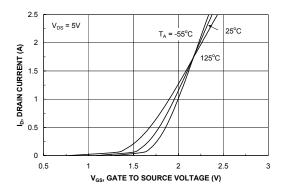


Figure 5. Transfer Characteristics.

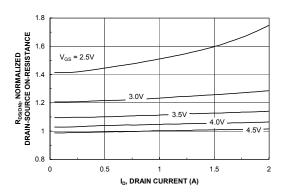


Figure 2. On-Resistance Variation with Drain Current and Gate Voltage.

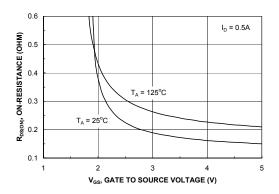


Figure 4. On-Resistance Variation with Gate-to-Source Voltage.

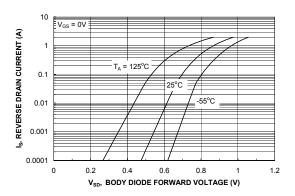
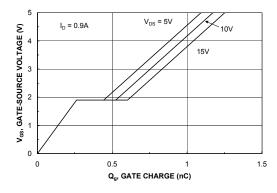


Figure 6. Body Diode Forward Voltage Variation with Source Current and Temperature.

Typical Characteristics



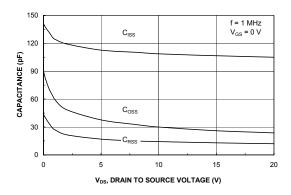
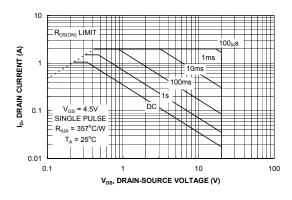


Figure 7. Gate Charge Characteristics.





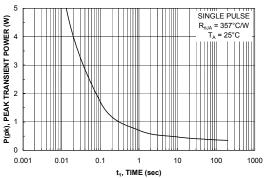


Figure 9. Maximum Safe Operating Area.



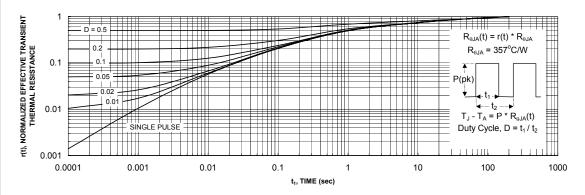


Figure 11. Transient Thermal Response Curve.

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