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November 2013



FCH47N60N N-Channel SupreMOS[®] MOSFET 600 V, 47 A, 62 mΩ

Features

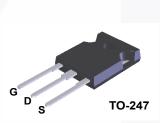
- 650 V @ T_J = 150°C
- $R_{DS}(on) = 51.5 \text{ m}\Omega$ (Typ.) @ $V_{GS} = 10 \text{ V}$, $I_D = 23.5 \text{ A}$
- Ultra Low Gate Charge (Typ. Q_g = 115 nC)
- Low Effective Output Capacitance (Typ. C_{oss(eff.)} = 511 pF)
- 100% Avalanche Tested
- RoHS Compliant

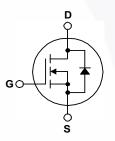
Application

- Solar Inverter
- AC-DC Power Supply

Description

The SupreMOS[®] MOSFET is Fairchild Semiconductor's next generation of high voltage super-junction (SJ) technology employing a deep trench filling process that differentiates it from the conventional SJ MOSFETs. This advanced technology and precise process control provides lowest Rsp on-resistance, superior switching performance and ruggedness. SupreMOS MOSFET is suitable for high frequency switching power converter applications such as PFC, server/telecom power, FPD TV power, ATX power, and industrial power applications.





Absolute Maximum Ratings T_C = 25°C unless otherwise noted.

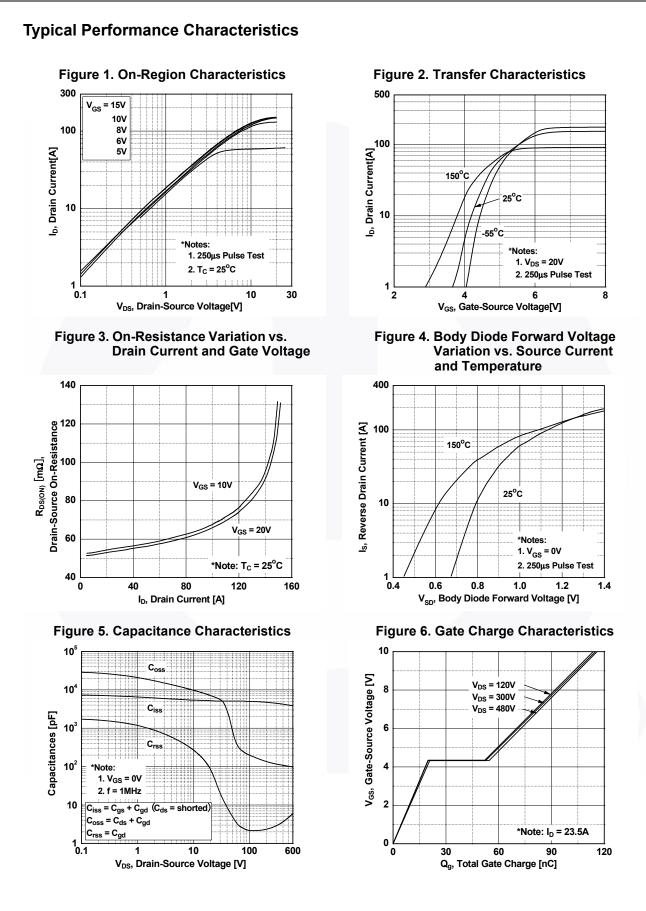
Symbol		Parameter		FCH47N60N	Unit
V _{DSS}	Drain to Source Voltage			600	V
V _{GSS}	Gate to Source Voltage			±30	V
ID	Drain Current	- Continuous (T _C = 25 ^o C)		47	Α
		- Continuous (T _C = 100 ^o C)	/	29.7	
I _{DM}	Drain Current	- Pulsed (Note 1)	141	A
E _{AS}	Single Pulsed Avalanche Energy (Note 2)			3068	mJ
I _{AR}	Avalanche Current	Note 1)	15.7	А	
E _{AR}	Repetitive Avalanche Er	Note 1)	3.7	mJ	
مار ، (مالا	MOSFET dv/dt			100	V/ns
dv/dt	Peak Diode Recovery dy	v/dt (Note 3)	20	V/ns
P _D	Power Dissipation	(T _C = 25 ^o C)		368	W
		- Derate above 25°C		2.94	W/ ^o C
T _J , T _{STG}	Operating and Storage Temperature Range			-55 to +150	°C
TL	Maximum Lead Temperature for Soldering, 1/8" from Case for 5 Seconds		nds	300	°C

Thermal Characteristics

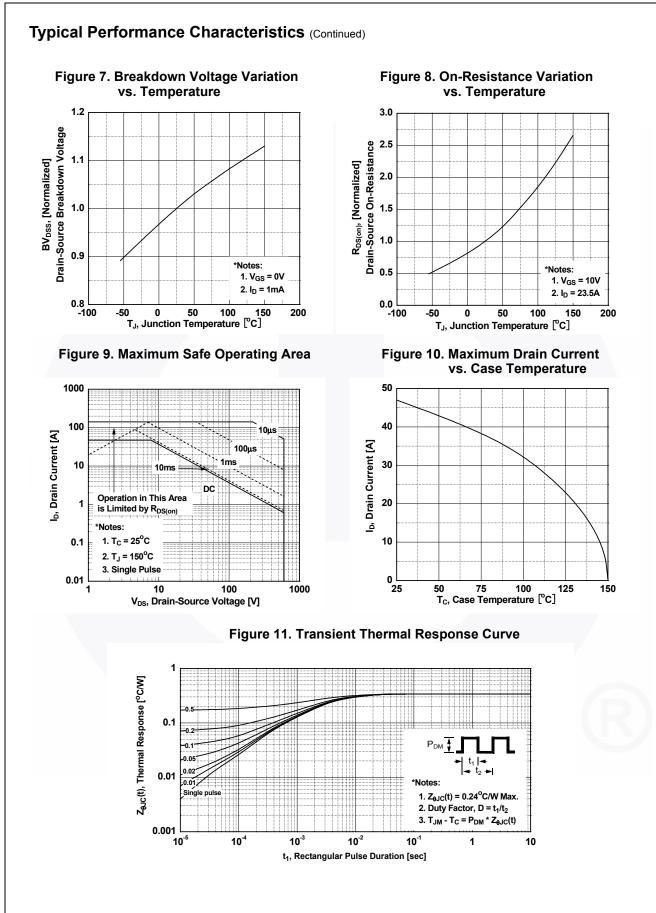
Symbol	bol Parameter FCH		Unit
$R_{ extsf{ heta}JC}$	R _{0JC} Thermal Resistance, Junction to Case, Max.		°C/W
$R_{ extsf{ heta}JA}$	Thermal Resistance, Junction to Ambient, Max.	40	°C/W

1

Part NumberTop MarkFCH47N60NFCH47N60N		Package TO-247			te Tape Width		Quantity 30 units		
Electrica	l Chara	icteristics T _C = 25°C u	nless other	wise noted.					
Symbol		Parameter		Test Conditions	5	Min.	Тур.	Max.	Unit
Off Charac	teristics								
BV _{DSS}	Drain to S	Source Breakdown Voltage	I _D =	1 mA, V _{GS} = 0 V, T _C :	= 25°C	600	-	-	V
ΔBV _{DSS} / ΔΤ.I	Breakdown Voltage Temperature Coefficient			$I_D = 1$ mA, Referenced to 25°C		-	0.78	-	V/ºC
I _{DSS}	Zero Gat	e Voltage Drain Current		= 480 V, V _{GS} = 0 V = 480 V, V _{GS} = 0 V, T	c = 125°C	-	-	10 100	μA
I _{GSS}	Gate to E	Body Leakage Current		$= \pm 30 \text{ V}, \text{ V}_{\text{DS}} = 0 \text{ V}$	0	-	-	±100	nA
On Charac	teristics						I		
	-	eshold Voltage	Vee	= V _{DS} , I _D = 250 μA		2	-	4	V
V _{GS(th)} R _{DS(on)}		ain to Source On Resistance		$= V_{DS}, I_D = 230 \mu\text{A}$ = 10 V, I _D = 23.5 A		-	- 51.5	62.0	mΩ
9FS		Transconductance		= 40 V, I _D = 23.5 A		-	56	-	S
			03						
	1	Input Capacitance				-	5037	6700	pF
C _{oss}		apacitance		V _{DS} = 100 V, V _{GS} = 0 V f = 1 MHz		-	200	270	pF
C _{rss}		Transfer Capacitance	f = 1			-	2.5	4.0	pF
C _{oss}		apacitance	Vns	= 380 V, V _{GS} = 0 V, f	= 1 MHz	-	108	-	pF
C _{oss(eff.)}		Output Capacitance		= 0 V to 380 V, V _{GS} =			511	-	pF
Q _{g(tot)}	-	e Charge at 10V				-	115	151	nC
Q _{gs}		Source Gate Charge		V _{DS} = 380 V, I _D = 23.5 A, V _{GS} = 10 V		-	21	-	nC
Q _{gd}	-	Drain "Miller" Charge	- 63		(Note 4)	-	34	-	nC
ESR	Equivaler	nt Series Resistance(G-S)	f = 1	MHz		-	0.9	-	Ω
Switching	Characte	eristics							
_	-	Delay Time					11	32	ns
t _{d(on)}		Rise Time	Vnn	V_{DD} = 380 V, I _D = 23.5 A R _G = 4.7 Ω (Note 4)			9	28	ns
triver		Delay Time					135	280	ns
t _{d(off)}	Turn-Off I					-	22	54	ns
		e Characteristics			. ,				1
I _S	1	Continuous Drain to Source	Diode For	vard Current		_	-	47	Α
I _{SM}	Maximum Pulsed Drain to Source Diode					-	_	141	A
V _{SD}		Source Diode Forward Voltag		= 0 V, I _{SD} = 23.5 A		-	-	1.2	V
t _{rr}	Reverse I	Recovery Time		= 0 V, I _{SD} = 23.5 A		-	495	-	ns
Q _{rr}		Recovery Charge		it = 100 A/μs	_	-	12	-	μC
2. I _{AS} = 15.7 A, R _G 3. I _{SD} ≤ 47 A, di/dt ≤	= 25 Ω, startin ≤ 200 A/μs, V _D	mited by maximum junction temperatu g $T_J = 25^{\circ}$ C. $_{D} \le 380$ V, starting $T_J = 25^{\circ}$ C. rating temperature typical characteristi							



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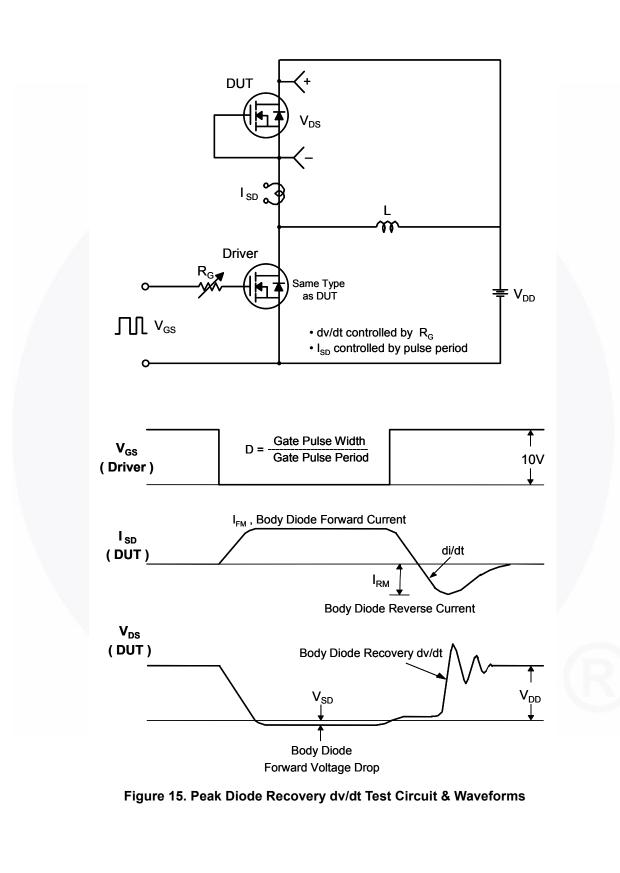


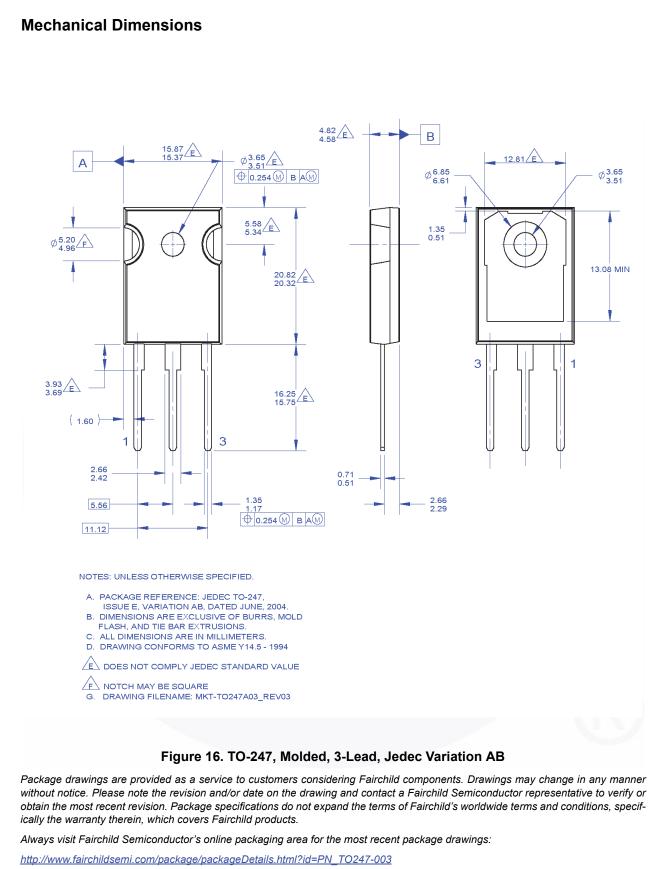
 V_{GS} ξ א Q_g FV_{DS} Q_{gd} Q_{gs} • DUT I_G = const. Charge Figure 12. Gate Charge Test Circuit & Waveform R VDS V_{DS} 90% ο V_{DD} GS R_{G} 10% V_{GS} DUT V_{GS} ∏ 0 Figure 13. Resistive Switching Test Circuit & Waveforms L $E_{AS} = \frac{1}{2} L I_{AS}^2$ V_{DS} $\mathsf{BV}_{\mathsf{DSS}}$ ID o I_{AS} R_{G} ≑ V_{DD} $I_{D}(t)$ $\mathsf{V}_{\mathsf{D}\mathsf{D}}$ V_{GS}] $V_{DS}(t)$ DUT Time t_p Figure 14. Unclamped Inductive Switching Test Circuit & Waveforms

FCH47N60N — N-Channel SupreMOS[®] MOSFET

5

FCH47N60N — N-Channel SupreMOS[®] MOSFET







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