

## FCP7N60N / FCPF7N60NT N-Channel SupreMOS<sup>®</sup> MOSFET

600 V, 6.8 A, 520 m $\Omega$ 

## Features

- $R_{DS(on)} = 460 \text{ m}\Omega \text{ (Typ.)} @ V_{GS} = 10 \text{ V}, I_D = 3.4 \text{ A}$
- Ultra Low Gate Charge (Typ.Q<sub>g</sub> = 17.8 nC)
- Low Effective Output Capacitance (Typ. C<sub>oss</sub>.eff = 91 pF)
- 100% Avalanche Tested
- RoHS Compliant

## Application

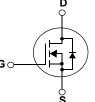
- LCD/LED TV and Monitor
- Lighting
- Solar Inverter
- AC-DC Power Supply



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The SupreMOS<sup>®</sup> MOSFET is Fairchild Semiconductor<sup>®</sup>, 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.





## MOSFET Maximum Ratings T<sub>C</sub> = 25°C unless otherwise noted

Symbol		FCP7N60N	FCPF7N60NT	Unit			
V <sub>DSS</sub>	Drain to Source Voltage				600		
V <sub>GSS</sub>	Gate to Source Voltage				V		
I <sub>D</sub>	Drain Current	-Continuous (T <sub>C</sub> = 25°C)		6.8	6.8*	^	
		-Continuous ( $T_c = 100^{\circ}C$ )		4.3	4.3*	A	
I <sub>DM</sub>	Drain Current	- Pulsed (Note 1)		20.4	20.4	Α	
E <sub>AS</sub>	Single Pulsed Avalanche Energy (Note 2)				79.4		
I <sub>AR</sub>	Avalanche Current			6.8		А	
E <sub>AR</sub>	Repetitive Avalanche Energy				mJ		
	MOSFET dv/dt Ruggedness				100		
dv/dt	Peak Diode Recovery dv/dt (Note 3)				V/ns		
P <sub>D</sub>	Dower Dissingtion	$(T_{\rm C} = 25^{\rm o}{\rm C})$		64.1	30.5	W	
	Power Dissipation	- Derate above 25°C		0.51	0.24	W/ºC	
T <sub>J</sub> , T <sub>STG</sub>	Operating and Storage Temperature Range			-55 to +150		°C	
TL	Maximum Lead Temperature for Soldering Purpose, 1/8" from Case for 5 Seconds			300		٥C	
Drain current li	mited by maximum junction temperate	ure			4		

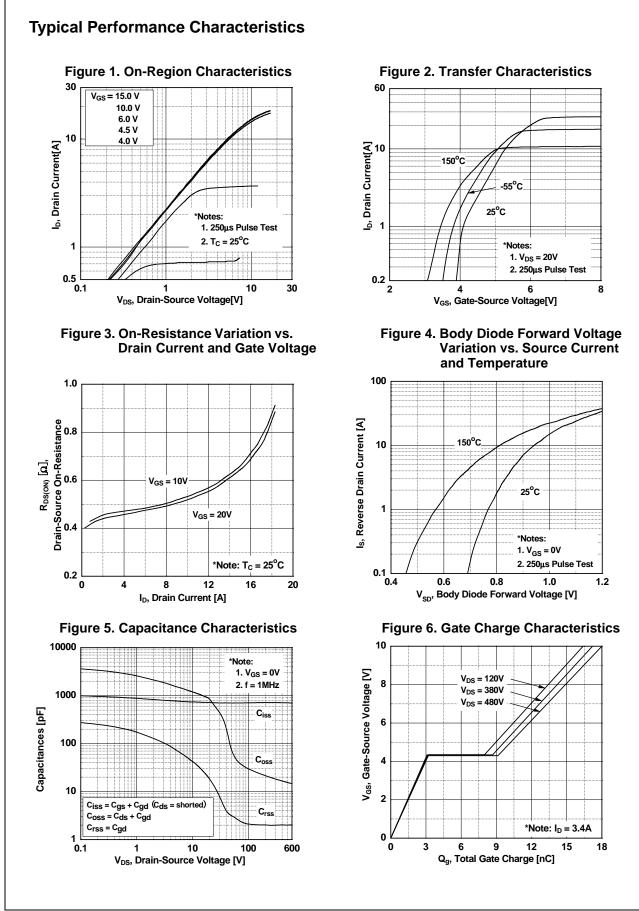
GDS

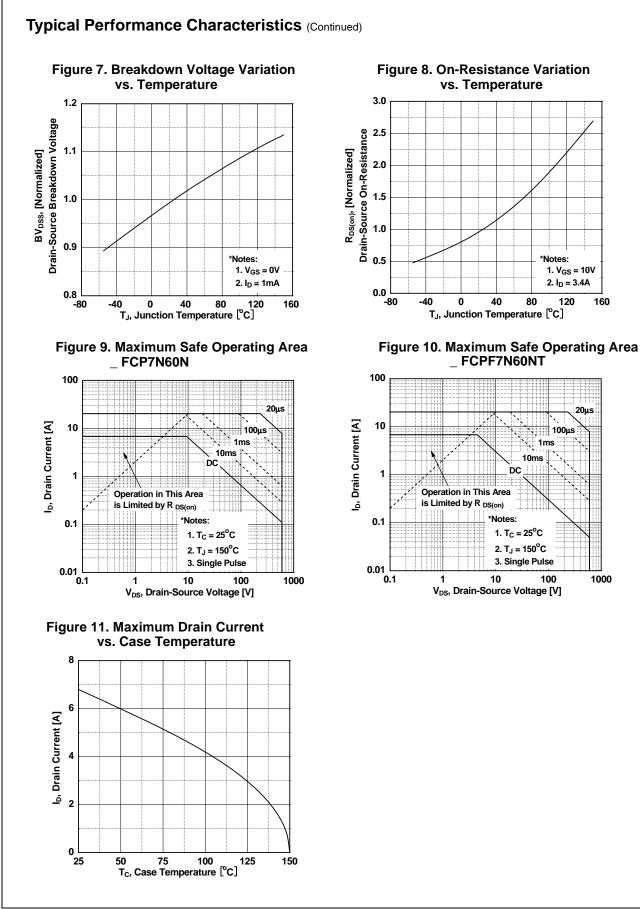
### Thermal Characteristics

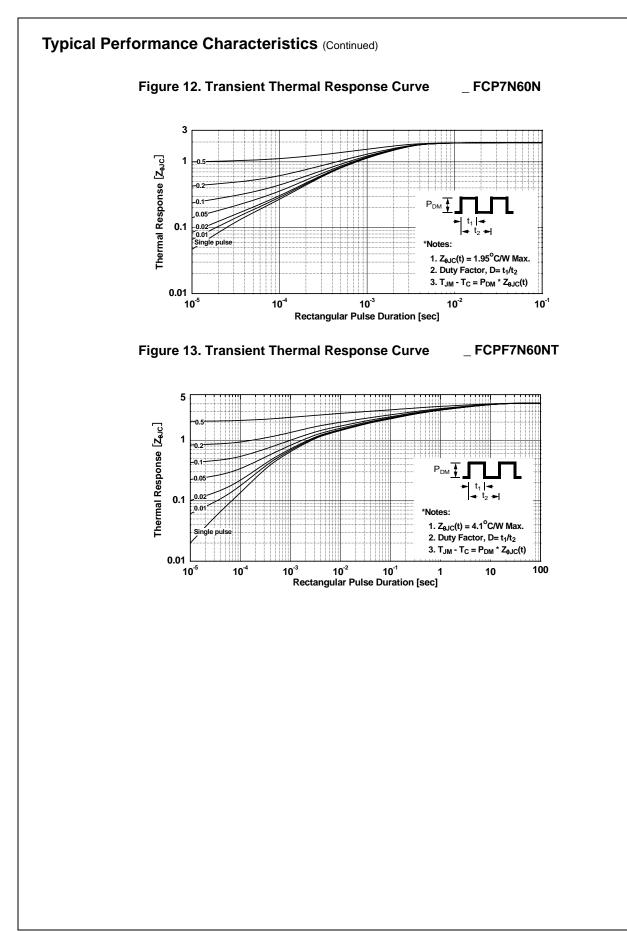
Symbol	Parameter	FCP7N60N	FCPF7N60NT	Unit	
$R_{ extsf{ heta}JC}$	Thermal Resistance, Junction to Case	1.95	4.1		
$R_{\theta CS}$	Thermal Resistance, Case to Heak Sink (Typical)	0.5	0.5	°C/W	
$R_{ extsf{ heta}JA}$	Thermal Resistance, Junction to Ambient	62.5	62.5		

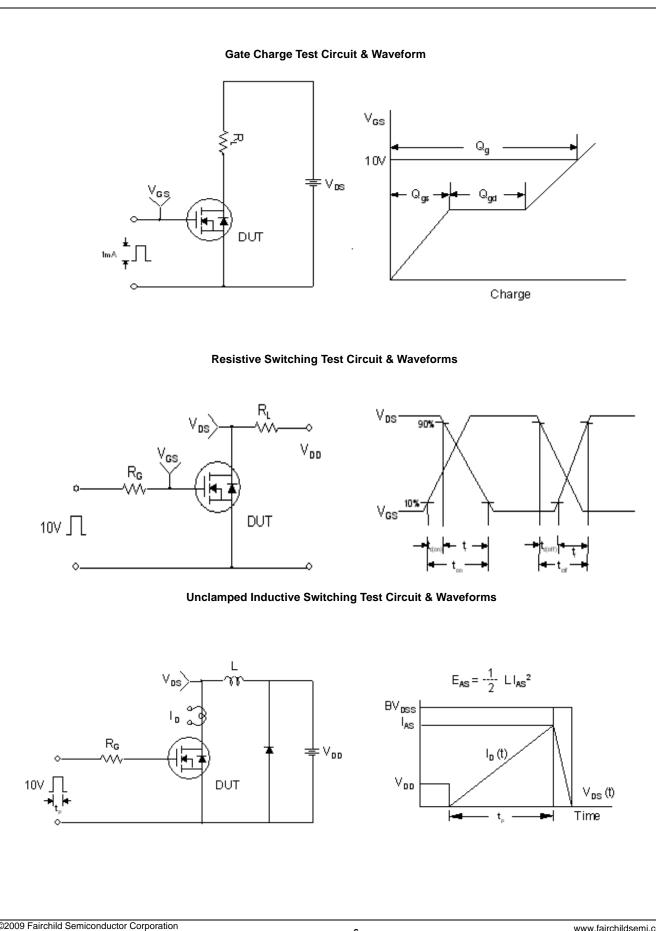
FCP7N60N
/ FCPF7N60N <sup>-</sup>
T N-Channel
MOSFET

Device Marking Device Pack		Package	age Reel Size Tape		e Width		Quantit	y		
FCP7N60N FCP7N60N TO-22		TO-220A	В	-		-		50		
FCPF7N60NT FCPF7N60NT TO-22		TO-220F	=	-		-		50		
Electrica	l Char	acteristics T <sub>C</sub> =	= 25ºC unless o	otherwise n	oted					
Symbol	Parameter			Test Conditions			Min.	Тур.	Max.	Unit
Off Charac	teristic	S								
BV <sub>DSS</sub>	Drain to	to Source Breakdown Voltage		$I_D = 1 \text{ mA}, V_{GS} = 0 \text{ V}, T_C = 25^{\circ}\text{C}$			600	-	-	V
		down Voltage Temperature						0.6		V/°C
$\Delta T_{J}$	Coefficient			$I_D = 1$ mA, Referenced to 25°C $V_{DS} = 480$ V, $V_{GS} = 0$ V			-	0.6	-	V/°C
DSS	Zero Ga	o Gate Voltage Drain Current					-	-	10	μA
055		,			$V, V_{GS} = 0 V, T_{C}$	$_{\rm C} = 125^{\rm o}{\rm C}$	-	-	100	μι
GSS	Gate to	to Body Leakage Current		$V_{GS} = \pm 30$	V, $V_{DS} = 0 V$		-	-	±100	nA
On Charac	teristic	s								
V <sub>GS(th)</sub>	Gate Threshold Voltage			$V_{GS} = V_{DS}$	<sub>s</sub> , I <sub>D</sub> = 250 μA		2.0	-	4.0	V
R <sub>DS(on)</sub>	Static D	Drain to Source On Resistance		$V_{GS} = 10 \text{ V}, \text{ I}_{D} = 3.4 \text{ A}$			-	0.46	0.52	Ω
9 <sub>FS</sub>	Forward	ard Transconductance		$V_{DS} = 20 \text{ V}, \text{ I}_{D} = 3.4 \text{ A}$			-	8.5	-	S
Dynamic C	haracte	prietice								
		apacitance		V <sub>DS</sub> = 100 V, V <sub>GS</sub> = 0 V			-	719	960	pF
C <sub>ISS</sub>		Capacitance					-	30	40	pr
C <sub>rss</sub>		se Transfer Capacitance		f = 1 MHz		_	2.1	3.2	pr	
C <sub>oss</sub>		ut Capacitance		V <sub>DS</sub> = 380 V, V <sub>GS</sub> = 0 V, f = 1 MHz			_	17	-	pF
C <sub>oss</sub> eff		ve Output Capacitance		$V_{DS} = 380 \text{ V}, V_{GS} = 0 \text{ V}, 1 = 1 \text{ WHZ}$ $V_{DS} = 0 \text{ V} \text{ to } 380 \text{ V}, V_{GS} = 0 \text{ V}$			-	91	-	pF
Q <sub>g(tot)</sub>		Gate Charge at 10V					_	17.8	35.6	nC
Q <sub>gs</sub>		o Source Gate Charge		V <sub>DS</sub> = 380 V,I <sub>D</sub> = 3.4 A V <sub>GS</sub> = 10 V			-	3.2	6.3	nC
∝ <sub>gs</sub> Q <sub>gd</sub>		o Drain "Miller" Charge		(Note 4)			-	6.0	11.9	nC
∝ <sub>gd</sub> ESR		alent Series Resistance (G-S)		Drain Open			-	2.5	-	Ω
itabina	Charaa	toriotico		•		I			1	
Switching								40	0.4	
t <sub>d(on)</sub>		Turn-On Delay Time Turn-On Rise Time Turn-Off Delay Time		$V_{DD} = 380 \text{ V}, \text{ I}_{D} = 3.4 \text{ A}$ $R_{G} = 4.7 \Omega$			-	12	24	ns
<u>r</u>							-	6	22	ns
t <sub>d(off)</sub>							-	35	80	ns
<sup>[</sup> f		f Fall Time			(Note 4)		-	12	24	ns
	1	de Characteristic				i			1	1.
s				de Forward Current			-	-	6.8	A
SM	Maximum Pulsed Drain to Source Diode F						-	-	20.4	A
V <sub>SD</sub>		in to Source Diode Forward Voltage		$V_{GS} = 0 V, I_{SD} = 3.4 A$			-	-	1.2	V
		se Recovery Time		$V_{GS} = 0 V, I_{SD} = 3.4 A$ dI <sub>F</sub> /dt = 100 A/µs			-	211	-	ns
		e Recovery Charge		$u_{F}/u_{I} = 10$	ιο Α/με		-	1.8	-	μC

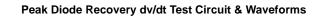


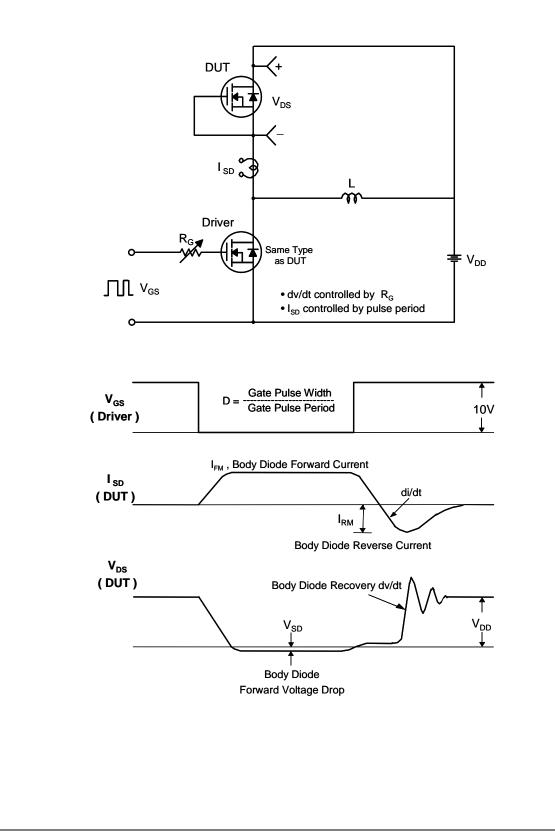


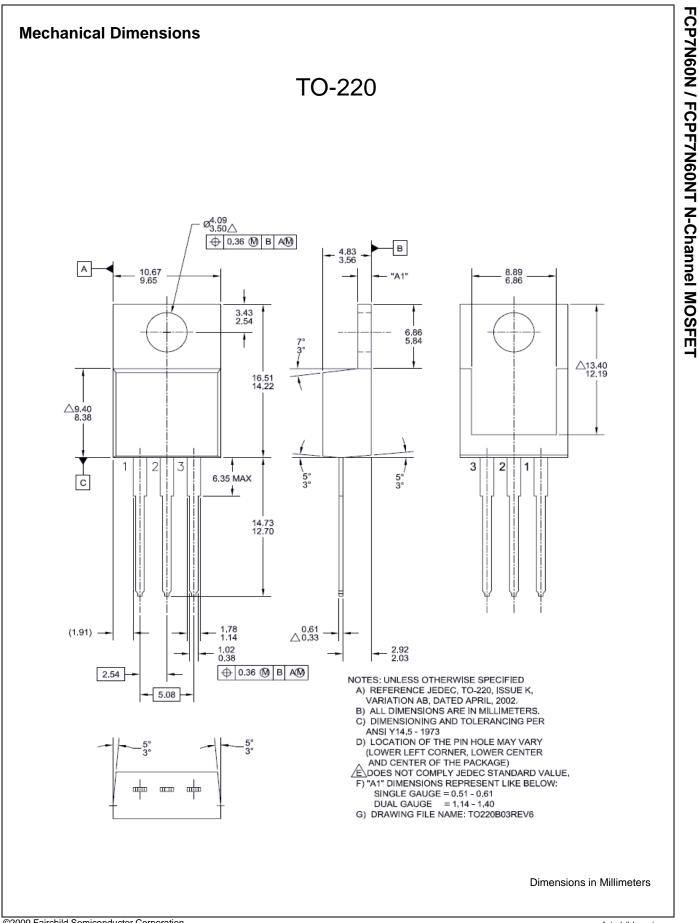




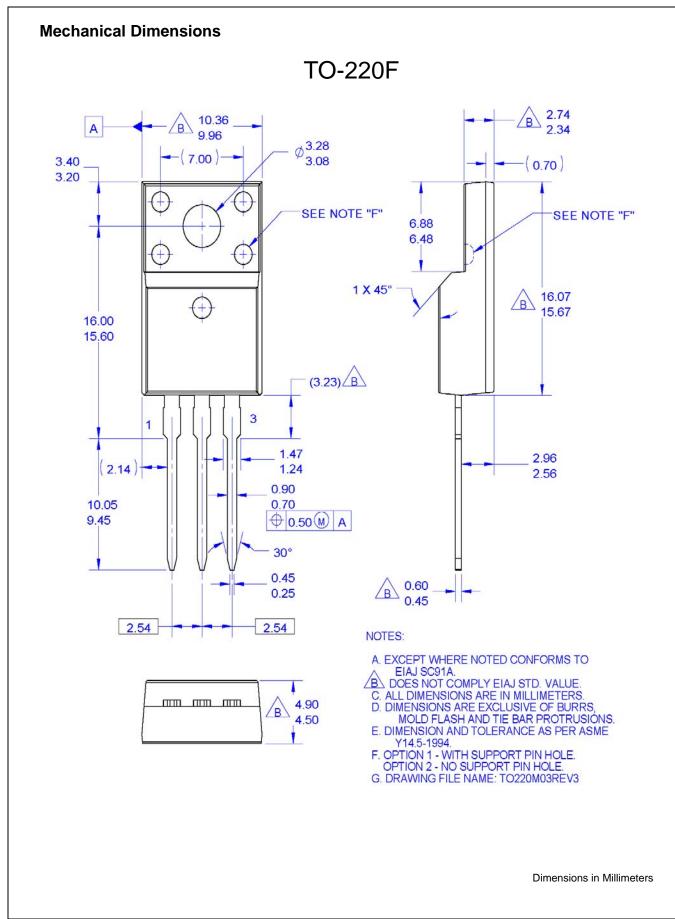
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