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FCP13N60N / FCPF13N60NT N-Channel SupreMOS[®] MOSFET 600 V, 13 A, 258 mΩ

Features

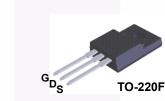
- R_{DS(on)} = 220 mΩ (Typ.) @ V_{GS} = 10 V, I_D = 6.5 A
- Ultra Low Gate Charge (Typ. Q_q = 30.4 nC)
- Low Effective Output Capacitance (Typ. C_{oss(eff.)} = 145 pF)
- 100% Avalanche Tested
- RoHS Compliant

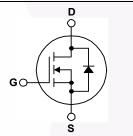
Application

- LCD/LED/PDP TV
- Lighting
- 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.





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

TO-220

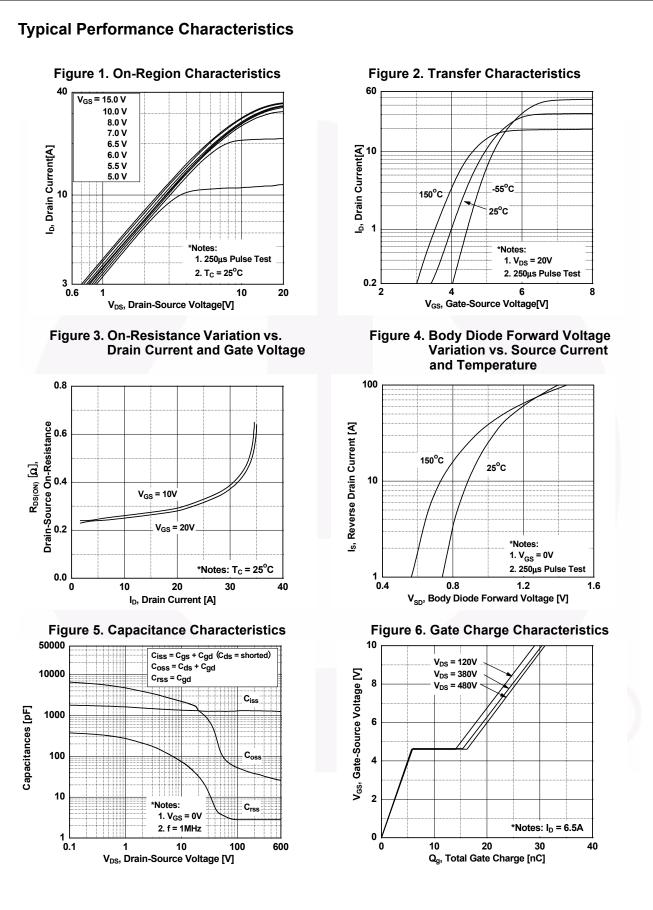
Symbol		Parameter			FCPF13N60NT	Unit
V _{DSS}	Drain to Source Voltage	6	V			
V _{GSS}	Gate to Source Voltage			±	V	
ID	Drain Current	- Continuous (T _C = 25 ^o C)	- Continuous (T _C = 25 ^o C)		13*	٨
	Drain Current	- Continuous ($T_C = 100^{\circ}C$)		8.2 8.2*		A
I _{DM}	Drain Current	- Pulsed	, a ,		39	А
E _{AS}	Single Pulsed Avalanche Energy (Note 2)			2	mJ	
I _{AR}	Avalanche Current	(Note 1)	4.3		А	
E _{AR}	Repetitive Avalanche Energy			1.16		mJ
-1	MOSFET dv/dt	1	V/ns			
dv/dt	Peak Diode Recovery dv/dt			20		V/ns
P _D	Dewer Dissignation	$(T_{C} = 25^{\circ}C)$		116	33.8	W
	Power Dissipation	- Derate Above 25°C		0.93	0.27	W/ ^o C
T _J , T _{STG}	Operating and Storage Temperature Range			-55 to	°C	
TL	Maximum Lead Temperature for Soldering, 1/8" from Case for 5 Seconds			3	300	
Drain current l	imited by maximum junction ter	nperature.			L.	

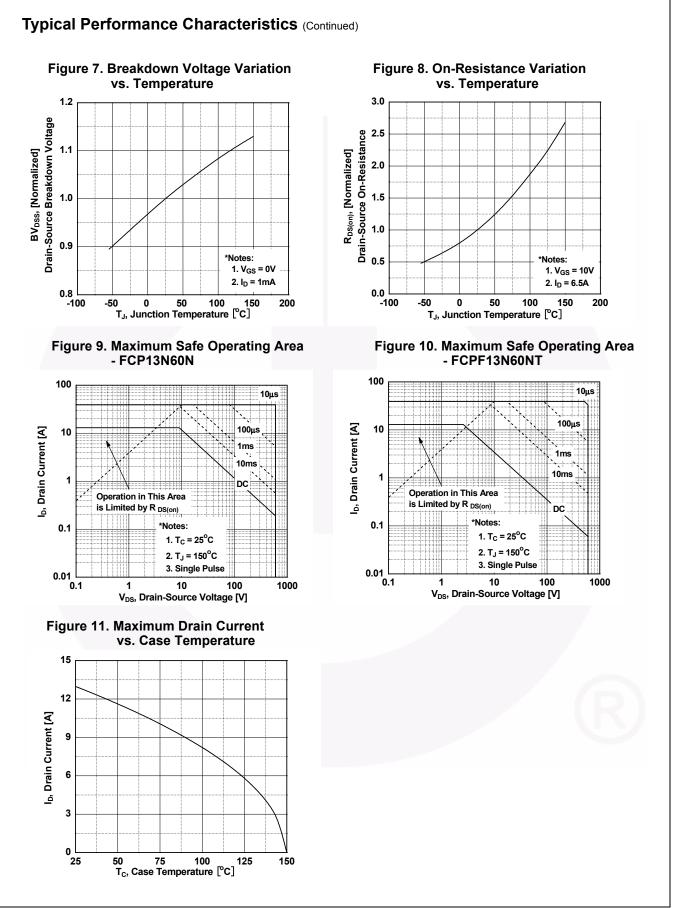
Thermal Characteristics

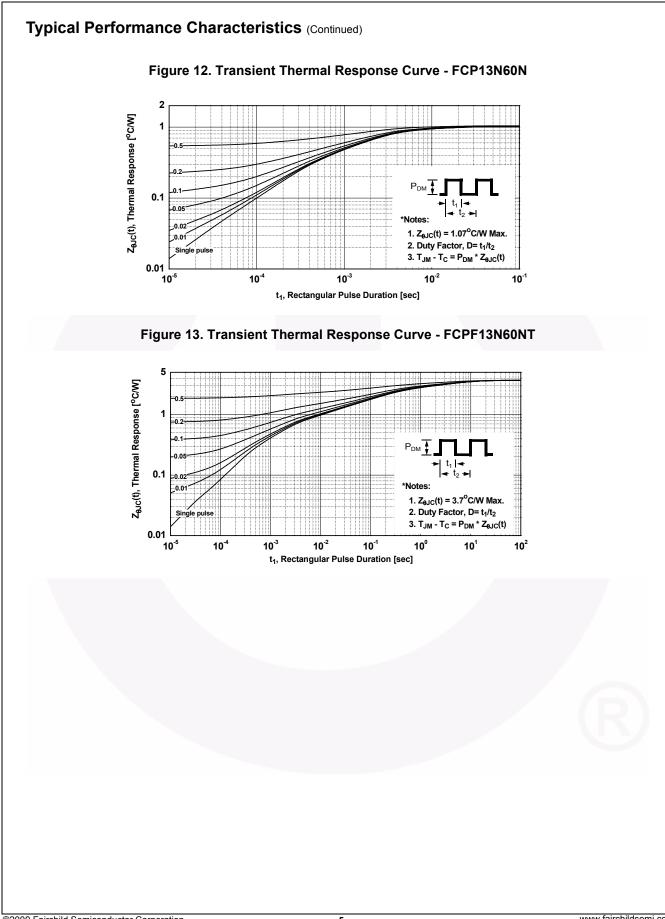
Symbol	Parameter	FCP13N60N	FCPF13N60NT	Unit	
$R_{\theta JC}$	Thermal Resistance, Junction to Case, Max.	1.07	3.7	°C/W	
$R_{ extsf{ heta}JA}$	Thermal Resistance, Junction to Ambient, Max.	62.5	62.5	C/VV	

Part Nun	nber	Top Mark	Packag	e Packing Method	Reel Size	Та	pe Width	Qua	antity
FCP13N60N FCP13N60N TO		TO-220	220 Tube N/A			N/A		50 units	
FCPF13N60NT FCPF13N60NT TO			TO-220	F Tube	N/A	N/A		50 units	
Electrica	l Char	acteristics T _C = 2	5ºC unless	otherwise noted.					
Symbol		Parameter		Test Conditions		Min.	Тур.	Max.	Unit
Off Charac	teristic	S							
BV _{DSS}	Drain to	Source Breakdown Vol	tage	I _D = 1 mA, V _{GS} = 0 V, T _C = 25 ^o C			-	-	V
ΔΒV _{DSS} / ΔΤ _J	Breakdo	own Voltage Temperatur ent	e	$I_D = 1 \text{ mA}, \text{ Referenced to } 25^{\circ}\text{C}$		-	0.73	-	V/ºC
I _{DSS}	Zero Ga	ate Voltage Drain Currer	ıt	V _{DS} = 480 V, V _{GS} = 0 V		-	-	10	μA
	-			$V_{DS} = 480 \text{ V}, V_{GS} = 0 \text{ V}, T_{C} = 125^{\circ}\text{C}$		-	-	100	
IGSS	Gate to	Body Leakage Current	_	$V_{GS} = \pm 30 \text{ V}, \text{ V}_{DS} = 0$	V	-	-	±100	nA
On Charac	teristic	S							
V _{GS(th)}	Gate Th	nreshold Voltage		$V_{GS} = V_{DS}, I_{D} = 250 \mu$	ιA	2.0	-	4.0	V
R _{DS(on)}	Static D	rain to Source On Resis	tance	V _{GS} = 10 V, I _D = 6.5 A	\	-	0.220	0.258	Ω
9 _{FS}	Forward	d Transconductance		$V_{\rm DS}$ = 40 V, I _D = 6.5 A		-	16.3	-	S
Dynamic C	haracte	eristics							
C _{iss}	Input Ca	Input Capacitance Output Capacitance Reverse Transfer Capacitance Output Capacitance		$V_{DS} = 100 V, V_{GS} = 0 V,$ f = 1 MHz $V_{DS} = 380 V, V_{GS} = 0 V, f = 1 MHz$		-	1325	1765	pF
C _{oss}	Output					-	50	65	pF
C _{rss}	Reverse					-	3	5	pF
C _{oss}	Output					-	30	-	pF
C _{oss(eff.)}	Effective	ective Output Capacitance		$V_{DS} = 0 V \text{ to } 480 V, V_{GS} = 0 V$		-	145	-	pF
Q _{g(tot)}	Total Ga	ate Charge at 10V		$V_{DS} = 380 \text{ V}, \text{I}_{D} = 6.5 \text{ A},$ $V_{GS} = 10 \text{ V}$ (Note 4)		-	30.4	39.5	nC
Q _{gs}		Source Gate Charge				-	6.0	-	nC
Q _{gd}		Drain "Miller" Charge				-	9.5	-	nC
ESR	Equivale	valent Series Resistance (G-S)		f = 1 MHz			2.8	-	Ω
Switching	Charac	teristics							
t _{d(on)}		Delay Time				-	14.5	39	ns
t _r		Turn-On Rise Time Turn-Off Delay Time		V_{DD} = 380 V, I _D = 6.5 A, V _{GS} = 10 V, R _G = 4.7 Ω			10.6	31.2	ns
t _{d(off)}	Turn-Of					-	45	100	ns
t _f	Turn-Of	f Fall Time		(Note 4)		-	9.8	29.6	ns
Drain-Sour	ce Dior	le Characteristics							
I _S	1	m Continuous Drain to S	Source Diode	e Forward Current		-	_	13*	A
I _{SM}	Maximum Pulsed Drain to Source Diode F		e Diode For			-	-	39	Α
V _{SD}	Drain to	Source Diode Forward	Voltage	$V_{GS} = 0 V, I_{SD} = 6.5 A$		-	-	1.2	V
t _{rr}		se Recovery Time se Recovery Charge		$V_{GS} = 0 V, I_{SD} = 6.5 A,$ $dI_F/dt = 100 A/\mu s$		-	287	-	ns
Q _{rr}	Reverse					-	3.5		μC
2. $I_{AS} = 4.3 \text{ A}, R_G =$ 3. $I_{SD} \le 13 \text{ A}, \text{ di/dt} :$	= 25 Ω, startir ≤ 200 A/μs, \	limited by maximum junction ter Ing $T_J = 25^{\circ}$ C. $T_{DD} \leq BV_{DSS}$, starting $T_J = 25^{\circ}$ C erating temperature typical char						U	9

FCP13N60N / FCPF13N60NT — N-Channel SupreMOS[®] MOSFET

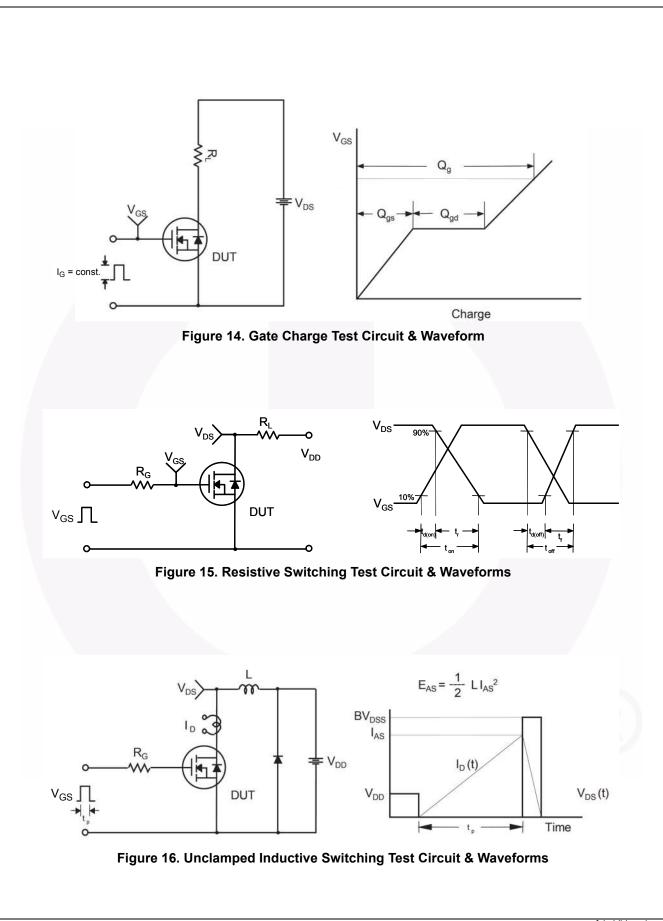




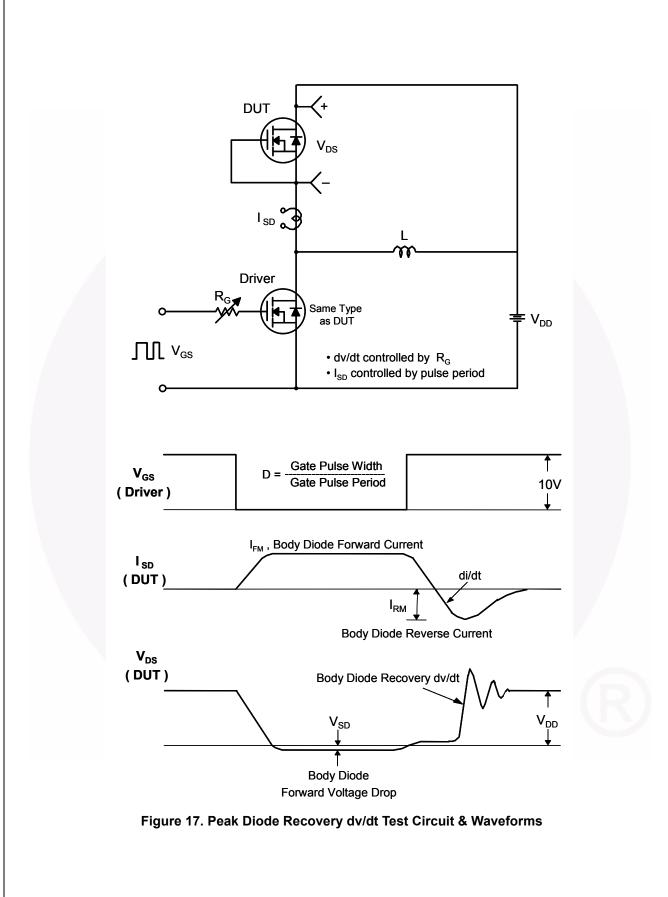


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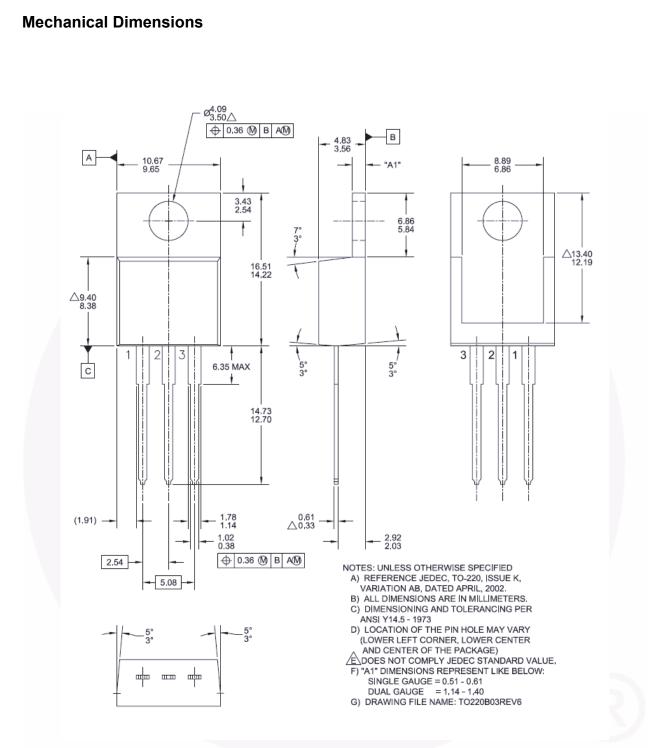
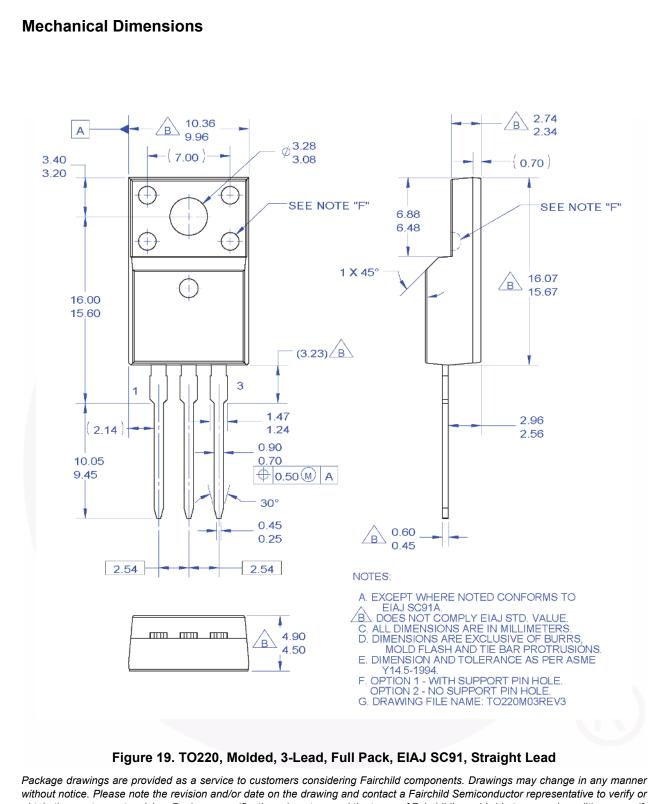


Figure 18. TO-220, Molded, 3-Lead, Jedec Variation AB

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