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

Features

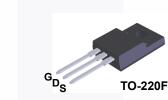
- R_{DS(on)} = 220 mΩ (Typ.) @ V_{GS} = 10 V, I_D = 6.5 A
- Ultra Low Gate Charge (Typ. Q_g = 30.4 nC)
- Low Effective Output Capacitance (Typ. C_{oss(eff.)} = 145 pF)
- 100% Avalanche Tested
- RoHS Compliant

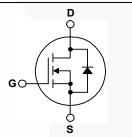
Application

- 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

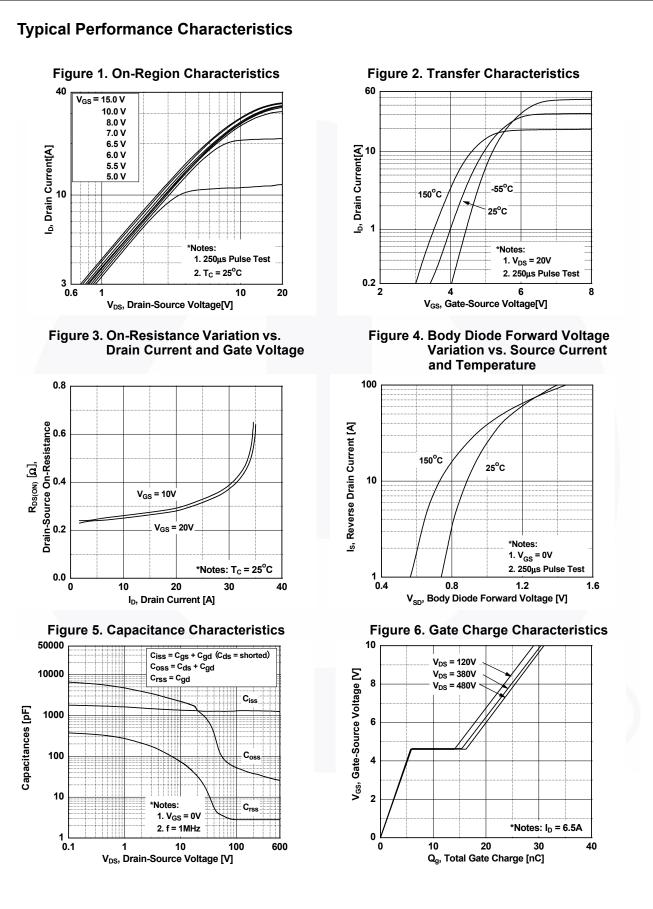
Symbol		FCP13N60N	FCPF13N60NT	Unit		
V _{DSS}	Drain to Source Voltage	6	V			
V _{GSS}	Gate to Source Voltage			±	V	
ID	Drain Current	- Continuous (T _C = 25 ^o C)		13	13*	•
	Drain Current	- Continuous (T _C = 100 ^o C)		8.2	8.2*	A
I _{DM}	Drain Current	- Pulsed	(Note 1)	39	39	А
E _{AS}	Single Pulsed Avalanche Ene	2	mJ			
I _{AR}	Avalanche Current		(Note 1)	4.3		А
E _{AR}	Repetitive Avalanche Energy	(Note 1)	1.16		mJ	
du/dt	MOSFET dv/dt	1	V/ns			
dv/dt Peak Diode Recovery d		1) :		20		V/ns
P _D	Dower Discinction	$(T_{\rm C} = 25^{\rm o}{\rm C})$		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 300			00	°C	
Drain current I	imited by maximum junction temper	ature.				

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	

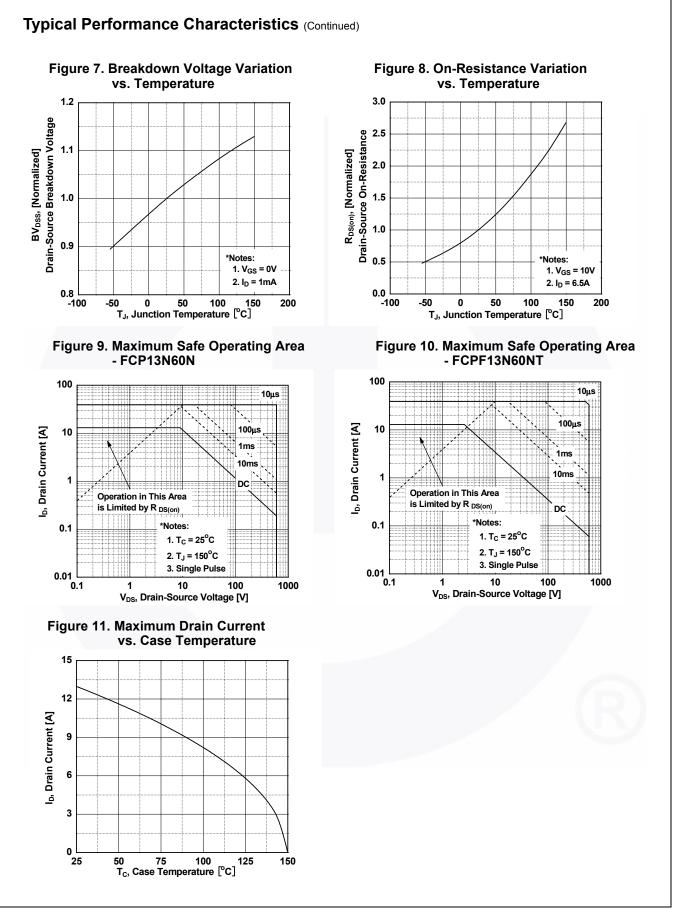
Part Nun	nber	Top Mark	Packag	ge l	Packing Method	Reel Size	Та	pe Width	Qua	antity
		TO-22	0	Tube	N/A		N/A	50 units		
FCPF13N	60NT	FCPF13N60NT	TO-220)F	Tube	N/A		N/A	50 units	
Electrica	l Char	acteristics ⊤ _c = 2	5°C unless	otherw	ise noted					
Symbol		Parameter			Test Conditio	ns	Min.	Тур.	Max.	Unit
Off Charac	teristic	S		1		H				
3V _{DSS}	Drain to	o Source Breakdown Vol	tage	ln = 1	mA, V _{GS} = 0 V, T	c = 25°C	600	-	-	V
ΔBV _{DSS} / ΔTJ	Breakdown Voltage Temperature Coefficient		v	$I_D = 1 \text{ mA}, \text{ Referenced to } 25^{\circ}\text{C}$			-	0.73	-	V/ºC
	7			V _{DS} = 480 V, V _{GS} = 0 V			-	-	10	
I _{DSS} Zero Ga		Gate Voltage Drain Current		$V_{DS} = 480 \text{ V}, V_{GS} = 0 \text{ V}, T_{C} = 125^{\circ}\text{C}$			-	-	100	μA
GSS	Gate to	Body Leakage Current		$V_{GS} = \pm 30 \text{ V}, \text{ V}_{DS} = 0 \text{ V}$			-	-	±100	nA
On Charac	teristic	S								
V _{GS(th)}	Gate T	hreshold Voltage		V _{GS}	= V _{DS} , I _D = 250 μA		2.0	-	4.0	V
R _{DS(on)}	Static D	Drain to Source On Resis	tance	$V_{GS} = 10 \text{ V}, \text{ I}_{D} = 6.5 \text{ A}$			-	0.220	0.258	Ω
ĴFS	Forwar	d Transconductance		$V_{DS} = 40 \text{ V}, \text{ I}_{D} = 6.5 \text{ A}$			-	16.3	-	S
Dynamic C	haract	eristics								
C _{iss}	Input C	Input Capacitance Output Capacitance Reverse Transfer Capacitance Output Capacitance					-	1325	1765	pF
C _{oss}	Output			V _{DS} = 100 V, V _{GS} = 0 V, f = 1 MHz		-	50	65	pF	
C _{rss}	Revers						-	3	5	pF
C _{oss}	Output			V _{DS} = 380 V, V _{GS} = 0 V, f = 1 MHz				30	-	pF
C _{oss(eff.)}	Effectiv	Effective Output Capacitance		V _{DS} = 0 V to 480 V, V _{GS} = 0 V			-	145	-	pF
Q _{g(tot)}	Total G	ate Charge at 10V		Vns	$V_{DS} = 380 \text{ V}, I_{D} = 6.5 \text{ A},$		-	30.4	39.5	nC
Q _{gs}	Gate to	Source Gate Charge		V _{GS} = 10 V		-	6.0	-	nC	
Q _{gd}	Gate to	Drain "Miller" Charge		(Note 4)			-	9.5	-	nC
ESR	Equivalent Series Resistance (G-S)		G-S)	f = 1 MHz			-	2.8	-	Ω
Switching	Charac	teristics								
t _{d(on)}	Turn-O	n Delay Time						14.5	39	ns
t _r	Turn-O	Turn-On Rise 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-Off Delay Time						7-	45	100	ns
t _f	Turn-Of	ff Fall Time		(Note 4)			-	9.8	29.6	ns
Drain-Sou	ce Dio	de Characteristics								
Is	Maximu	m Continuous Drain to S	Source Diod	le Forw	ard Current		-	-	13*	Α
I _{SM}	Maximum Pulsed Drain to Source Diod			Forward Current			-	-	39	Α
V _{SD}	Drain to	Source Diode Forward	Voltage	V _{GS} :	= 0 V, I _{SD} = 6.5 A		-	-	1.2	V
t _{rr}	Reverse	e Recovery Time		$V_{GS} = 0 V, I_{SD} = 6.5 A,$			-	287	-	ns
Q _{rr}	Reverse	e Recovery Charge	dl _F /dt = 100 A/µs				-	3.5	-	μC
$I_{AS} = 4.3 \text{ A}, \text{ R}_{G} = 4.3 \text{ A}, \text{ R}_{G} = 13 \text{ A}, \text{ di/dt}$	- = 25 Ω, starti ≤ 200 A/μs, '	limited by maximum junction tern g T_J = 25°C. $V_{DD} \leq BV_{DSS}, \mbox{ starting } T_J$ = 25°C perating temperature typical characteristics that the temperature typical start of temperature typical start								

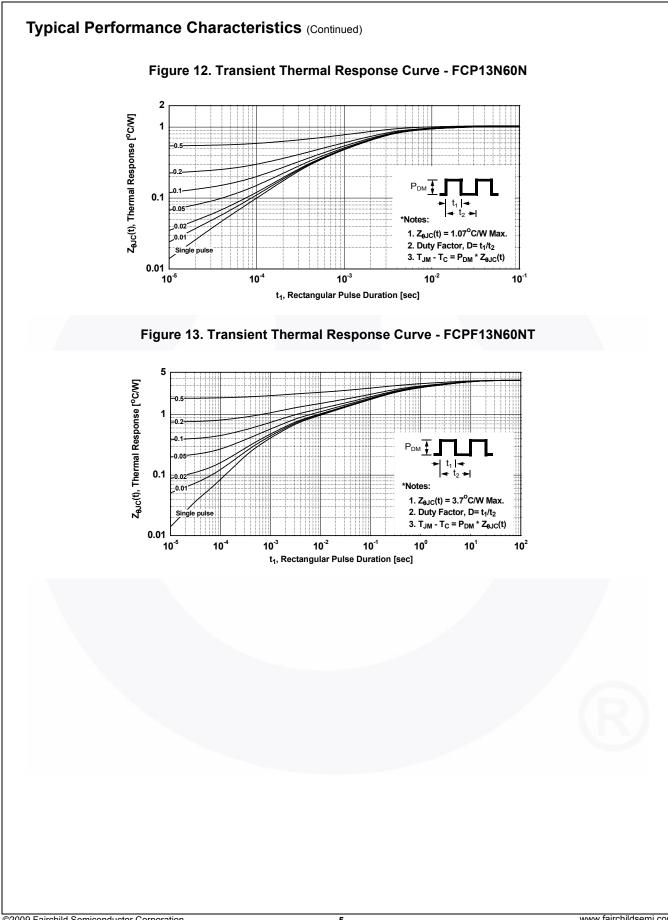
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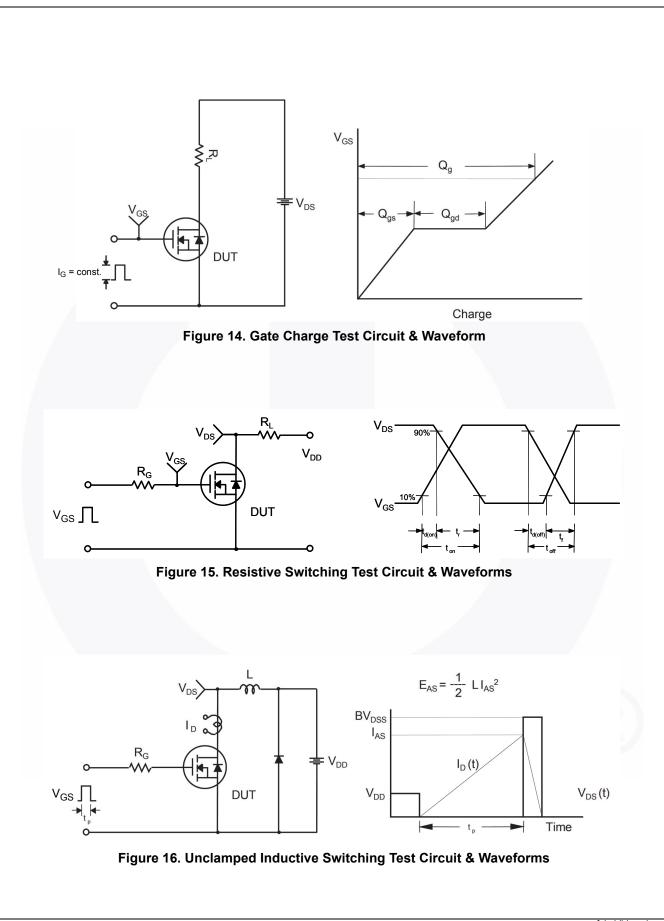
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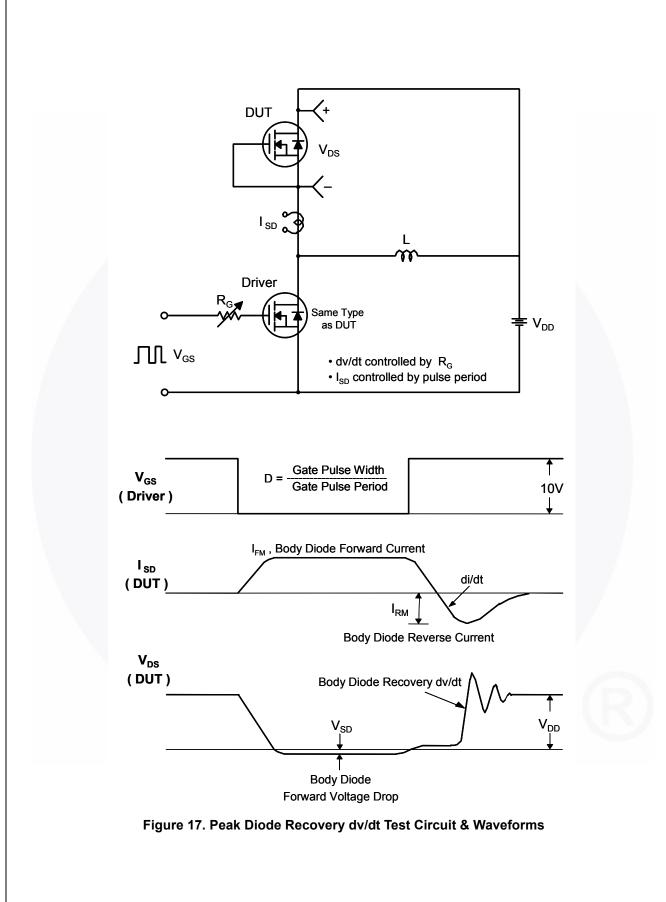
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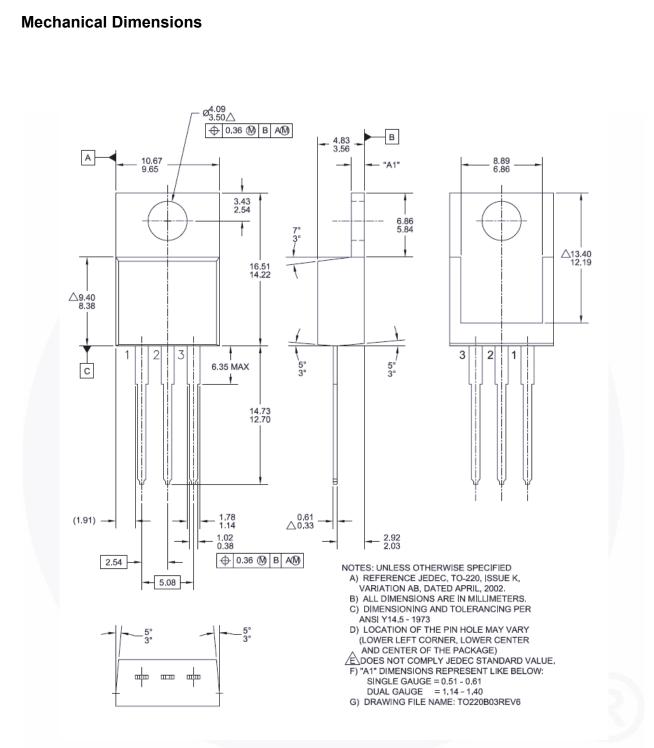
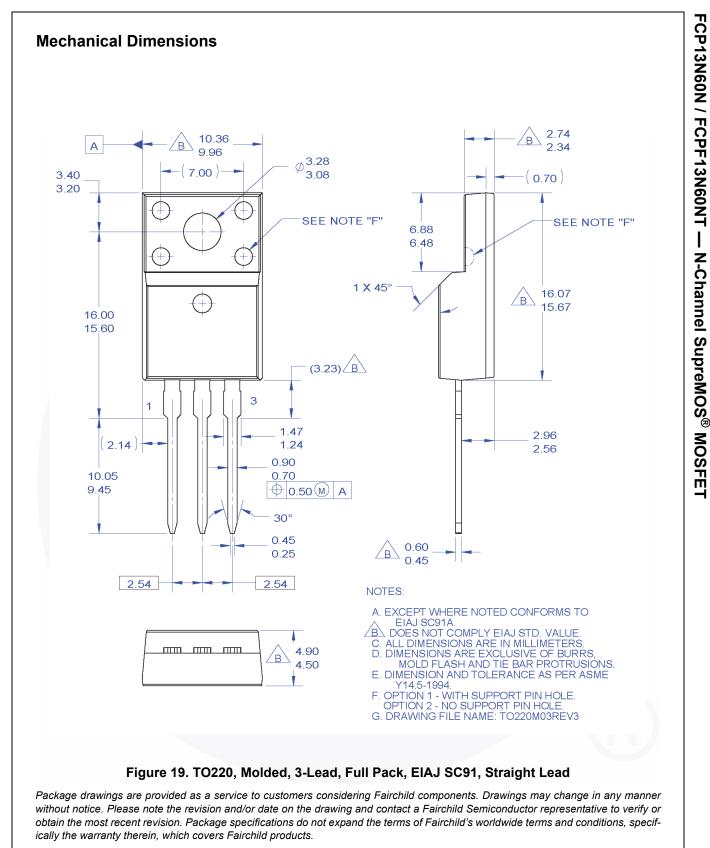


Figure 18. TO-220, Molded, 3-Lead, Jedec Variation AB

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