600V, N-Channel MOSFET

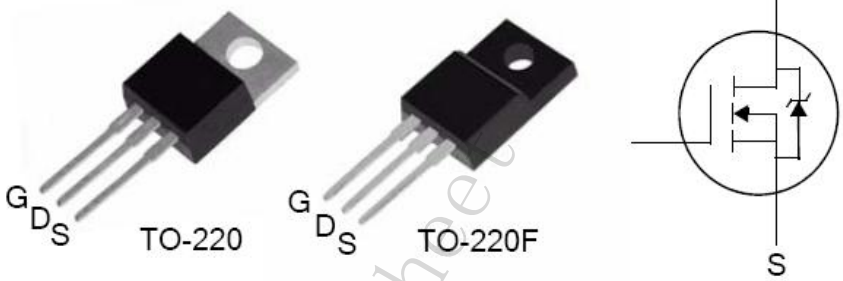
General Features

- Low ON Resistance
- Low Gate Charge
- Peak Current vs. Pulse Width Curve
- RoHS Compliant/Lead Free Package
- Inductive Switching Curves

BV_{DSS}	$R_{DS(ON)}$ (Max.)	I_D
600V	2.2Ω	4.0A

Applications:

- SMPS Power Supply
- Adaptor/Charger
- TV Main Power
- LCD Panel Power



Packages
Not to Scale

Ordering Codes

Part Number	Package	Marking
FTP04N60	TO-220	FTP04N60
FTA04N60	TO-220F	FTA04N60

Electrical Ratings

Absolute Maximum Ratings T_C=25℃ unless otherwise specified

Symbol	Parameter	FTP04N60	FTA04N60	Units
V_{DS}	Drain-to-Source Voltage (NOTE*1)	600		V
I_D	Continuous Drain Current	4.0		A
I_D@100℃	Continuous Drain Current	2.5		
I_{DM}	Pulsed Drain Current, V_{GS}@10V (NOTE*2)	16.0		
P_D	Power Dissipation	86	28	W
	Derating Factor above 25℃	0.69	0.22	W/℃
V_{GS}	Gate-to-Source Voltage	±30		V
E_{AS}	Single Pulse Avalanche Energy L=10mH, I_D=4.0A	80		mJ
dv/dt	Peak Diode Recovery dv/dt (NOTE*3)	3.0		V/ns
T_L T_{PKG}	Maximum Temperature for Soldering Leads at 0.063 in (1.6mm) from Case for 10 seconds Package Body for 10 seconds	300 260		℃
T_J and T_{STG}	Operating Junction and Storage Temperature Range	-55 to 150		

**Drain Current limited by Maximum Junction Temperature. Caution: Stresses greater than those listed in the "Absolute Maximum Ratings" Table may cause permanent damage to the device.*

Thermal data

Symbol	Parameter	FTP04N60	FTA04N60	Units	Test Conditions
$R_{\theta JC}$	Thermal resistance Junction-to-Case Max	1.45	4.5	℃/W	Water cooled heat sink，P_D adjusted for a peak junction temperature of +150℃
$R_{\theta JA}$	Thermal resistance Junction-to-Ambient Max	62	100		1 cubic foot chamber, free air.

Electrical Characteristics

OFF Characteristics T_J=25℃ unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
BV_{DSS}	Drain-to-Source Breakdown Voltage	600	--	--	V	V_{GS}=0V, I_D=250μA
$\triangle BV_{DSS}/\triangle T_J$	Breakdown Voltage Temperature Coefficient	--	0.6	--	V/℃	Reference to 25℃, I_D=250μA
I_{DSS}	Drain-to-Source Leakage Current	--	--	12	μA	V_{DS}=600V, V_{GS}=0V
		--	--	250		V_{DS}=480V, V_{GS}=0V, T_J=125℃
I_{GSS}	Gate-to-Source Forward Leakage	--	--	100	nA	V_{GS}=+30V
		--	--	-100		V_{GS}=-30V

ON Characteristics T_J =25℃ unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
$R_{DS(ON)}$	Static Drain-to-Source On-Resistance	--	1.76	2.2	Ω	V_{GS}=10V, I_D=2.4A (NOTE*4)
$V_{GS(TH)}$	Gate Threshold Voltage	2.0	--	4.0	V	V_{DS} = V_{GS}, I_D=250μA
gfs	Forward Transconductance	--	3.75	--	S	V_{DS} =15V, I_D=4A (NOTE*4)

Dynamic Characteristics Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
C_{ISS}	Input Capacitance	--	--	--	pF	V_{GS}=0V V_{DS}=25V f=1.0MHz
C_{OSS}	Output Capacitance	--	--	--		
C_{ISS}	Reverse Transfer Capacitance	--	--	--		
Q_G	Total Gate Charge	--	--	--	nC	V_{DD}=300V I_D=4A
Q_{GS}	Gate-to-Source Charge	--	--	--		
Q_{GD}	Gate-to-Drain (Miller) Charge	--	--	--		

Resistive Switching Characteristics Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
$t_{d(ON)}$	Turn-on Delay Time	--	--	--	ns	V_{DD}=300V I_D=4A V_{GS}=10V R_G=9.1 Ω
t_{rise}	Rise Time	--	--	--		
$t_{d(OFF)}$	Turn-off Delay Time	--	--	--		
t_{fall}	Fall Time	--	--	--		

Source-Drian Diode Characteristics T_J=25℃ unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
I_{SD}	Continuous Source Current(Body Diode)	--	--	4.0	A	Integral pn-diode in MOSFET
I_{SM}	Maximum Pulsed Current(Body Diode)	--	--	16.0	A	
V_{SD}	Diode Forward Voltage	--	--	1.2	V	I_S=4.0A, V_{GS}=0V
t_{rr}	Reverse Recovery Time	--	--	--	ns	V_{GS}=0V I_F=4A,di/dt=100A/us
Q_{rr}	Reverse Recovery Charge	--	--	--	nC	

NOTE：

*1. T_J=+25℃ to +150℃
*2. Repetitive rating; pulse width limited by maximum junction temperature.
*3. I_{SD}=4A di/dt≤100A/μs, V_{DD}≤BV_{DSS}, T_J=+150℃.
*4. Pulse width≤380μs; duty cycle≤2%.

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