

# TO-220! @HC!&&\$F Plastic-Encapsulate MOSFETS

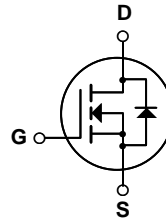
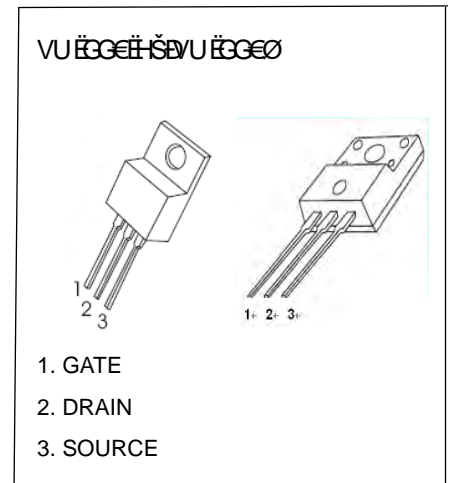
## CJP12N60,CJPF12N60 600V N-Channel Power MOSFET

### General Description

This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These devices are well suited for high efficiency switch mode power supply.

### FEATURE

- Low  $C_{RSS}$
- Fast switching
- Improved dv/dt capability



### Maximum ratings ( $T_a=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	$V_{DS}$	600	V
Gate-Source Voltage	$V_{GS}$	$\pm 30$	
Continuous Drain Current	$I_D$	12	A
Single Pulsed Avalanche Energy (note1)	$E_{AS}$	790	mJ
Power Dissipation	$P_D$	2	W
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$	62.5	$^\circ\text{C/W}$
Operating Temperature	$T_J$	150	$^\circ\text{C}$
Storage Temperature	$T_{STG}$	-55 ~+150	

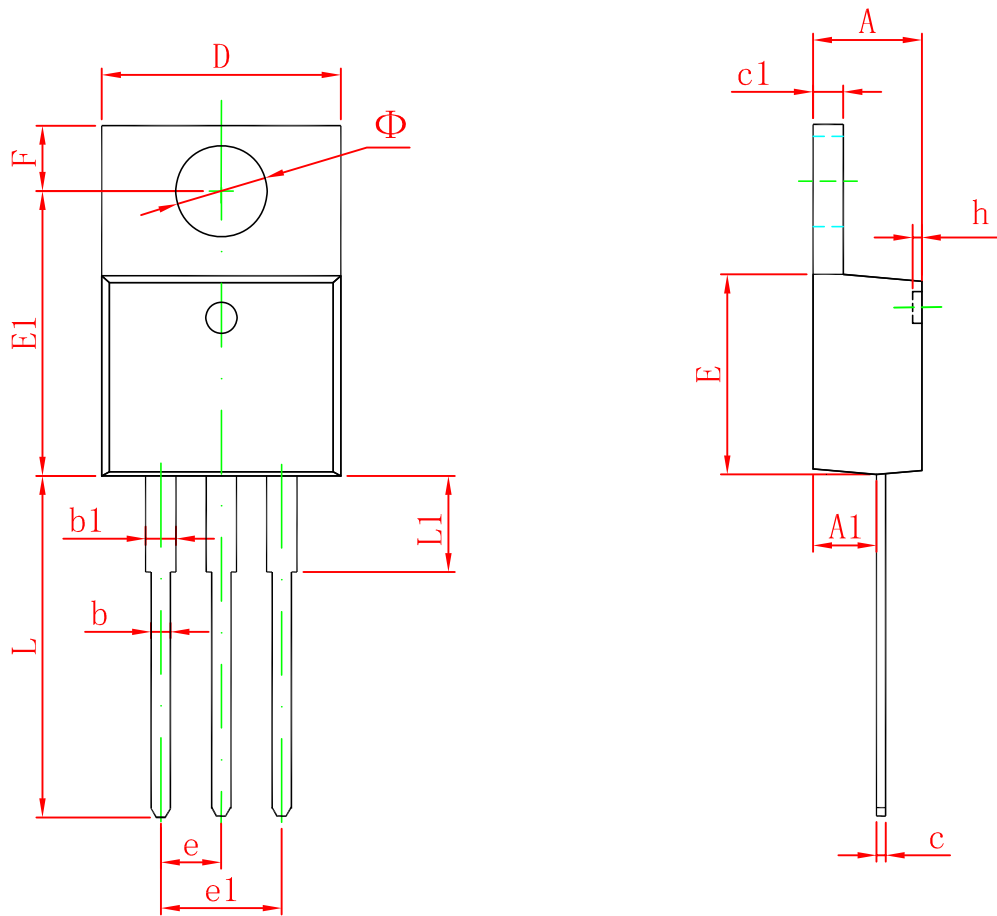
**Electrical characteristics (T<sub>a</sub>=25°C unless otherwise noted)**

Parameter	Symbol	Test Condition	Min	Typ	Max	Units
<b>Off characteristics</b>						
Drain-source breakdown voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> = 0V, I <sub>D</sub> =250μA	600			V
Drain-source diode forward voltage(note2)	V <sub>SD</sub>	V <sub>GS</sub> = 0V, I <sub>S</sub> =12A			1.4	
Zero gate voltage drain current	I <sub>DSS</sub>	V <sub>DS</sub> =600V, V <sub>GS</sub> =0V			10	μA
Gate-body leakage current, forward(note2)	I <sub>GSSF</sub>	V <sub>DS</sub> =0V, V <sub>GS</sub> =30V			100	nA
Gate-body leakage current, reverse(note2)	I <sub>GSSR</sub>	V <sub>DS</sub> =0V, V <sub>GS</sub> =-30V			-100	
<b>On characteristics (note2)</b>						
Gate-threshold voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	2.0		4.0	V
Static drain-source on-resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =6.0A			0.8	Ω
<b>Dynamic characteristics (note 3)</b>						
Input capacitance	C <sub>ISS</sub>	V <sub>DS</sub> =25V, V <sub>GS</sub> =0V, f =1MHz		1800		pF
Output capacitance	C <sub>OSS</sub>			200		
Reverse transfer capacitance	C <sub>ISS</sub>			25		
<b>Switching characteristics(note3)</b>						
Turn-on delay time	t <sub>d(on)</sub>	V <sub>DD</sub> =325V, R <sub>G</sub> =4.7Ω, I <sub>D</sub> =12A		30		ns
Turn-on rise time	t <sub>r</sub>			90		
Turn-off delay time	t <sub>d(off)</sub>			160		
Turn-off fall time	t <sub>f</sub>			90		

**Notes :**

1. L=10mH, I<sub>AS</sub>=12 A, V<sub>DD</sub>=50V, R<sub>G</sub>=25Ω, Starting T<sub>J</sub>=25°C.
2. Pulse Test : Pulse width≤300μs, duty cycle ≤2%.
3. These parameters have no way to verify.

# TO-220-3L Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	4.470	4.670	0.176	0.184
A1	2.520	2.820	0.099	0.111
b	0.710	0.910	0.028	0.036
b1	1.170	1.370	0.046	0.054
c	0.310	0.530	0.012	0.021
c1	1.170	1.370	0.046	0.054
D	10.010	10.310	0.394	0.406
E	8.500	8.900	0.335	0.350
E1	12.060	12.460	0.475	0.491
e	2.540 TYP		0.100 TYP	
e1	4.980	5.180	0.196	0.204
F	2.590	2.890	0.102	0.114
h	0.000	0.300	0.000	0.012
L	13.400	13.800	0.528	0.543
L1	3.560	3.960	0.140	0.156
$\Phi$	3.735	3.935	0.147	0.155