

Silicon N-Channel Power MOSFET

Description

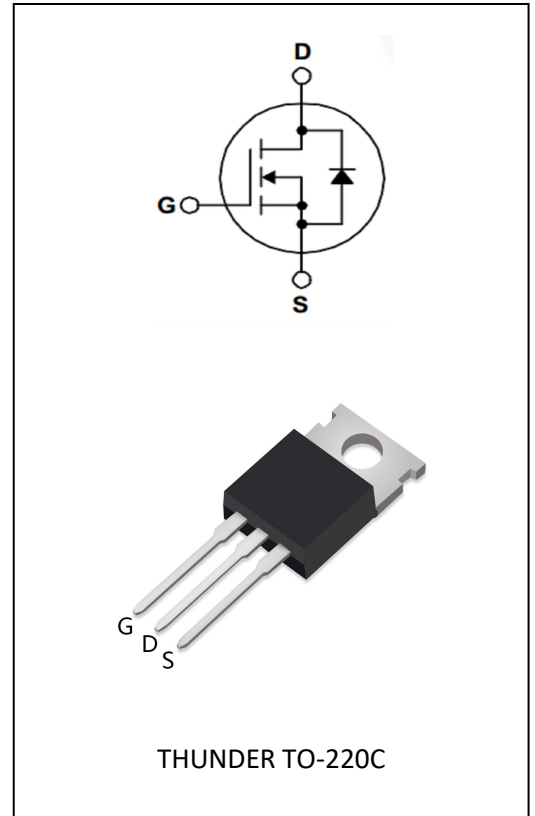
The TH3N120PC uses advanced technology and design to provide excellent $R_{DS(ON)}$. It can be used in a wide variety of applications.

General Features

- $V_{DS}=1200V, I_D=3A$
- Low ON Resistance
- Low Reverse transfer capacitances
- 100% Single Pulse avalanche energy Test

Application

- Power switching application
- Adapter and charger



Electrical Characteristics @ $T_a=25^\circ\text{C}$ (unless otherwise specified)

a) Absolute Maximum Ratings:

Symbol	Parameter	Value	Unit
V_{DSS}	Drain-to-Source Breakdown Voltage	1200	V
I_D	Drain Current (continuous) at $T_c=25^\circ\text{C}$	3	A
I_{DM}	Drain Current (pulsed)	12	A
V_{GS}	Gate to Source Voltage	+/-30	V
P_{tot}	Total Dissipation at $T_c=25^\circ\text{C}$	250	W
T_j	Max. Operating Junction Temperature	175	$^\circ\text{C}$
E_{AS}	Single Pulse Avalanche Energy	30	mJ

b) Electrical Parameters:

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_{DS}	Drain-source Voltage	$V_{GS}=0V, I_D=250\mu A$	1200			V
$R_{DS(on)}$	Static Drain-to-Source on-Resistance	$V_{GS}=10V, I_D=1.5A$		5.1	6.0	Ω
$V_{GS(th)}$	Gated Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	3.0	4.0	5.0	V
I_{DSS}	Drain to Source leakage Current	$V_{DS}=1200V, V_{GS}=0V$			5.0	μA
$I_{GSS(F)}$	Gated to Source Forward Leakage	$V_{GS}=+30V$			100	nA
$I_{GSS(R)}$	Gated to Source Reverse Leakage	$V_{GS}=-30V$			-100	nA
C_{iss}	Input Capacitance	$V_{GS}=0V,$ $V_{DS}=25V,$ $f=1.0MHz$		1006		pF
C_{oss}	Output Capacitance			59.8		pF
C_{rss}	Reverse Transfer Capacitance			2.2		pF

c) Switching Characteristics:

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{d(on)}$	Turn-on Delay Time	$V_{DD}=600V, I_D=3A,$ $R_G=10\Omega$		15.1		nS
t_r	Turn-on Rise Time			19.4		nS
$t_{d(off)}$	Turn-off Delay Time			25.6		nS
t_f	Turn-off Fall Time			76.2		nS
Q_g	Total Gate Charge	$V_{DS}=960V$ $I_D=3A$ $V_{GS}=10V$		19.7		nC
Q_{gs}	Gate-Source Charge			7.5		nC
Q_{gd}	Gate-Drain Charge			5.4		nC

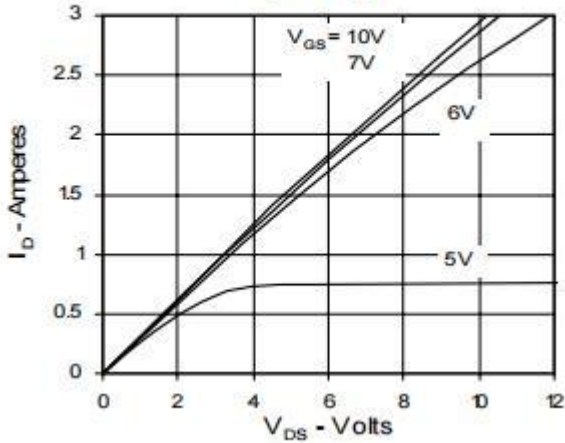
d) Source-Drain Diode Characteristics:

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{SD}	S-D Current(Body Diode)				3	A
I_{SDM}	Pulsed S-D Current(Body Diode)				12	A
V_{SD}	Diode Forward Voltage	$V_{GS}=0V, I_{DS}=3.0A$			1.5	V
t_{rr}	Reverse Recovery Time	$T_J=25^\circ C, I_F=3.0A$ $di/dt=100A/us$		526		nS
Q_{rr}	Reverse Recovery Charge			2.0		μC
*Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$						

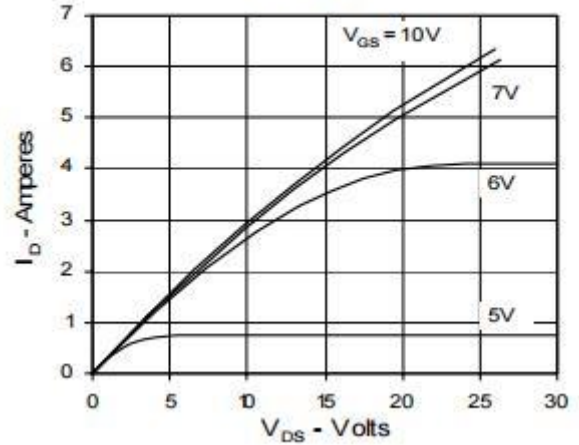
Symbol	Parameter	Typ.	Unit
$R_{\theta JC}$	Junction-to-Case	0.6	$^\circ C/W$

Electrical performance (typical)

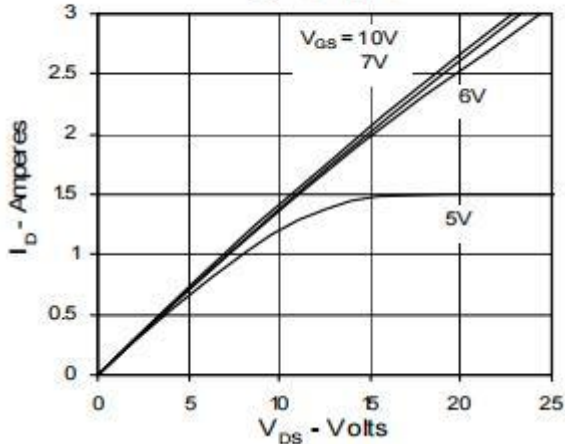
**Fig. 1. Output Characteristics
@ 25 Deg. C**



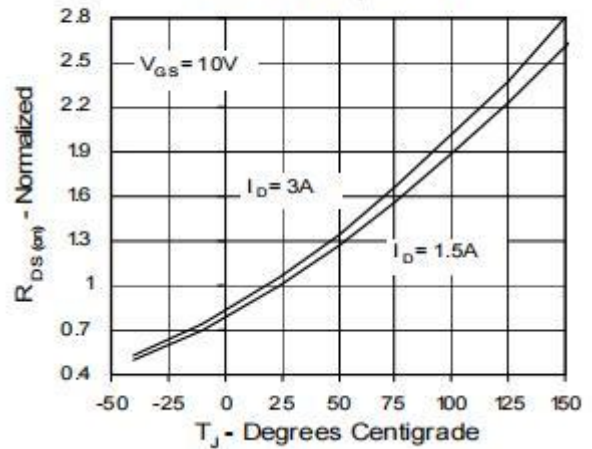
**Fig. 2. Extended Output Characteristics
@ 25 deg. C**



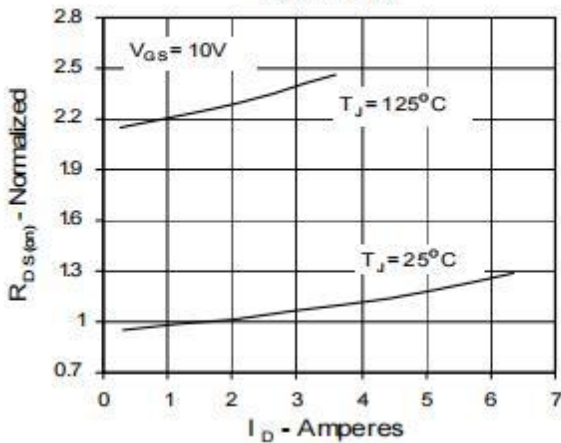
**Fig. 3. Output Characteristics
@ 125 Deg. C**



**Fig. 4. $R_{DS(on)}$ Normalized to I_{D25} Value vs.
Junction Temperature**



**Fig. 5. $R_{DS(on)}$ Normalized to I_{D25}
Value vs. I_D**



**Fig. 6. Drain Current vs. Case
Temperature**

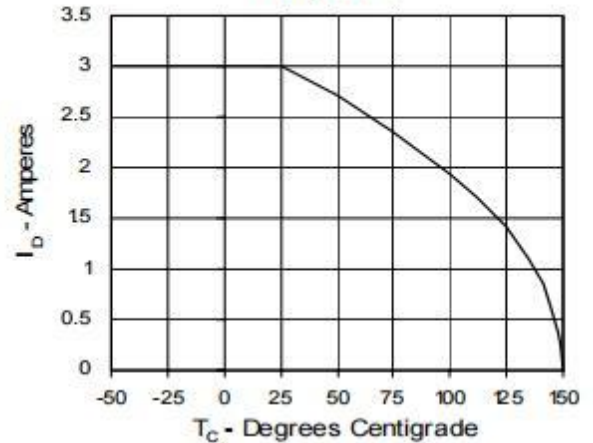


Fig. 7. Input Admittance

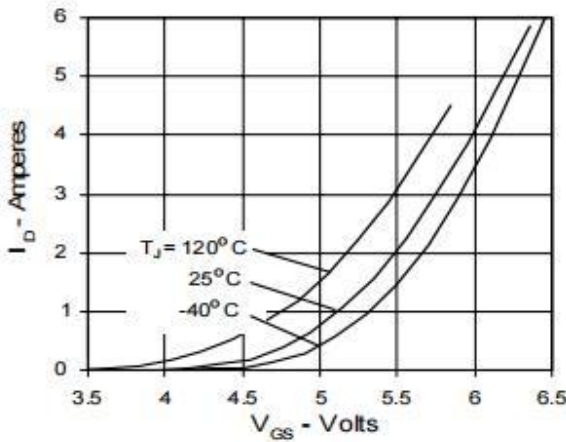


Fig. 8. Transconductance

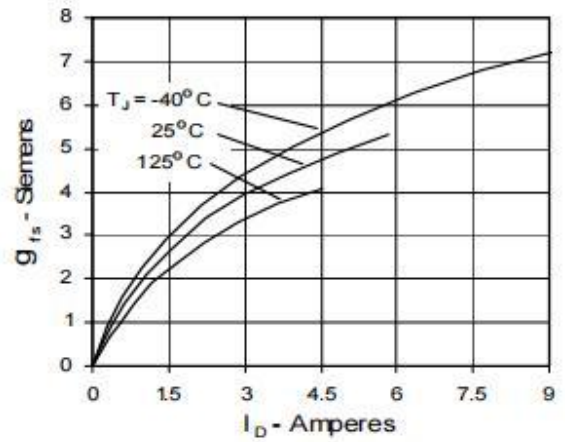


Fig. 9. Source Current vs. Source-To-Drain Voltage

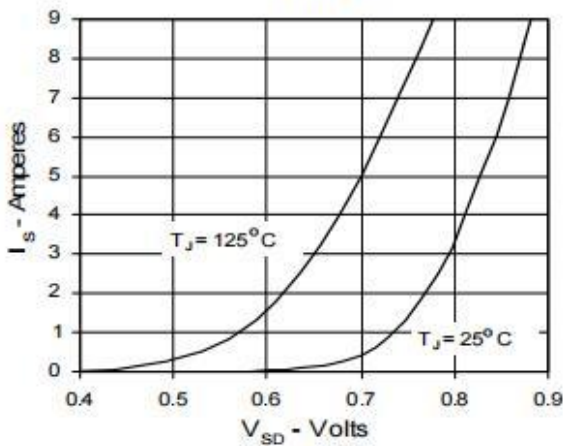


Fig. 10. Gate Charge

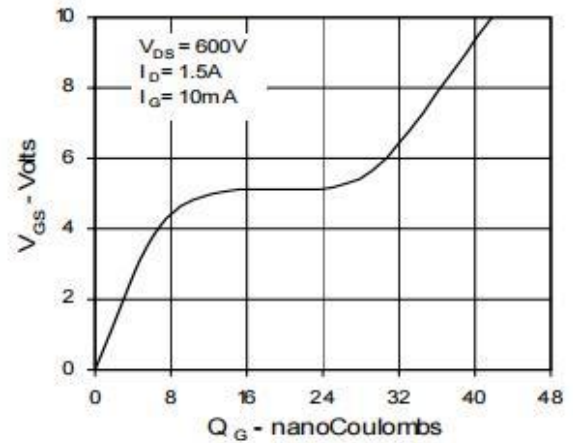


Fig. 11. Capacitance

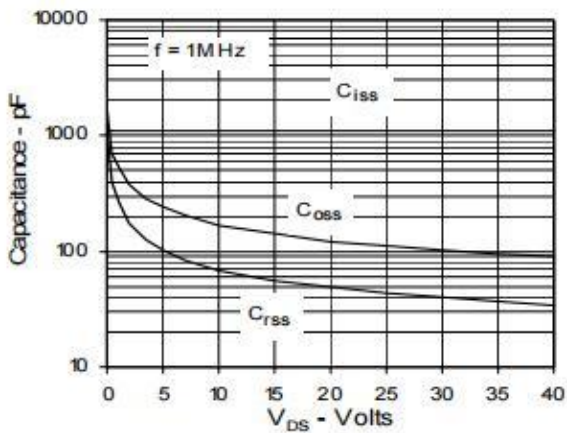
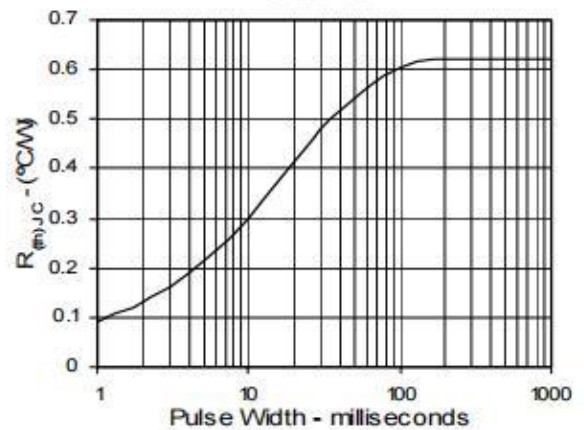
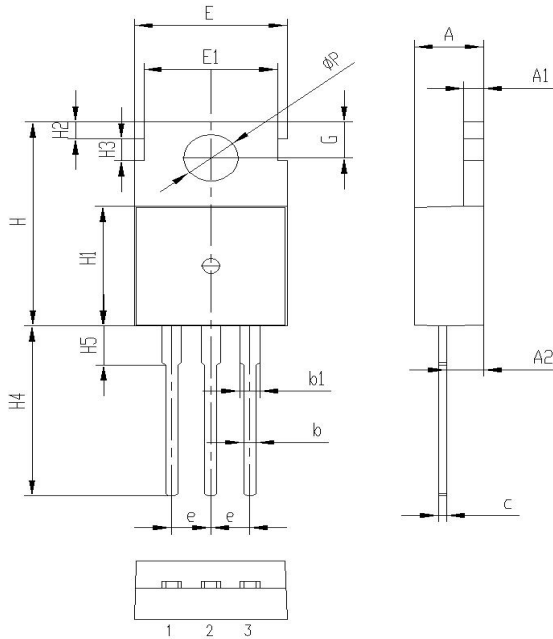


Fig. 12. Maximum Transient Thermal Resistance



Package Information
TO-220C PACKAGE
基本尺寸


Symbol	单位 mm		
	Min	Nom	Max
A	4.30	4.5	4.70
A1	1.20	1.30	1.40
A2	2.20	2.4	2.60
b	0.60	0.8	1.00
b1	1.20	1.30	1.40
c	0.40	0.5	0.60
e	2.44	2.54	2.64
E	9.80	10.0	10.2
E1	8.50	8.70	8.90
H	15.5	15.7	15.9
H1	9.00	9.2	9.40
H2	1.10	1.34	1.50
H3	1.50	1.7	1.90
H4	12.9	13.3	13.7
H5	2.80	3.0	3.20
G	2.60	2.8	3.00
ΦP	3.40	3.6	3.80

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