PN10HN60

Chipown

N-Channel Superjunction MOSFET

600V, 10A, 0.38Ω

NeoFET®

General Description

The NeoFET, Chipown's new generation of high voltage super-junction MOSFETs, based on an advanced deep trench filling process technologies. The NeoFET MOSFET achieves an approximate 70% reduction in specific on-resistance compared to that of a conventional MOSFET. By combining the experience of the leading SJ MOSFET supplier, utilizing this advanced technology and precise process control, NeoFET provides superior switching performance and ruggedness. The NeoFET fits the PC ATX Power, Server, Telecom, Adapter, LCD and PDP TV, Lighting, UPS and industrial power applications.

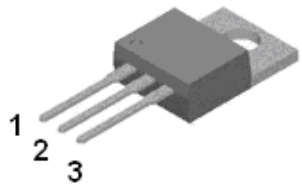
Features

- $R_{DS(on)}$ = 0.34Ω (Typ.)@ V_{GS} = 10V, I_D = 5A
- Extremely high dv/dt capablity
- Very high commutation ruggedness
- Extremely low losses due to very low R_{dson}*Q_g
- Ultra low gate charge (Typ. Q_g = 25nC)
- Low effective output capacitance
- 100% avalanche tested
- JEDEC qualified, Pb-free plating

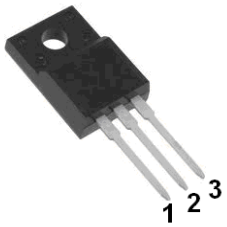
Applications

- PC ATX Power
- Adapter
- LCD and PDP TV
- Lighting
- Server, Telecom,
- UPS
- Switching applications

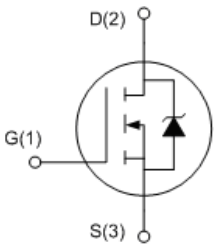
Pin Assignments



TO-220



TO-220FP



RoHS COMPLIANT Pb Pb-Free

Order codes	Package
PN10HN60-CAI-T1	TO220
PN10HN60-CBI-T1	TO220FP

Electrical Characteristics

Table 1. Absolute Maximum Ratings (T_J = 25°C, unless otherwise specified)

SYMBOL	PARAMETER	Value (TO-220)	Value (TO-220FP)	UNIT
V_{DSS}	Darin to Source Voltage	600		V
I_D	Continuous Drain Current (Tc=25°C)	10		A
	Continuous Drain Current (Tc=100°C)	7		A
I_{DM}	Drain Current Pulsed	30		A
V_{GS}	Gate to Source Voltage	±30		V
E_{AS}	Single Pulsed Avalanche Energy	200		mJ
I_{AR}	Avalanche Current	3.5		A
dv/dt	Peak Diode Recovery	35		V/ns
P_D	Total Power Dissipation (Tc= 25°C)	83.3	29.8	W
	Derating Factor	0.67	0.24	W/°C
T_{STG} T_J	Operating junction temperature & Storage temperature	-55~+150		°C

Table 2. Thermal Characteristics

SYMBOL	PARAMETER	Value (TO-220)	Value (TO-220FP)	UNIT
R_{JC}	Thermal Resistance, Junction-Case	1.5	4.2	°C/W
R_{CS}	Thermal Resistance, Junction-Heat Sink	0.5	0.5	°C/W
R_{JA}	Thermal Resistance, Junction- ambient	62.5	62.5	°C/W

Table 3. Electrical Characteristics (T_J = 25°C, unless otherwise specified)

SYMBOL	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNIT
Off Characteristics						
B_{VDSS}	Drain-Source Breakdown Voltage	V_{GS}=0V,I_D=250μA	600	-	-	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=600V,V_{GS}=0V	-	-	1	μA
	Drain-Source Leakage Current	V_{DS}=600V,V_{GS}=0V T_J=125°C	-	-	50	μA
I_{GSS}	Gate-Source Leakage Current	V_{DS}=0V,V_{GS}=30V	-	-	100	nA
	Gate-Source Leakage Reverse	V_{DS}=0V,V_{GS}=-30V	-	-	-100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=250μA	2	-	4	V
$R_{DS(ON)}$	Static Drain-Source On-state Resistance	V_{GS}=10V,I_D=5A	-	0.34	0.38	ohm
Dynamic Characteristics						
g_{fs}(1)	Forward Transconductance	V_{DS}=15V,I_D=5A	-	8.3	-	S
Ciss	Input Capacitance	V_{GS}=0V, V_{DS}=100V f=1MHz	-	658	-	pF
Coss	Output Capacitance		-	46	-	
Crss	Reverse Transfer Capacitance		-	6.2	-	
Switching Characteristics						
$t_{d(ON)}$	Turn-on Delay Time	V_{DD}=380V,R_G=4.7Ω I_D=4.5A,V_{GS}=10V	-	13	-	ns
t_r	Rise Time		-	9	-	
$t_{d(ON)}$	Turn-off Delay Time		-	57	-	
t_f	Fall Time		--	10	-	
Q_g	Total Gate Charge	V_{DS}=380V,I_D=4.5A V_{GS}=10V	-	25	-	nC
Q_{gs}	Gate-Source Charge		-	3.9	-	
Q_{gd}	Gate-Drain Charge		-	4.4	-	

Table 4. Source-Drain Diode Ratings and Characteristics (T_J = 25°C, unless otherwise specified)

SYMBOL	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNIT
I_S	Continuous Source Current	V_{GS}=0V	-	-	10	A
I_{SM}(2)	Pulsed Source Current	V_{GS}=0V	-	-	30	A
V_{SD}(1)	Diode Forward Voltage	I_S=1A,V_{GS}=0V	-	-	1.2	V
t_{rr}	Reverse Recovery Time	I_S=4.5A,V_{DD}=300V dI_F=100A/us	-	200	-	ns
Q_{rr}	Reverse Recovery Charge		-	2200	-	nC

NOTES

(1) Pulsed test: Pulsed width=300μs, Duty Cycle=1.5%

(2) Pulsed width limited by safe operating area

Typical Performance Characteristics

Figure1. On-Region Characteristics

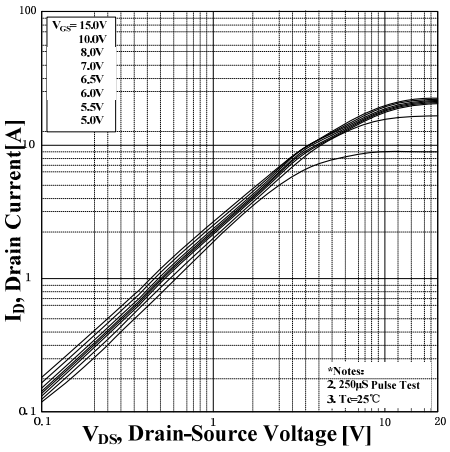


Figure2. Transfer Characteristics

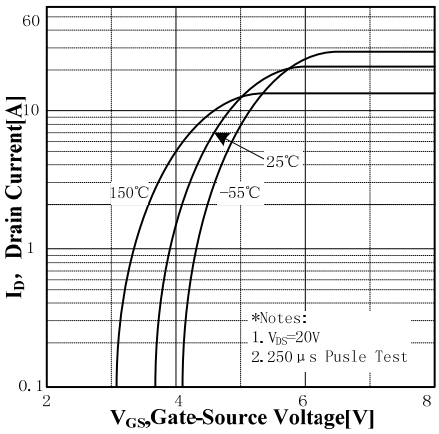


Figure3. On-Resistance Variation vs.Drain Current and Gate Voltage

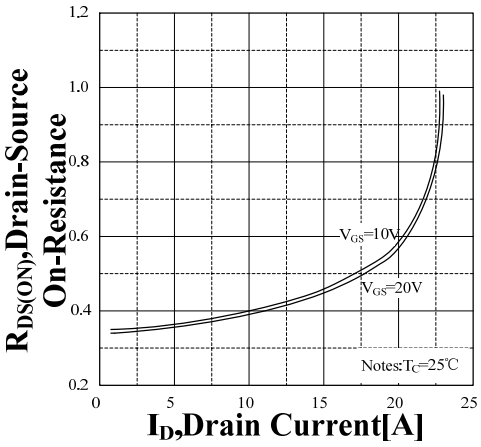


Figure4. Body Diode Forward Voltage Variation vs. Source Current and Temperature

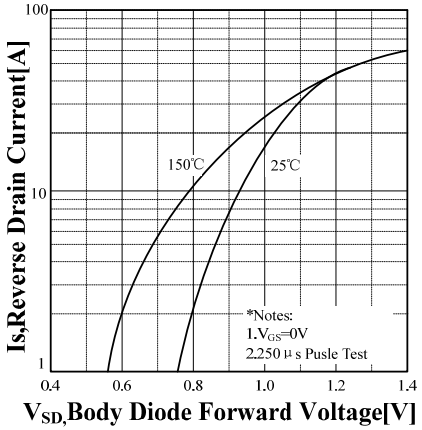


Figure5. Capacitance Characteristics

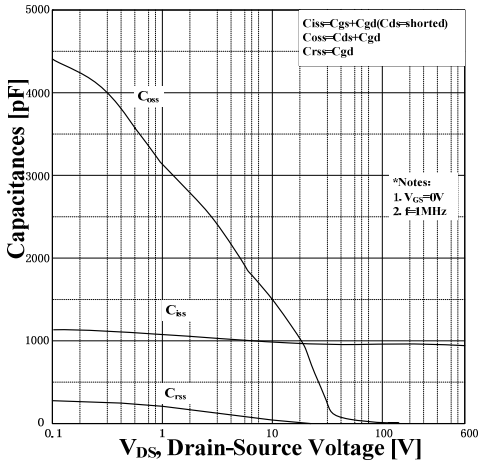


Figure6. Gate Charge Characteristics

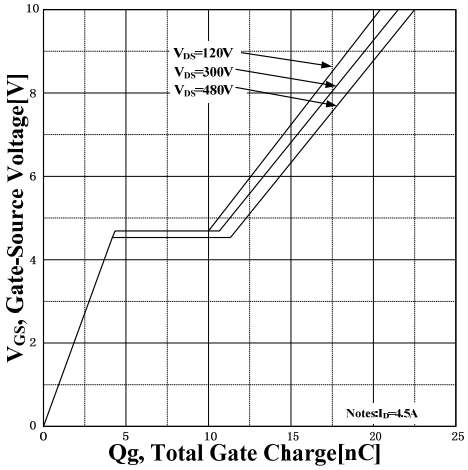


Figure7. Breakdown Voltage Variation vs. Temperature

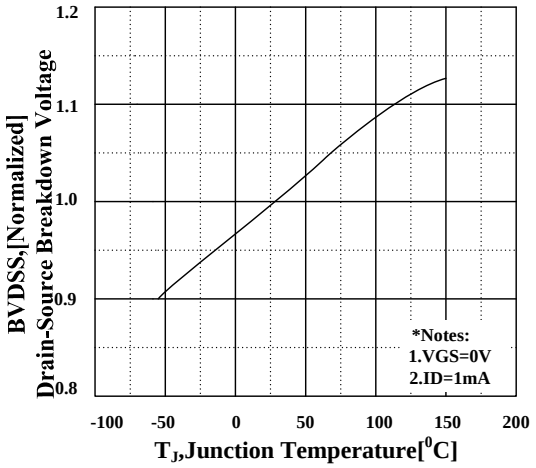


Figure8. On-Resistance Variation vs. Temperature

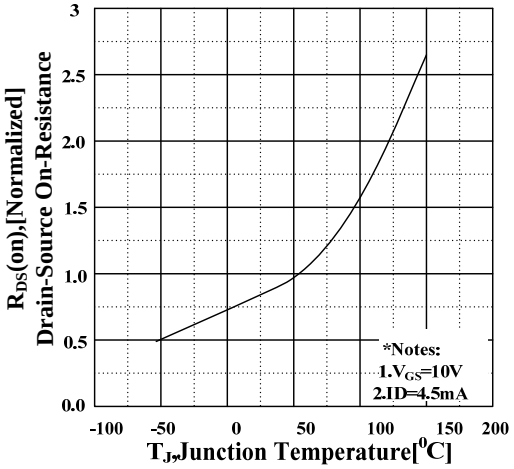


Figure9. Maximum Drain Current vs. Case Temperature

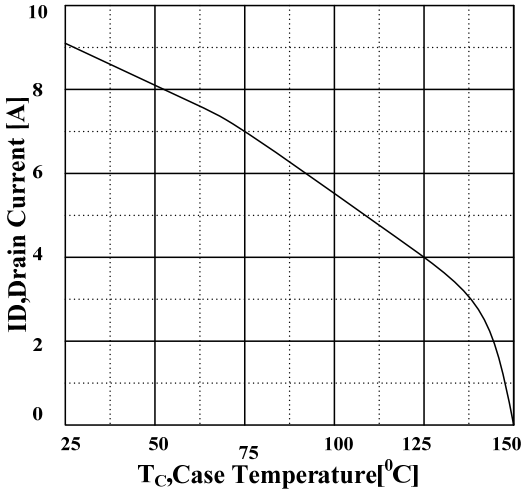


Figure 10. Maximum Safe Operating Area

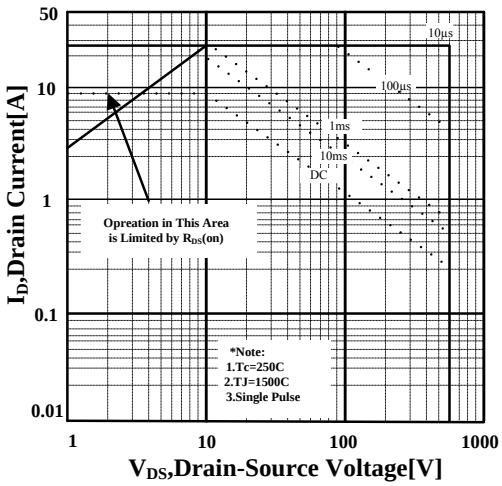


Figure 11. Transient Thermal Response Curve (TO-220)

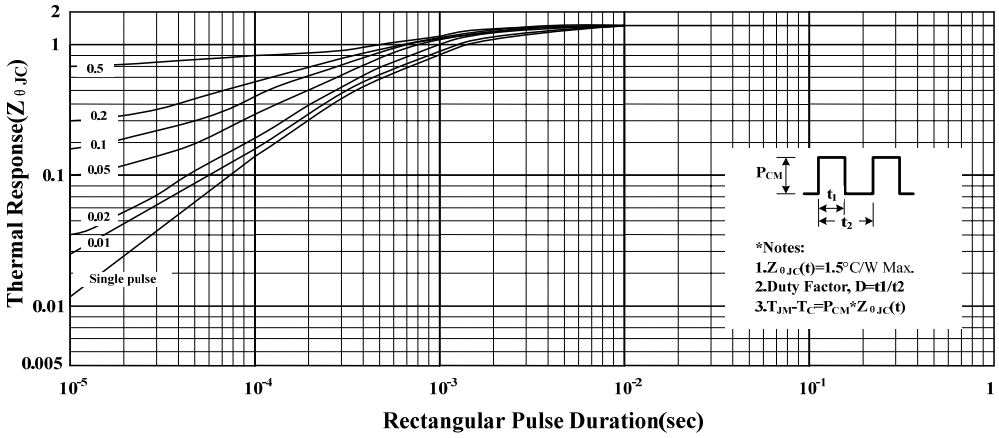
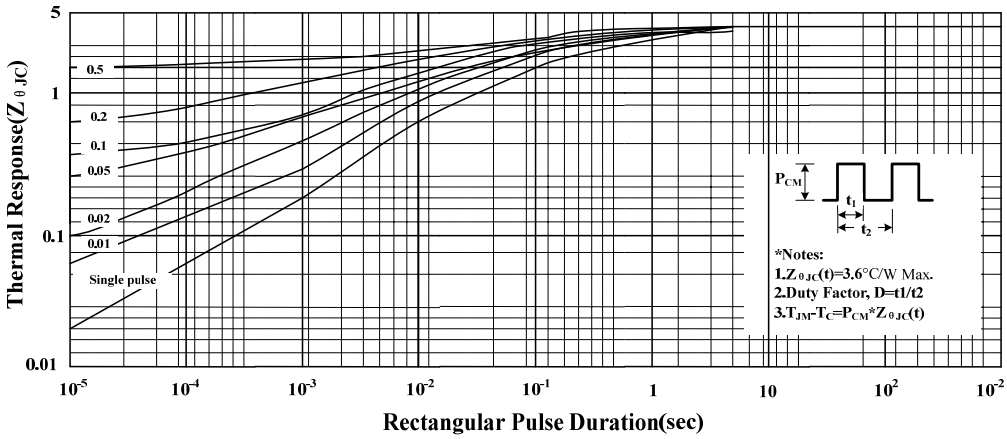


Figure 12. Transient Thermal Response Curve (TO-220FP)

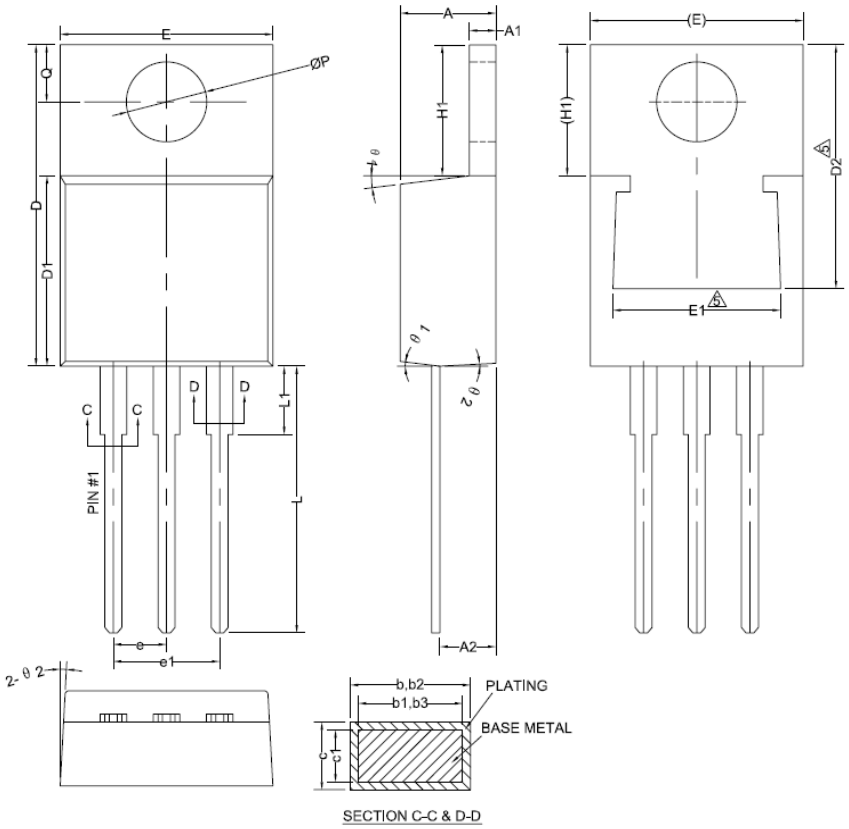


Package Dimensions（TO-220）

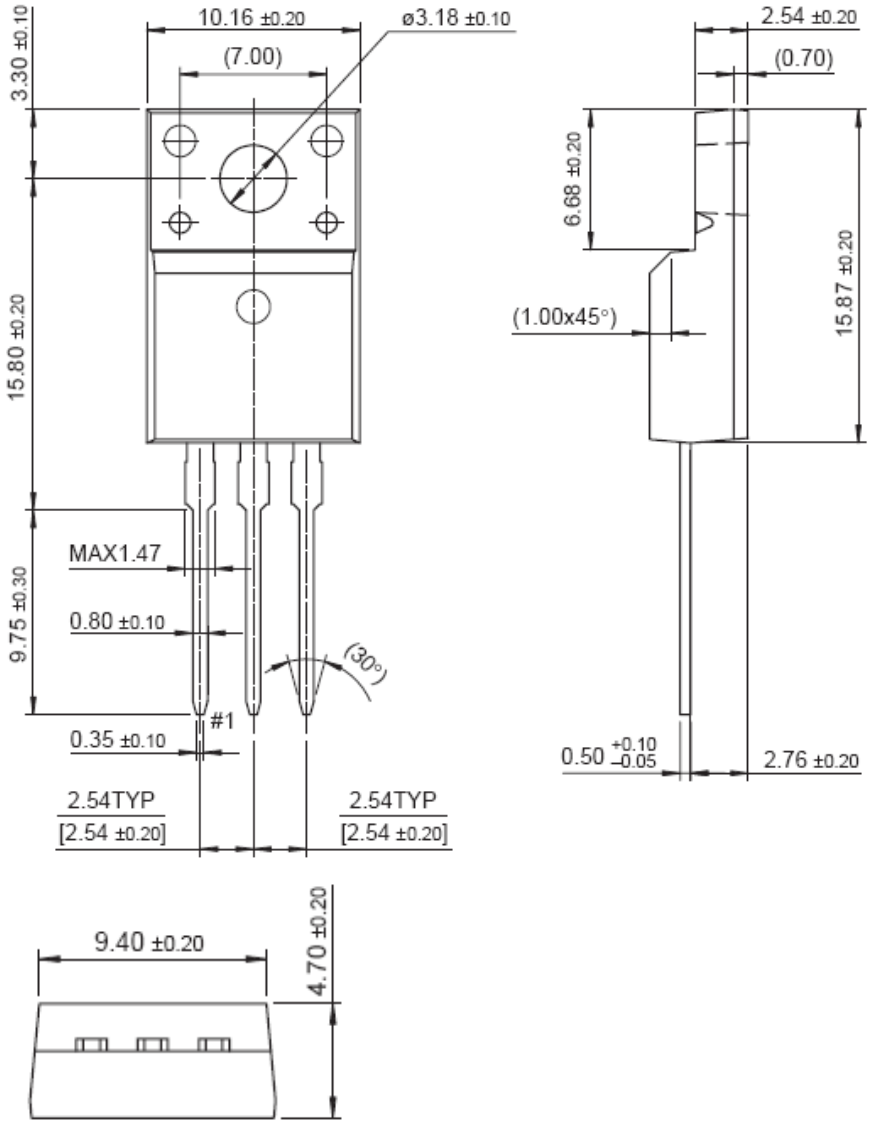
Table . TO-220 mechanical data

Size / symbol	Min(mm)	Max(min)	Size / symbol	Min(mm)	Max(min)
A	4.40	4.70	E	9.96	10.36
A1	1.22	1.32	E1	6.68	8.89
A2	2.59	2.79	e	2.44	2.64
b	0.77	0.90	e1	4.98	5.18
b1	0.76	0.86	H1	6.10	6.50
b2	1.23	1.36	L	12.70	13.12
b3	1.22	1.32	L1	-	3.90
c	0.34	0.47	ΦP	3.80	3.88
c1	0.33	0.43	Q	2.60	2.90
D	15.15	15.75	θ1	5°	9°
D1	9.05	9.25	θ2	1°	5°
D2	11.40	12.88			

Figure . Package dimensions



Package Dimensions（TO-220FP）



Dimensions in Millimeters

TOP MARK	Package
PN10HN60	TO220
YWWXXXXX	TO220FP