PN4HN60

Chipown

N-Channel Superjunction MOSFET

600V, 4.5A, 0.95Ω

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.

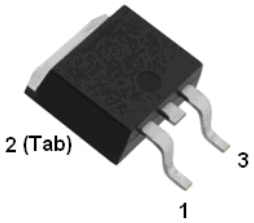
Features

- $R_{DS(on)}$ = 0.85Ω (Typ.)@ V_{GS} = 10V, I_D = 2.8A
- 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 = 15nC)
- 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



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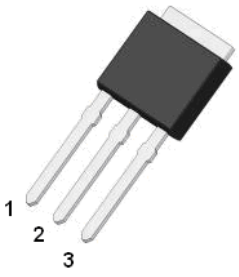

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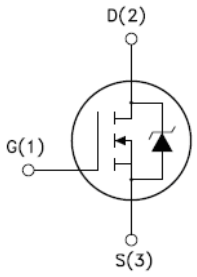


Order codes	Package
PN4HN60-DAI-T1	TO251
PN4HN60-DBI-T1	TO252

RoHS COMPLIANT Pb Pb-Free

Electrical Characteristics

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

SYMBOL	PARAMETER	Value	UNIT
V_{DSS}	Darin to Source Voltage	600	V
I_D	Continuous Drain Current (Tc=25°C)	4.5	A
	Continuous Drain Current (Tc=100°C)	2.8	A
I_{DM}	Drain Current Pulsed	13	A
V_{GS}	Gate to Source Voltage	±30	V
E_{AS}	Single Pulsed Avalanche Energy	130	mJ
I_{AR}	Avalanche Current	4	A
dv/dt	Peak Diode Recovery	15	V/ns
	Drain source dv/dt	20	V/ns
P_D	Total Power Dissipation (Tc= 25°C)	50	W
	Derating Factor	0.4	W/°C
T_{STG} T_J	Operating junction temperature & Storage temperature	-55~+150	°C

Table 2. Thermal Characteristics

SYMBOL	PARAMETER	TO-252	TO-251	UNIT
R_{JC}	Thermal Resistance, Junction-Case	2.5	2.5	°C/W
R_{CS}	Thermal Resistance, Junction-Heat Sink	-	-	°C/W
R_{JA}	Thermal Resistance, Junction- ambient	75	75	°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=150°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	3.2	4	V
$R_{DS(ON)}$	Static Drain-Source On-state Resistance	V_{GS}=10V,I_D=2A	-	0.85	0.95	ohm
Dynamic Characteristics						
g_{fs}(1)	Forward Transconductance	V_{DS}=15V,I_D=2A	-	3.3	-	S
Ciss	Input Capacitance	V_{GS}=0V, V_{DS}=25V f=1MHz	-	360	-	pF
Coss	Output Capacitance		-	280	-	
Crss	Reverse Transfer Capacitance		-	11	-	
Switching Characteristics						
$t_{d(ON)}$	Turn-on Delay Time	V_{DD}=380V,R_G=4.7Ω I_D=4A,V_{GS}=10V	-	25	-	ns
t_r	Rise Time		-	30	-	
$t_{d(ON)}$	Turn-off Delay Time		-	72	-	
t_f	Fall Time		--	38	-	
Q_g	Total Gate Charge	V_{DS}=380V,I_D=4.5A V_{GS}=10V	-	10	25	nC
Q_{gs}	Gate-Source Charge		-	1.6	-	
Q_{gd}	Gate-Drain Charge		-	1.8	-	

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	-	-	4.5	A
I_{SM}(2)	Pulsed Source Current	V_{GS}=0V	-	-	13	A
V_{SD}(1)	Diode Forward Voltage	I_S=1A,V_{GS}=0V	-	0.95	1.2	V
t_{rr}	Reverse Recovery Time	I_S=4A,V_{DD}=300V dI_F=100A/us	-	200	-	ns
Q_{rr}	Reverse Recovery Charge		-	1	-	uC

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

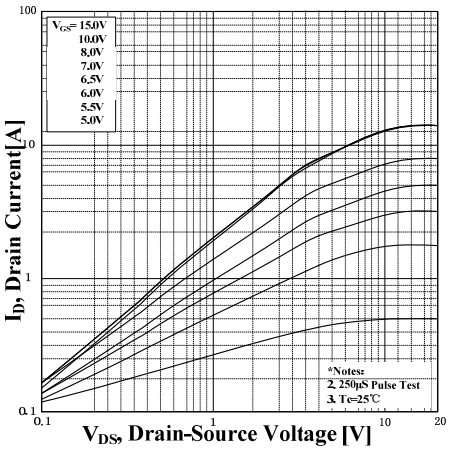


Figure2. Transfer Characteristics

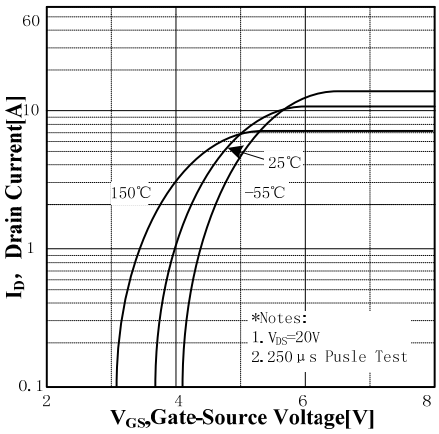


Figure3. On-Resistance Variation vs.Drain Current and Gate Voltage

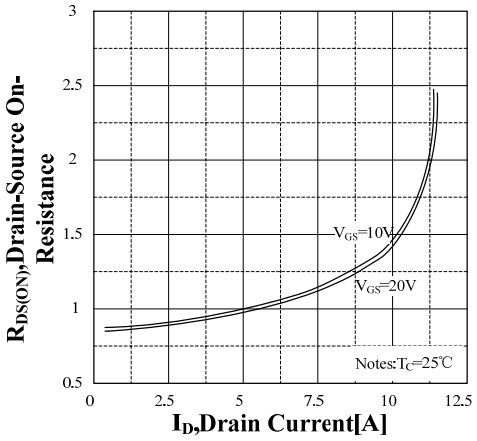


Figure4. Body Diode Forward Voltage Variation vs. Source Current and Temperature

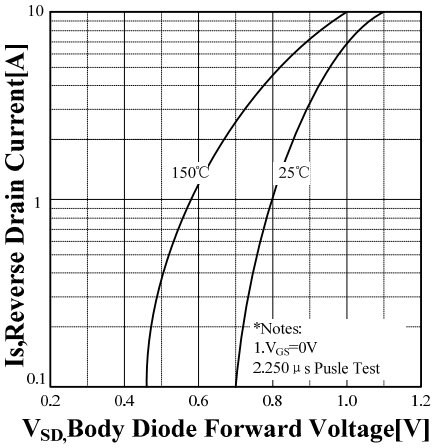


Figure5. Capacitance Characteristics

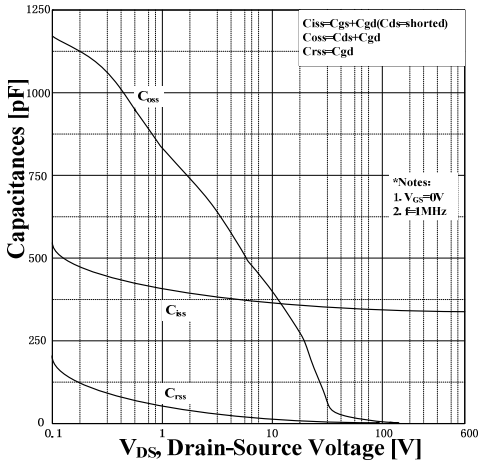


Figure6. Gate Charge Characteristics

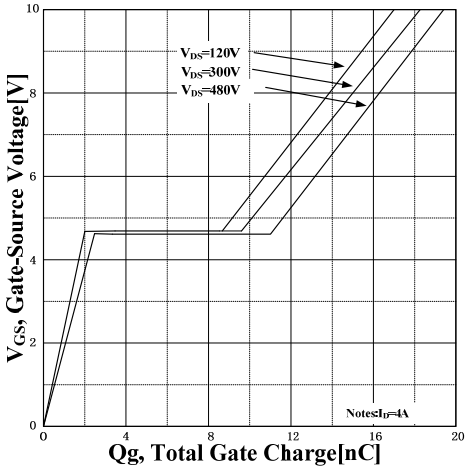


Figure7. Breakdown Voltage Variation vs. Temperature

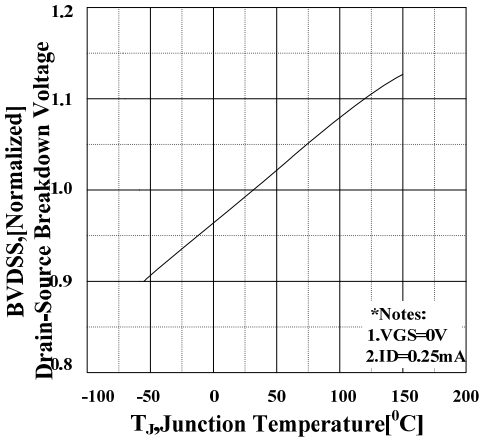


Figure8. On-Resistance Variation vs. Temperature

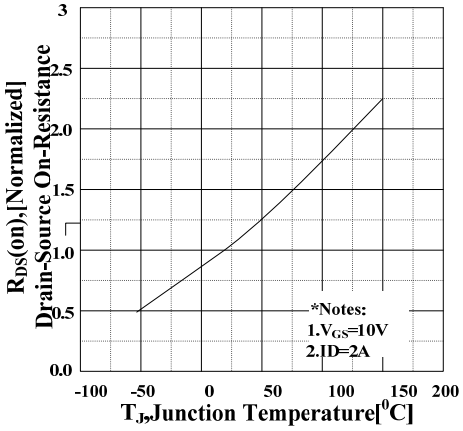


Figure9. Maximum Drain Current vs. Case Temperature

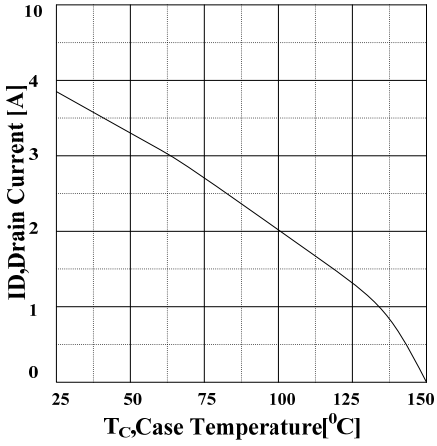


Figure 10. Maximum Safe Operating Area

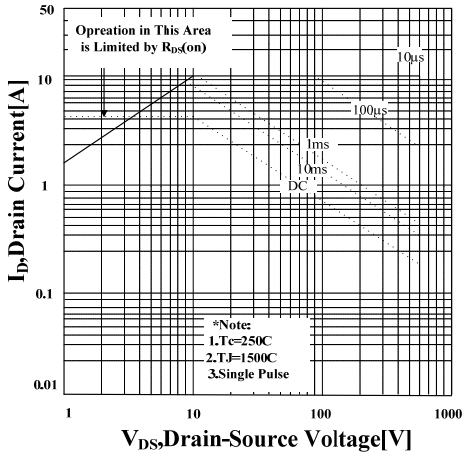
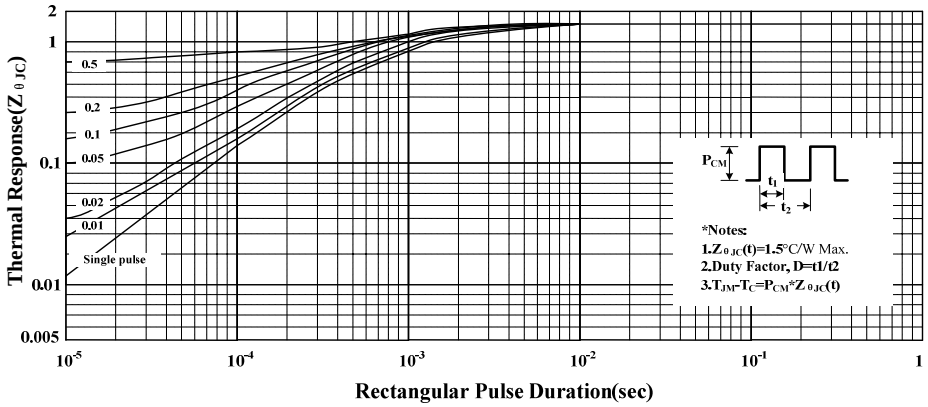


Figure 11. Transient Thermal Response Curve



Package Dimensions

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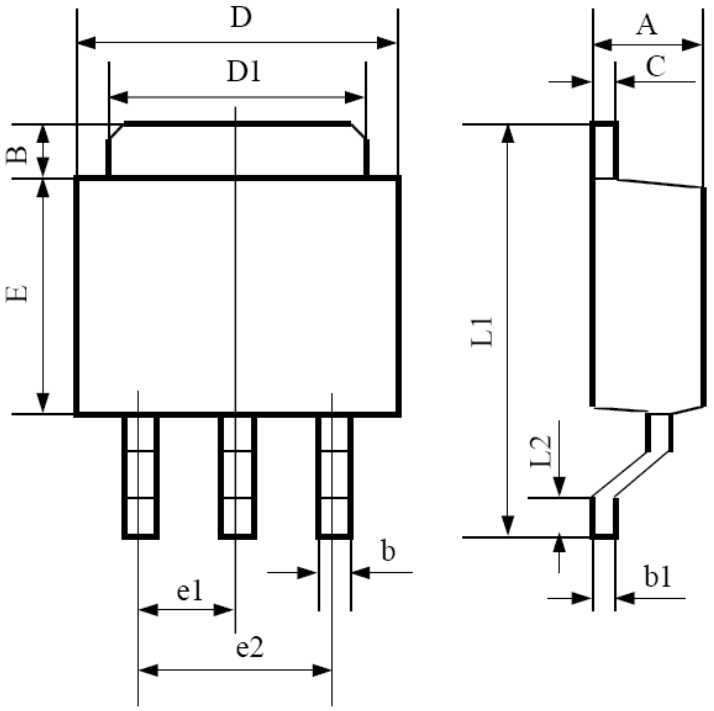
Symbol	Dimensions in Millmeters		Dimensions in Inches	
	Min	Max	Min	Max
A	2.200	2.400	0.087	0.094
B	1.300	1.500	0.051	0.059
b	0.550	0.650	0.022	0.026
b1	0.460	0.560	0.018	0.022
C	0.460	0.560	0.018	0.022
D	6.400	6.600	0.252	0.260
D1	5.200	5.400	0.205	0.212
E	5.400	5.600	0.212	0.220
e1	2.250	2.350	0.089	0.093
e2	4.500	4.700	0.177	0.185
L1	9.250	9.750	0.346	0.384
L2	0.950	1.450	0.037	0.057



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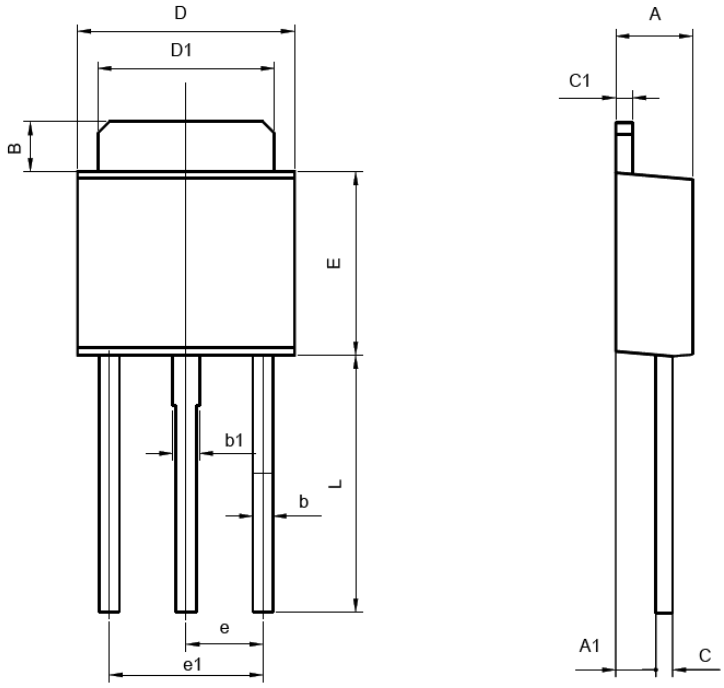
Symbol	Dimensions in Millmeters		Dimensions in Inches	
	Min	Max	Min	Max
A	2.200	2.400	0.087	0.094
A1	1.100	1.300	0.043	0.051
B	1.350	1.650	0.053	0.065
b	0.500	0.700	0.020	0.028
b1	0.700	0.900	0.028	0.035
c	0.460	0.560	0.018	0.022
c1	0.460	0.560	0.018	0.022
D	6.350	6.650	0.250	2.262
D1	5.200	5.400	0.205	0.213
E	5.400	5.600	0.213	0.224
e	2.3000 TYP		0.091TYP	
e1	4.500	4.700	0.177	0.185
L	7.500	7.900	0.295	0.311



TOP MARK	Package
PN4HN60	TO251
YWWXXXXX	TO252

Note: Y: Year Code; W: Week Code; XXXXX: Internal Code