IP04N03B

30V_{DS}/±20V_{GS} N-Channel Shield Trench Power MOSFET

Description

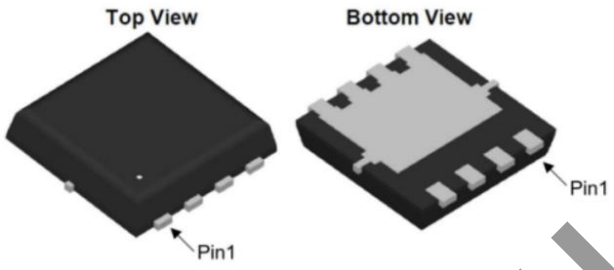
The IP04N03B has the characteristics of extremely low $R_{DS(ON)}$, high-speed switching and high efficiency in DC/DC conversion,marking it suitable for load switching and DC/DC converters.

Application

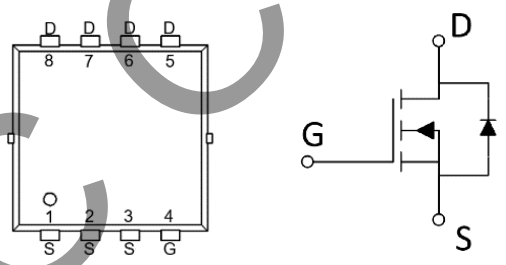
- Load Switch
- DC/DC conversion
- Portable and Battery-powered Products

General Features

- V_{DS}=30V,I_D=65A
- $R_{DS(ON)}$=3.1mΩ（TYP.）V_{GS}=10V,I_D=20A
- $R_{DS(ON)}$=4mΩ（TYP.）V_{GS}=4.5V,I_D=20A
- Reliable and Rugged
- Avalanche Rated
- Low On-Resistance
- High Current Capability
- Halogen and Antimony Free,Rohs compliant



PDFN3030



schematic diagram

Package Marking and Ordering Information

Product ID	Pack		Marking	Qty(PCS)
IP04N03B	PDFN3030	Pb-Free	IP04N03B	5000pcs/Reel

Contents

Absolute Maximum Ratings (T_C=25℃, unless otherwise noted)

Symbol	Parameter	Value	Units
V_{DS}	Drain-Source Voltage (V_{GS}=0V)	30	V
V_{GS}	Gate-Source Voltage (V_{GS}=0V,static)	±20	V
I_D	Continuous Drain Current (T_C=25℃)	65	A
	Continuous Drain Current (T_C=100℃)	45	A
I_{DM}	Pulsed Drain Current	240	A
I_{AS}	Avalanche Current(L=0.01mH)	126	A
E_{AS}	Single Pulsed Avalanche Energy	80	mJ
P_D	Maximum Power Dissipation (T_C =25℃)	35	W
	Maximum Power Dissipation (T_C =100℃)	14	W
T_J,T_{STG}	Operating,Storage Temperature Range	-55~150	℃

Thermal Characteristics

Symbol	Parameter	Min.	Typ.	Max.	Units
$R_{\theta JC}$	Thermal Resistance,Junction-to-Case	-	3.6	-	℃/W
$R_{\theta JA}$	Thermal Resistance,Junction-to-Ambient	-	48	-	℃/W

Electrical Characteristics (T_C=25℃, unless otherwise noted)

Symbol	Parameter	Test Condition	Min	Typ	Max	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V,I_D=250μA	30	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=30V, V_{GS}=0V	-	-	1	μA
I_{GSS}	Gate -Source Leakage Current	V_{GS}=±20V, V_{DS}=0V	-	-	±100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}= V_{GS},I_D=250μA	1.0	1.5	2.0	V
$R_{DS(ON)}$	Drain-Source On-stage Resistance	V_{GS}=10V,I_D=20A	-	3.1	4	mΩ
		V_{GS}=4.5V,I_D=20A	-	4	5.2	

Dynamic Characteristics

Symbol	Parameter	Test Condition	Min	Typ	Max	Unit
C_{iss}	Input capacitance	V_{DS}=15V V_{GS}=0V f=1MHz	-	1147	-	pF
C_{oss}	Output capacitance		-	562	-	
C_{rss}	Reverse transfer capacitance		-	77	-	
R_g	Gate Resistance	f=1MHz	-	1.27	-	Ω
Q_g	Total Gate Charge	V_{DS}=15V V_{GS}=10V I_D=20A	-	21.3	-	nC
Q_{gs}	Gate Source Charge		-	4.5	-	
Q_{gd}	Gate Drain Charge		-	4	-	
$t_{d(on)}$	Turn-on delay Time	V_{GS}=10V V_{DS}=15V R_L=0.75Ω R_G=3Ω	-	4.8	-	ns
t_r	Rise time		-	28.8	-	
$t_{d(off)}$	Turn-off delay Time		-	23.2	-	
t_f	Fall time		-	8	-	

Reverse Diode Characteristics

Symbol	Parameter	Test Condition	Min	Typ	Max	Unit
V_{SD}	Body Diode Forward Voltage	V_{GS}=0V,I_{SD}=1A	-	0.7	-	V
t_{rr}	Reverse Recovery Time	V_{GS}=0V,I_{SD}=20A d_i/d_t=100A/μs	-	14	-	ns
Q_{rr}	Reverse Recovery Charge		-	1.6	-	nC

Notes :

(1) The data tested by surface mounted on a 1 inch2 FR-4 board with 2OZ copper

(2) The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%

(3) The power dissipation is limited by 150℃ junction temperature

(4) The data is theoretically the same as ID and IDM , in real applications , should be limited by total power dissipation

Typical Characteristics

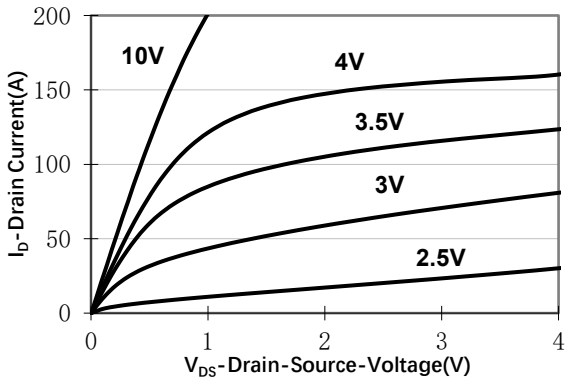


Figure 1. On-Region Characteristics

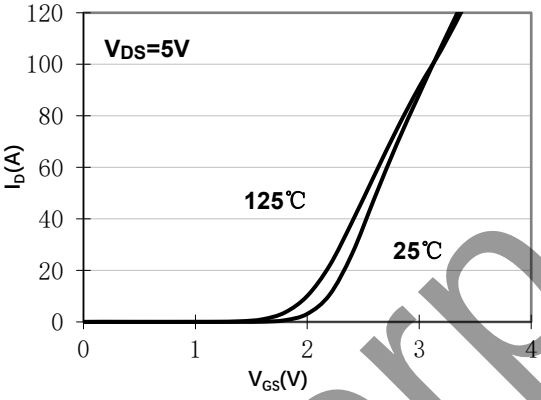


Figure 2. Transfer Characteristics

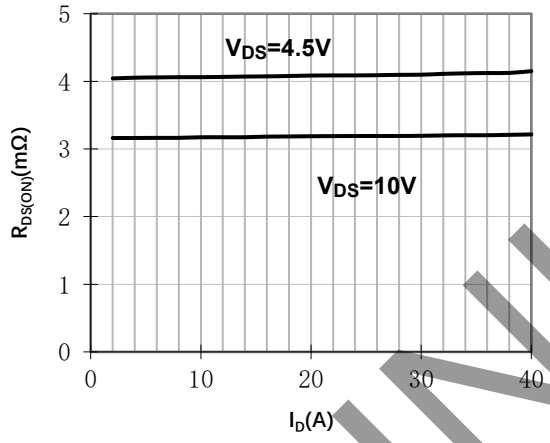


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

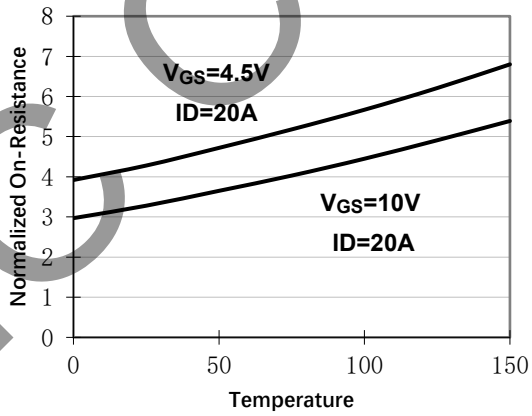


Figure 4. On-Resistance vs. Junction Temperature

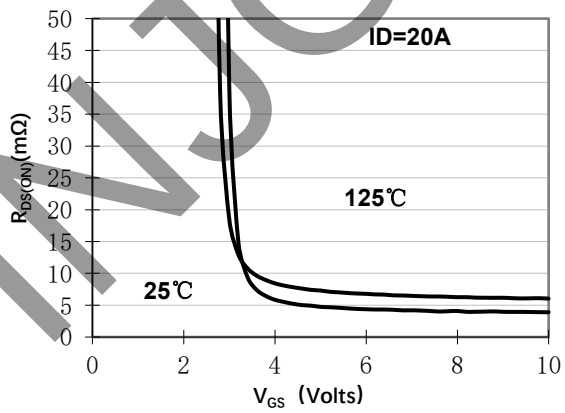


Figure 5. On-Resistance vs. Gate-Source Voltage

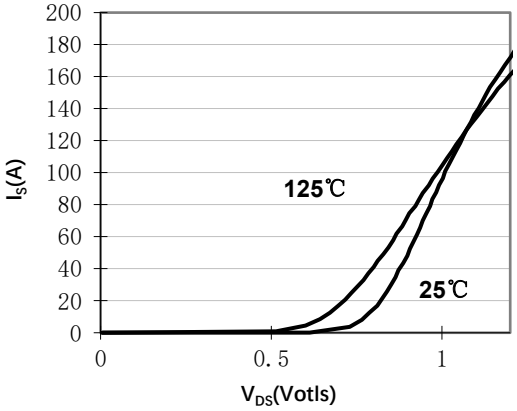


Figure 6. Body-Diode Characteristics

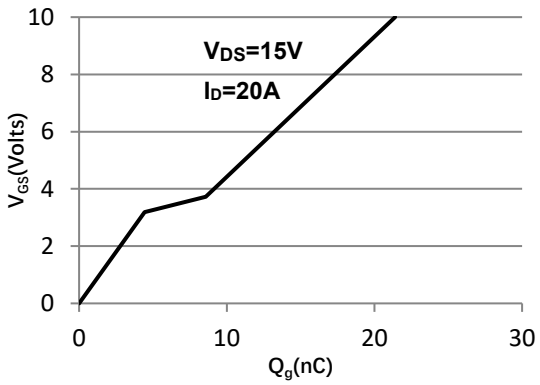


Figure 7. Gate-Charge Characteristics

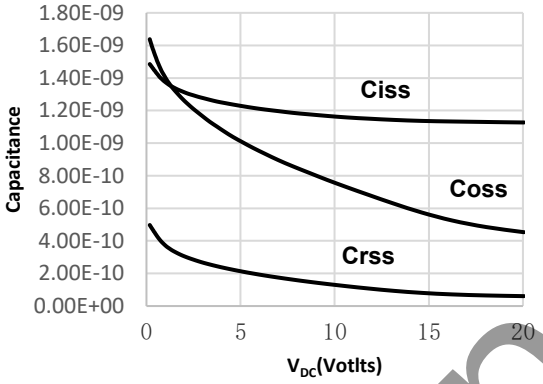


Figure 8. Capacitance Characteristics

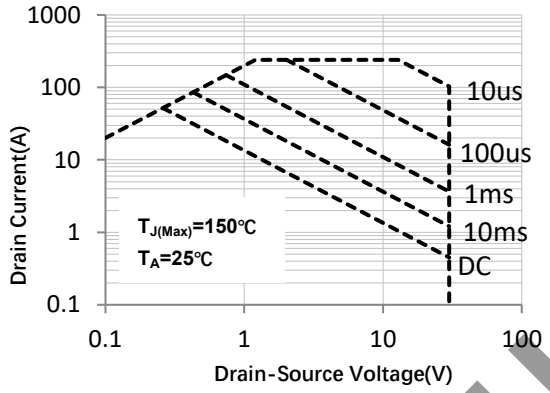


Figure 9. Maximum Forward Biased Safe Operating Area

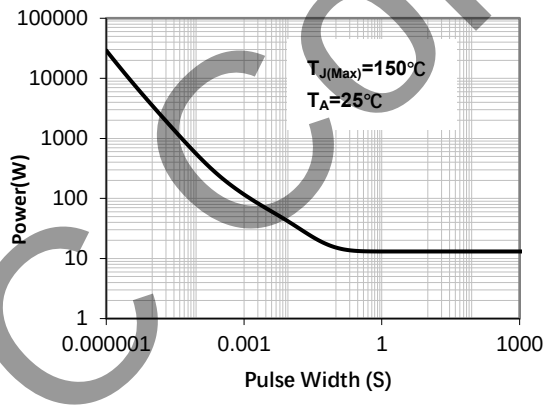


Figure 10. Single Pulse Power Rating Junction-to-Ambient

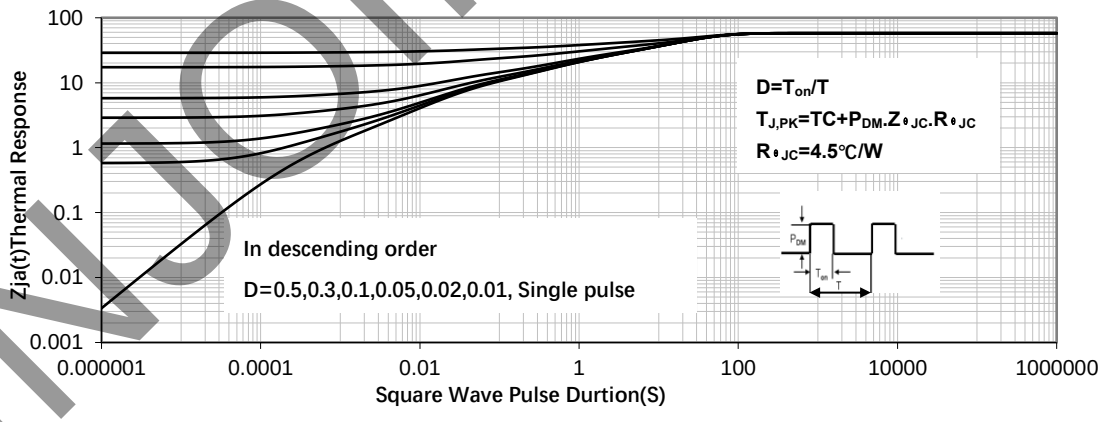
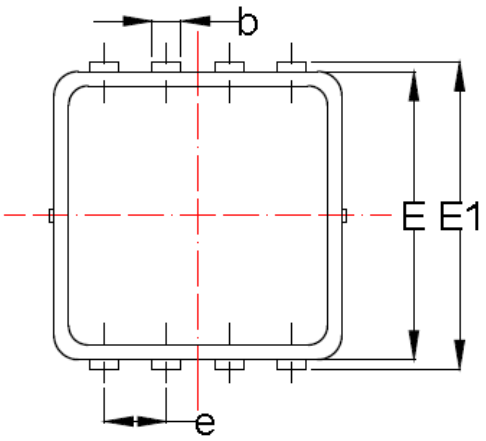
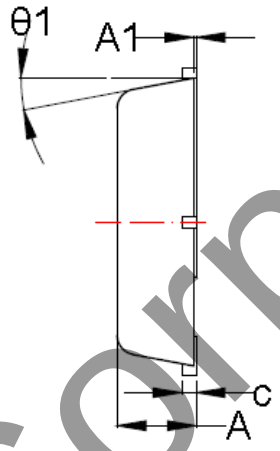


Figure 11. Normalized Maximum Transient Thermal Impedance

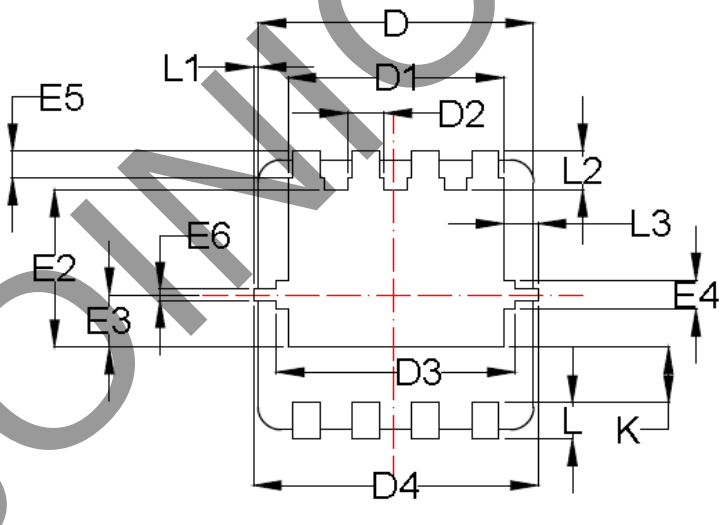
Package Mechanical Data-PDFN3030



TOP VIEW



SIDE VIEW



BOTTOM VIEW

Symbol	Dimensions In Millimeters		
	Min	NOM	MAN
A	0.65	0.775	0.90
A1	0.00	0.025	0.05
b	0.20	0.30	0.40
c	0.10	0.15	0.25
D	2.90	3.00	3.20
D1	2.25	2.35	2.69
D2	0.30	0.40	0.50
D3	2.50	2.60	2.70
D4	3.00	3.10	3.20
E	2.90	3.00	3.10
E1	3.00	3.20	3.60
E2	1.35	1.75	1.85
E3	0.48	0.58	0.68
E4	0.23	0.33	0.43
E5	0.20	0.30	0.40
E6	0.075	0.125	0.175
e	0.60	0.65	0.70
K	0.52	0.62	0.72
L	0.15	0.33	0.50
L1	0	0.10	0.20
L2	0.15	0.40	0.65
L3	0.275	0.375	0.475
Θ1	0°	10°	14°

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