

40V N-Channel Advanced Power MOSFET

Product Summary

V_{DS}	$R_{DS(ON)}$ MAX	I_D MAX
40V	6.5mΩ@10V	80A

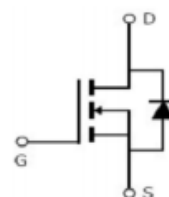
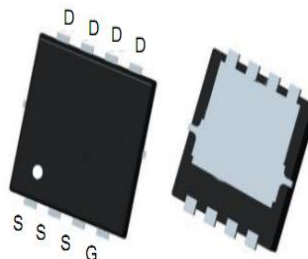
Features

- N-channel, normal level
- Very low on-resistance $R_{DS(on)}$

Application

- Industrial power supplies
- Boost converters
- Rectifier
- Telecom
- Battery management system

PDFN5X6-8L



Schematic diagram

Order Information

Product	Package	Marking	Packing
M04N80J	PDFN5x6	PTN4080	5000PCS/Reel

Absolute Maximum Ratings

Symbol	Parameter		Rating	Unit
Common Ratings (Tc=25°C Unless Otherwise Noted)				
VGS	Gate-Source Voltage		±20	V
V(BR)DSS	Drain-Source Breakdown Voltage		40	V
TJ	Maximum Junction Temperature		150	°C
TSTG	Storage Temperature Range		-55 to 150	°C
IS	Diode Continuous Forward Current	TC =25°C	80	A
Mounted on Large Heat Sink				
IDM	Pulse Drain Current Tested (Silicon Limit)	TC =25°C	320	A
ID	Continuous Drain current@VGS=10V (See Fig2)	TC =25°C	80	A
PD	Maximum Power Dissipation	TC =25°C	41	W
RθJC	Thermal Resistance-Junction to Case		3.0	°C/W
Drain-Source Avalanche Ratings				
EAS	Avalanche Energy, Single Pulsed ②		127	mJ

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Symbol	Parameter	Condition	Min.	Typ.	Max.	Unit
Static Electrical Characteristics @ T _J = 25°C (unless otherwise stated)						
V _{(BR)DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V I _D =250μA	40	--	--	V
I _{DSS}	Zero Gate Voltage Drain Current(Tc=25°C)	V _{DS} =32V,V _{GS} =0V	--	--	1	μA
I _{GSS}	Gate-Body 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	1.6	2.5	V
R _{DS(ON)}	Drain-Source On-State Resistance①	V _{GS} =10V, I _D =20A	--	4.6	6.5	mΩ
R _{DS(ON)}	Drain-Source On-State Resistance①	V _{GS} =4.5V, I _D =10A	--	5.6	8.0	mΩ
Dynamic Electrical Characteristics @ T _J = 25°C (unless otherwise stated)						
C _{iss}	Input Capacitance	V _{DS} =20V,V _{GS} =0V, f=1MHz	--	2610	--	pF
C _{oss}	Output Capacitance		--	204	--	pF
C _{rss}	Reverse Transfer Capacitance		--	190	--	pF
Q _g	Total Gate Charge	V _{DS} =20V,I _D =20A, V _{GS} =10V	--	37	--	nC
Q _{gs}	Gate-Source Charge		--	7	--	nC
Q _{gd}	Gate-Drain Charge		--	18	--	nC
Switching Characteristics						
t _{d(on)}	Turn-on Delay Time	V _{DD} =20V, I _D =10A, R _G =4.7Ω, V _{GS} =10V	--	16	--	nS
t _r	Turn-on Rise Time		--	15	--	nS
t _{d(off)}	Turn-Off Delay Time		--	20	--	nS
t _f	Turn-Off Fall Time		--	12	--	nS
Source- Drain Diode Characteristics@ T _J = 25°C (unless otherwise stated)						
V _{SD}	Forward on voltage	I _S =20A,V _{GS} =0V	--	--	1.2	V

Note:

- ① Pulse width ≤ 300μs; duty cycle ≤ 2%.
- ② Limited by T_{Jmax}, starting T_J = 25°C, L = 0.5mH, R_G = 25Ω, V_{GS} = 10V. Part not recommended for use above this value
- ③ Repetitive rating; pulse width limited by max. junction temperature.

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Typical Characteristics

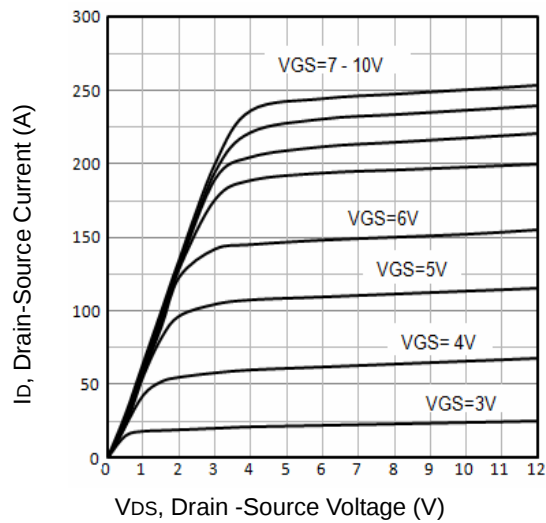


Fig1. Typical Output Characteristics

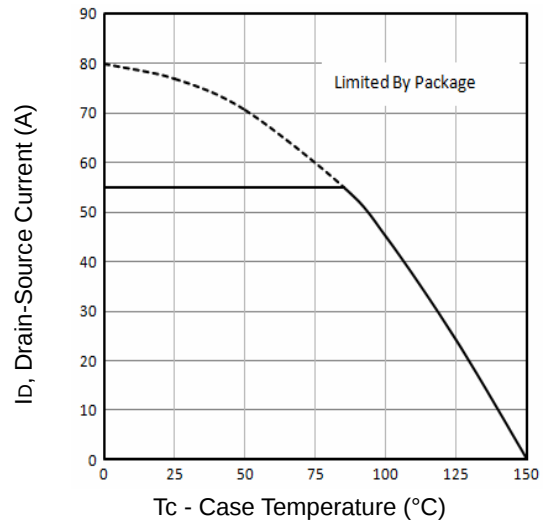


Fig2. Maximum Drain Current Vs. Case Temperature

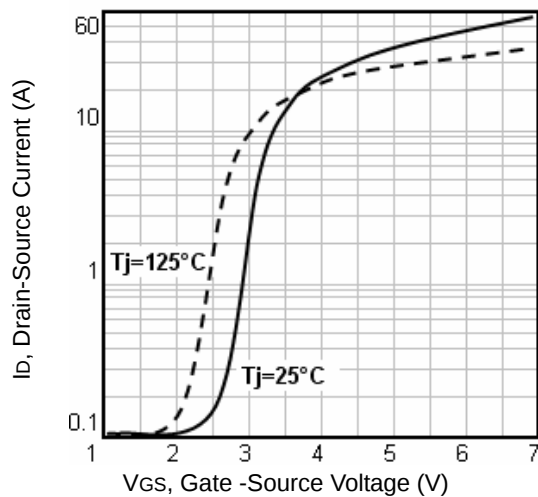


Fig3. Typical Transfer Characteristics

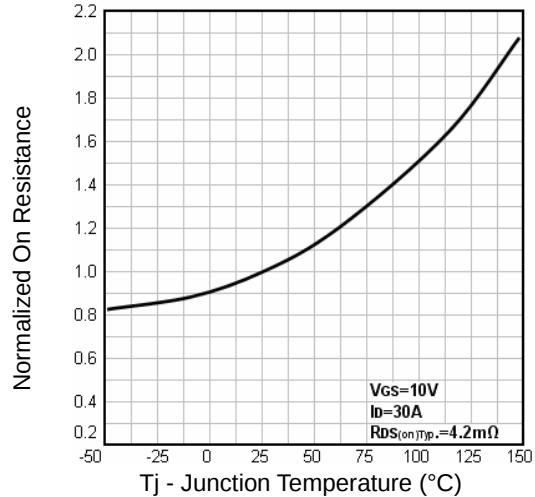


Fig4. Normalized On-Resistance Vs. Temperature

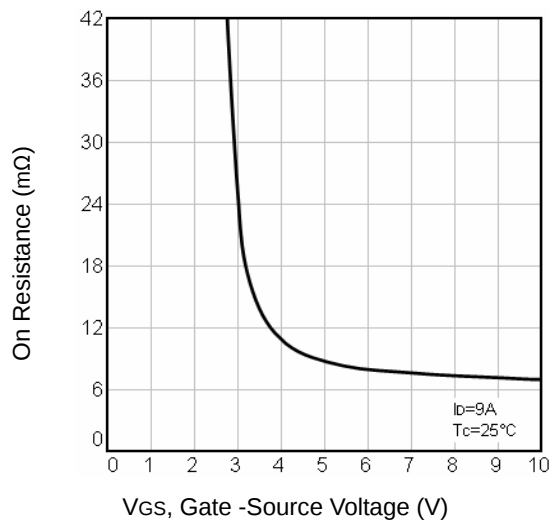


Fig5. On Resistance Vs. Gate-Source Voltage

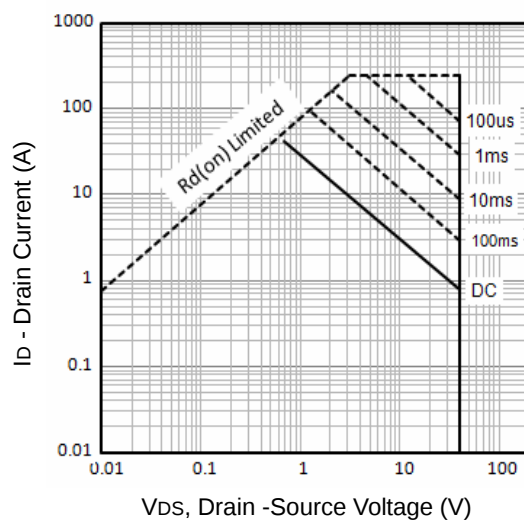


Fig6. Maximum Safe Operating Area

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Typical Characteristics

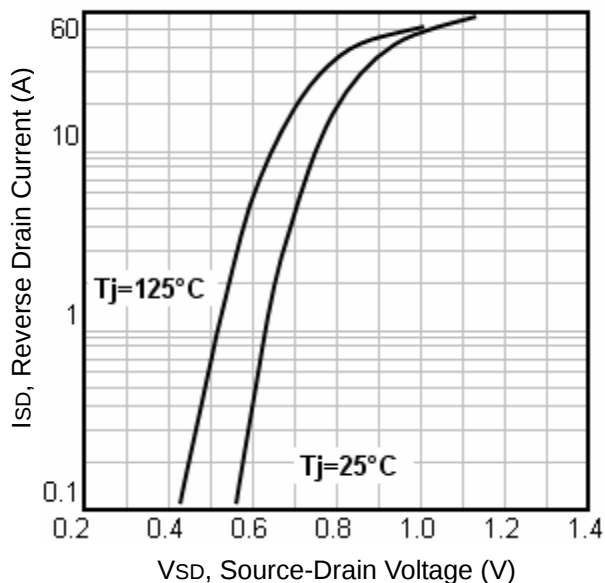


Fig7. Typical Source-Drain Diode Forward Voltage

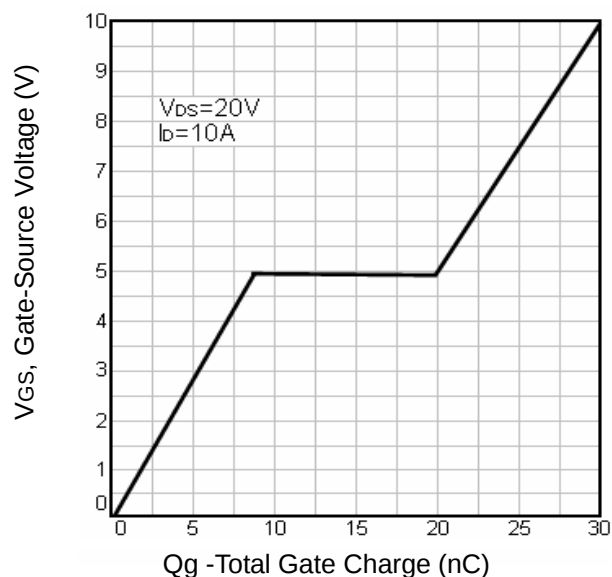


Fig8. Typical Gate Charge Vs. Gate-Source Voltage

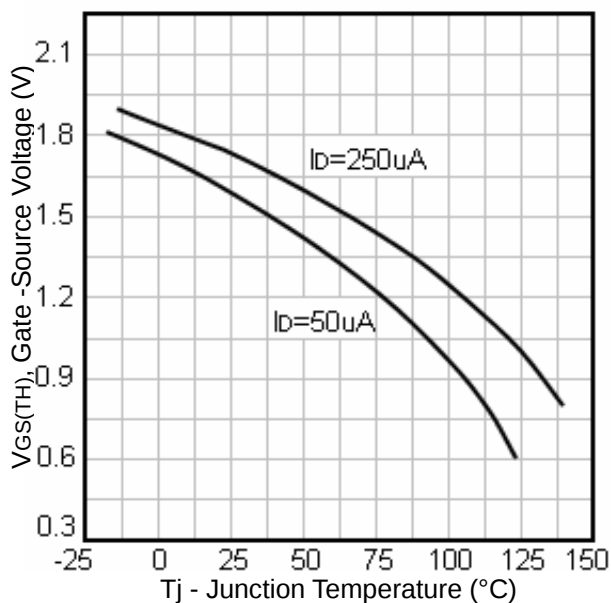


Fig9. Threshold Voltage Vs. Temperature

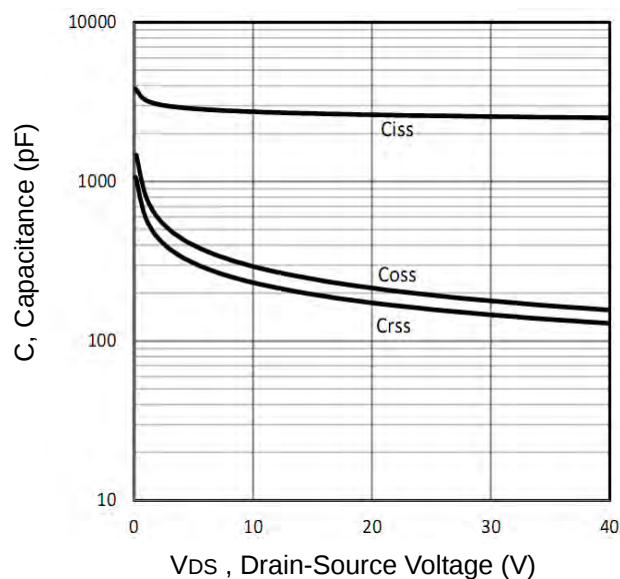


Fig10. Typical Capacitance Vs. Drain-Source Voltage

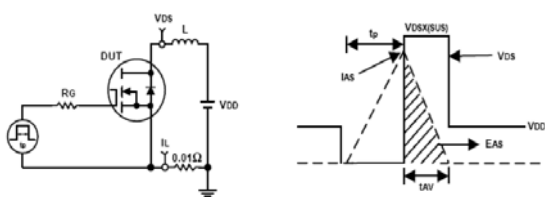


Fig11. Unclamped Inductive Test Circuit and waveforms

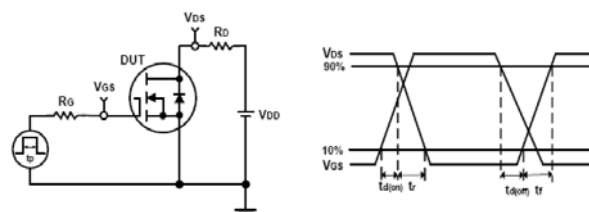
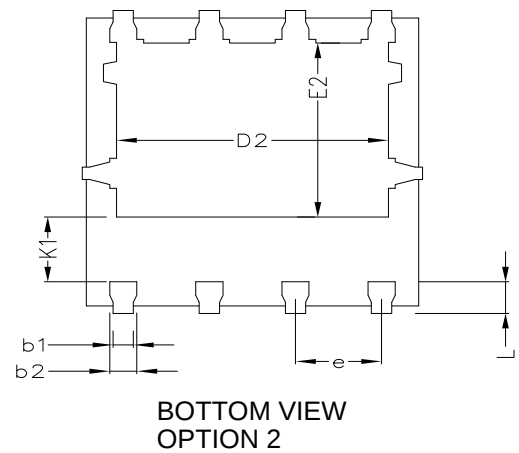
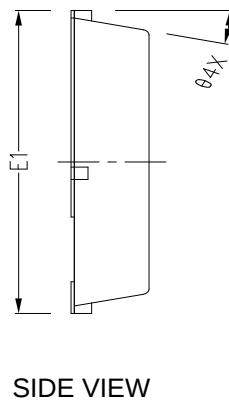
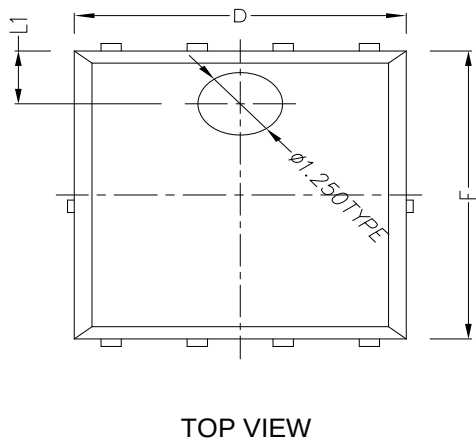
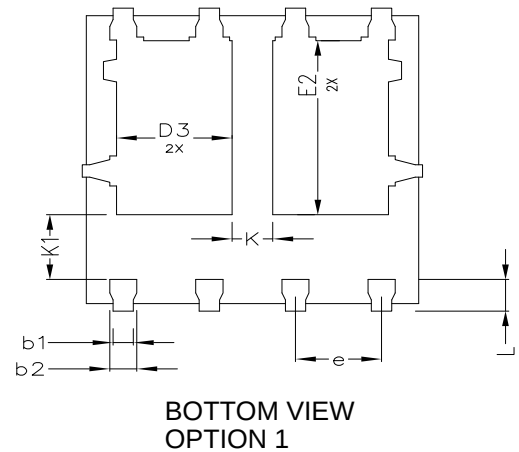
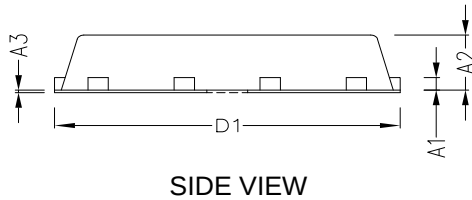


Fig12. Switching Time Test Circuit and waveforms

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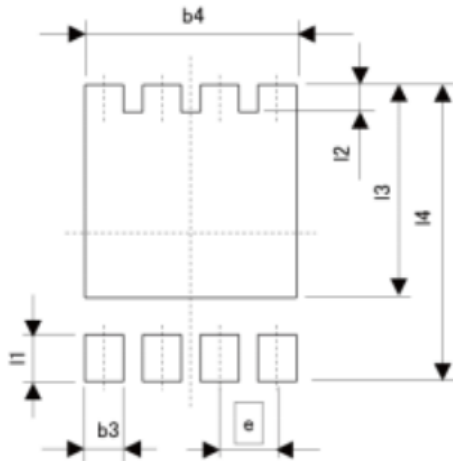
PDFN5X6 Package Outline Dimensions (Units: mm)



COMMON DIMENSIONS (UNITS OF MEASURE IS mm)			
	MIN	NORMAL	MAX
A1	0.254 BSC		
A2	1.000	1.100	1.200
A3	0.005	-	0.020
b1	0.250	0.300	0.350
b2	0.350	0.400	0.450
D	4.800	4.900	5.000
D1	5.000	5.100	5.200
D2	3.910	4.010	4.110
D3	1.605	1.705	1.805
E	5.650	5.750	5.850
E1	5.950	6.050	6.150
E2	3.375	3.475	3.575
e	1.270 TYPE		
L	0.530	0.630	0.730
L1	1.00 REF		
K	0.600 REF		
K1	1.235 REF		

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Suggested Pad Layout



DIM	MILIMETERS		INCHES	
	MIN	MAX	MIN	MAX
b3	-	0.68	-	0.027
b4	-	4.06	-	0.160
l1	-	0.81	-	0.032
l2	-	0.71	-	0.028
l3	-	4.49	-	0.177
l4	-	6.20	-	0.244