

30V N- and P-Channel MOSFET

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
30V	5.9mΩ@10V	45A
	9.7mΩ@4.5V	
-30V	7.7mΩ@-10V	-40A
	11.4mΩ@-4.5V	

Feature

- Trench Technology Power MOSFET
- Low $R_{DS(ON)}$
- Low Gate Charge
- Low Gate Resistance
- 100% UIS Tested

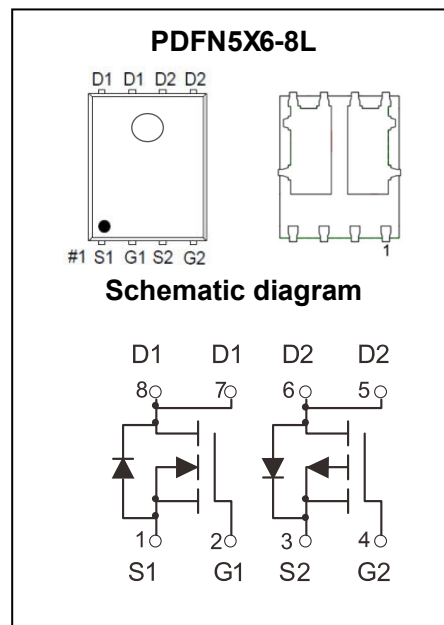
Application

- Motor Drive Applications

MARKING:



M100NP03L = Device Code
 XX = Data Code
 Solid Dot = Green Device Indicator



ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	NMOS	PMOS	Unit
Drain - Source Voltage	V_{DS}	30	-30	V
Gate - Source Voltage	V_{GS}	±20	±20	V
Continuous Drain Current ¹	I_D	45	-40	A
$T_C = 25^\circ\text{C}$				
Pulsed Drain Current ²	I_{DM}	180	-160	A
Single Pulsed Avalanche Current ^{3,4}	I_{AS}	25	35	A
Single Pulsed Avalanche Energy ^{3,4}	E_{AS}	156	306	mJ
Power Dissipation ⁶	P_D	29	29	W
Thermal Resistance from Junction to Ambient ⁷	$R_{\theta JA}$	40	40	$^\circ\text{C/W}$
Thermal Resistance from Junction to Case	$R_{\theta JC}$	4.3	4.3	$^\circ\text{C/W}$
Junction Temperature	T_J	150	150	$^\circ\text{C}$
Storage Temperature	T_{STG}	-55~ +150	-55~ +150	$^\circ\text{C}$

MOSFET ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted)
NMOS:

Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Off Characteristics						
Drain - Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} = 0V, I _D = 250μA	30			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 30V, V _{GS} = 0V			1	μA
Gate - Body Leakage Current	I _{GSS}	V _{GS} = ±20V, V _{DS} = 0V			±100	nA
On Characteristics⁵						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250μA	1	1.7	2.5	V
Drain-source On-resistance	R _{DS(on)}	V _{GS} = 10V, I _D = 20A		5.9	7	mΩ
		V _{GS} = 4.5V, I _D = 16A		9.7	13	
Forward tranconductance	g _{FS}	V _{DS} = 6V, I _D = 10A	5			S
Dynamic Characteristics						
Input Capacitance	C _{iss}	V _{DS} = 15V, V _{GS} = 0V, f = 1MHz		1330		pF
Output Capacitance	C _{oss}			203		
Reverse Transfer Capacitance	C _{rss}			193		
Gate Resistance	R _g	V _{DS} = 0V, V _{GS} = 0V, f = 1MHz		1.3		Ω
Switching Characteristics						
Total Gate Charge	Q _g	V _{DS} = 15V, V _{GS} = 10V, I _D = 20A		30.1		pC
Gate-source Charge	Q _{gs}			4.0		
Gate-drain Charge	Q _{gd}			8.1		
Turn-on Delay Time	t _{d(on)}	V _{DD} = 15V, V _{GS} = 10V, R _L = 0.75Ω R _G = 3Ω		15		ns
Turn-on Rise Time	t _r			13		
Turn-off Delay Time	t _{d(off)}			35		
Turn-off Fall Time	t _f			12		
Source - Drain Diode Characteristics						
Diode Forward Voltage ⁵	V _{SD}	V _{GS} = 0V, I _S = 20A			1.2	V

MOSFET ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted)

PMOS:

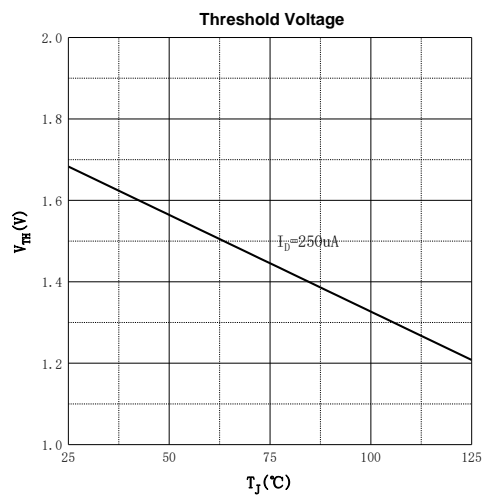
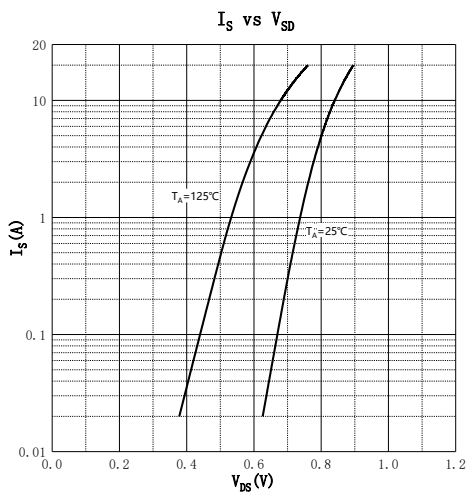
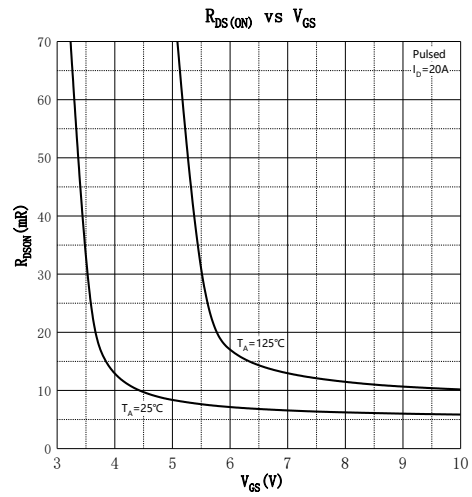
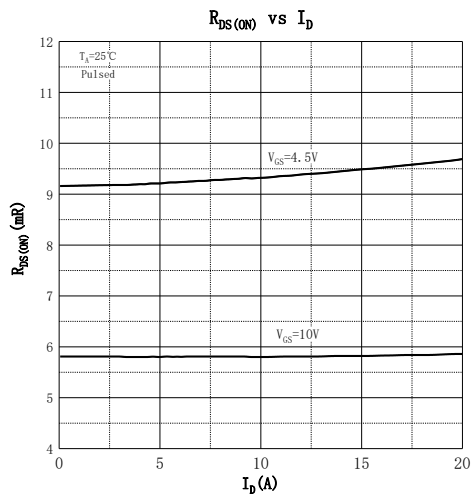
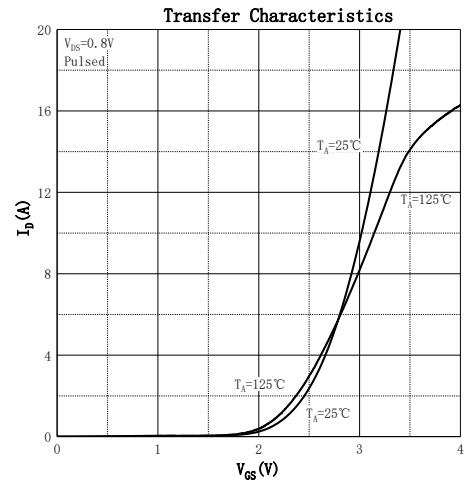
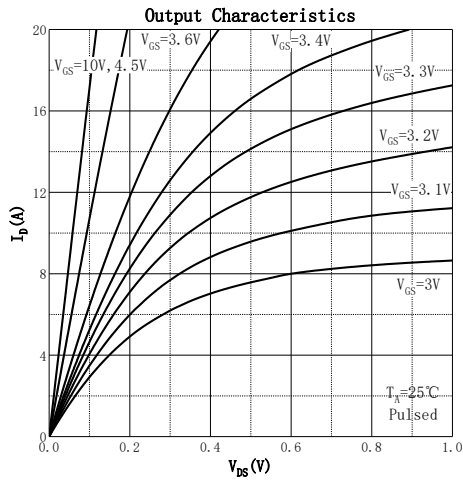
Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Off Characteristics						
Drain - Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} = 0V, I _D = -250μA	-30			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = -30V, V _{GS} = 0V			-1	μA
Gate - Body Leakage Current	I _{GSS}	V _{GS} = ±20V, V _{DS} = 0V			±100	nA
On Characteristics⁵						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = -250μA	-1	-1.7	-2.5	V
Drain-source On-resistance	R _{DS(on)}	V _{GS} = -10V, I _D = -20A		7.7	11	mΩ
		V _{GS} = -4.5V, I _D = -16A		11.4	15	
Forward transconductance	g _{FS}	V _{DS} = -6V, I _D = -6A	5			S
Dynamic Characteristics						
Input Capacitance	C _{iss}	V _{DS} = -15V, V _{GS} = 0V, f = 1MHz		3209		pF
Output Capacitance	C _{oss}			525		
Reverse Transfer Capacitance	C _{rss}			482		
Gate Resistance	R _g	V _{DS} = 0V, V _{GS} = 0V, f = 1MHz		4.5		Ω
Switching Characteristics						
Total Gate Charge	Q _g	V _{DS} = -15V, V _{GS} = -10V, I _D = -20A		61.8		pC
Gate-source Charge	Q _{gs}			8.0		
Gate-drain Charge	Q _{gd}			14.1		
Turn-on Delay Time	t _{d(on)}	V _{DD} = -15V, V _{GS} = -10V, R _L = 0.75Ω, R _G = 3Ω		18		ns
Turn-on Rise Time	t _r			45		
Turn-off Delay Time	t _{d(off)}			36		
Turn-off Fall Time	t _f			15		
Source - Drain Diode Characteristics						
Diode Forward Voltage ⁵	V _{SD}	V _{GS} = 0V, I _S = -20A			-1.2	V

Notes :

- 1.The maximum current rating is limited by package.And device mounted on a large heatsink
- 2.Pulse Test : Pulse Width ≤ 10μs, duty cycle ≤ 1%.
- 3.E_{AS} condition: V_{DD} = 15V, V_{GS} = 10V, L = 0.5mH, R_G = 25Ω Starting T_J = 25°C.
- 4.E_{AS} condition: V_{DD} = -15V, V_{GS} = -10V, L = 0.5mH, R_G = 25Ω Starting T_J = 25°C.
- 5.Pulse Test : Pulse Width ≤ 300μs, duty cycle ≤ 2%.
- 6.The power dissipation P_D is limited by T_{J(MAX)} = 150°C.And device mounted on a large heatsink
- 7.Device mounted on 1in² FR-4 board with 2oz. Copper, in a still air environment with T_A =25°C.

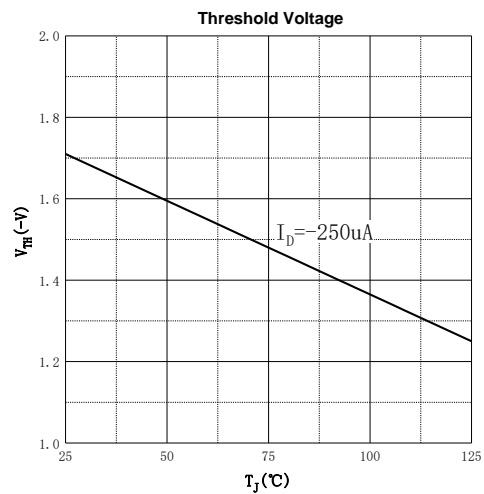
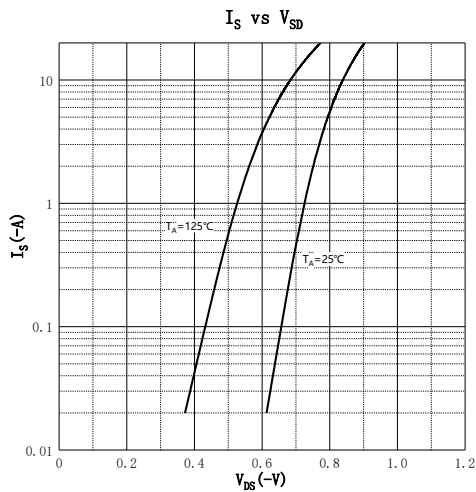
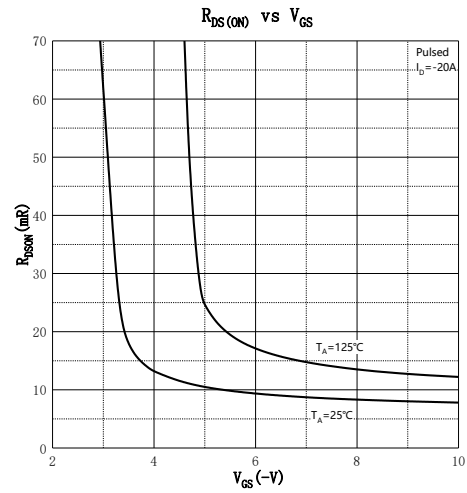
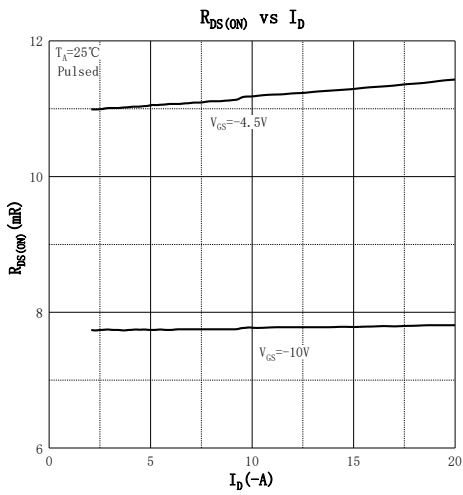
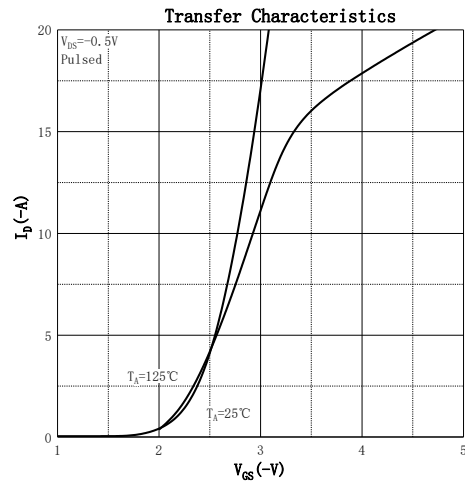
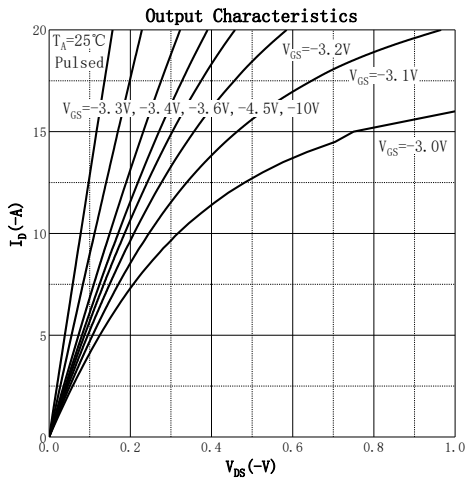
Typical Characteristics

NMOS:

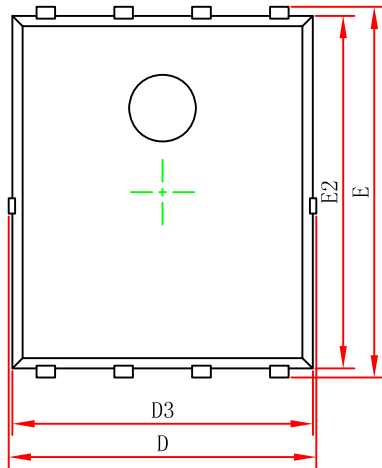


Typical Characteristics

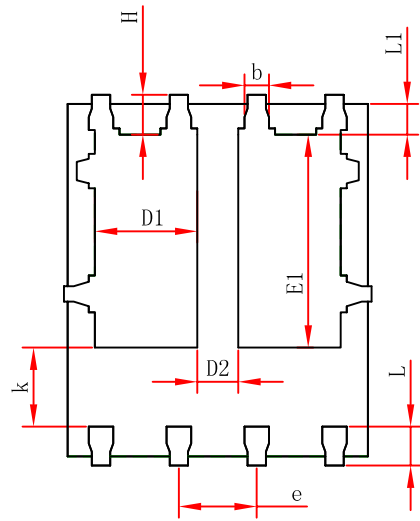
PMOS:



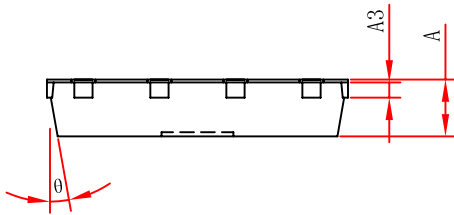
PDFN5×6-8L Package Information



Top View



Bottom View



Side View

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.900	1.000	0.035	0.039
A3	0.254 REF.		0.010REF.	
D	4.944	5.096	0.195	0.201
E	5.974	6.126	0.235	0.241
D1	1.470	1.870	0.058	0.074
D2	0.470	0.870	0.019	0.034
E1	3.375	3.575	0.133	0.141
D3	4.824	4.976	0.190	0.196
E2	5.674	5.826	0.223	0.229
k	1.190	1.390	0.047	0.055
b	0.350	0.450	0.014	0.018
e	1.270TYP.		0.050TYP.	
L	0.559	0.711	0.022	0.028
L1	0.424	0.576	0.017	0.023
H	0.574	0.726	0.023	0.029
θ	10°	12°	10°	12°