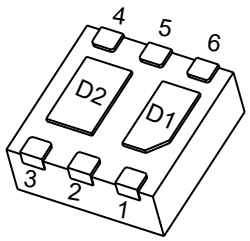
GPM1K3NP03LFF

30V N- and P-Channel MOSFET

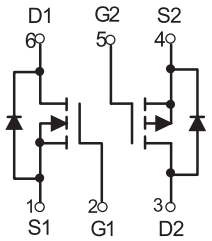
Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
30V	37mΩ@10V	2.8A
	49mΩ@4.5V	
-30V	100mΩ@-10V	-1.8A
	160mΩ@-4.5V	

DFN2×2-6L



Schematic diagram



Feature

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

Application

- Motor Drive Applications

MARKING:

03NP1K3= Device Code
X = Data Code
Solid Dot = Green Device Indicater

ABSOLUTE MAXIMUM RATINGS (T_A = 25℃ 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]	T_C = 25℃	I_D	2.8	-1.8	A
Pulsed Drain Current[2]		I_{DM}	11.2	-7.2	A
Power Dissipation[6]		P_D	1.5	1.5	W
Thermal Resistance from Junction to Ambient[7]		$R_{\theta JA}$	83	83	℃/W
Junction Temperature		T_J	150	150	℃
Storage Temperature		T_{STG}	-55~ +150	-55~ +150	℃

MOSFET ELECTRICAL CHARACTERISTICS (T_J = 25℃ 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 Characteristics[5]						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	1	1.5	3	V
Drain-source On-resistance	$R_{DS(on)}$	V_{GS} = 10V, I_D = 3.6A		37	58	mΩ
		V_{GS} = 4.5V, I_D = 3.1A		49	73	
Forward tranconductance	g_{FS}	V_{DS} = 5V, I_D = 4.5A		10		S
Dynamic Characteristics						
Input Capacitance	C_{iss}	V_{DS} = 15V, V_{GS} = 0V, f = 1MHz		160		pF
Output Capacitance	C_{oss}			27		
Reverse Transfer Capacitance	C_{rss}			21		
Gate Resistance	R_g	V_{DS} = 0V, V_{GS} = 0V, f = 1MHz		2.4		Ω
Switching Characteristics						
Total Gate Charge	Q_g	V_{DS} = 15V, V_{GS} = 10V, I_D = 3.6A		4.8		pC
Gate-source Charge	Q_{gs}			1.0		
Gate-drain Charge	Q_{gd}			0.7		
Turn-on Delay Time	$t_{d(on)}$	V_{DD} = 15V, V_{GS} = 10V, R_L = 3.3Ω R_G = 3Ω		4.5		ns
Turn-on Rise Time	t_r			1.5		
Turn-off Delay Ttime	$t_{d(off)}$			18.5		
Turn-off Fall Time	t_f			15.5		
Source - Drain Diode Characteristics						
Diode Forward Voltage[5]	V_{SD}	V_{GS} = 0V, I_S = 2.7A			1.2	V

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 Characteristics[5]						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = -250μA	-1	-1.5	-3	V
Drain-source On-resistance	$R_{DS(on)}$	V_{GS} = -10V, I_D = -2A		100	130	mΩ
		V_{GS} = -4.5V, I_D = -1.5A		160	190	
Forward tranconductance	g_{FS}	V_{DS} = -5V, I_D = -3.5A		6		S
Dynamic Characteristics						
Input Capacitance	C_{iss}	V_{DS} = -15V, V_{GS} = 0V, f = 1MHz		242		pF
Output Capacitance	C_{oss}			31		
Reverse Transfer Capacitance	C_{rss}			24		
Gate Resistance	R_g	V_{DS} = 0V, V_{GS} = 0V, f = 1MHz		8.2		Ω
Switching Characteristics						
Total Gate Charge	Q_g	V_{DS} = -15V, V_{GS} = -10V, I_D = -2A		5.9		pC
Gate-source Charge	Q_{gs}			1.3		
Gate-drain Charge	Q_{gd}			0.9		
Turn-on Delay Time	$t_{d(on)}$	V_{DD} = -15V, V_{GS} = -10V, R_L = 4Ω, R_G = 3Ω		7.5		ns
Turn-on Rise Time	t_r			4.1		
Turn-off Delay Ttime	$t_{d(off)}$			11.8		
Turn-off Fall Time	t_f			4.8		
Source - Drain Diode Characteristics						
Diode Forward Voltage[5]	V_{SD}	V_{GS} = 0V, I_S = -2A			-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%.

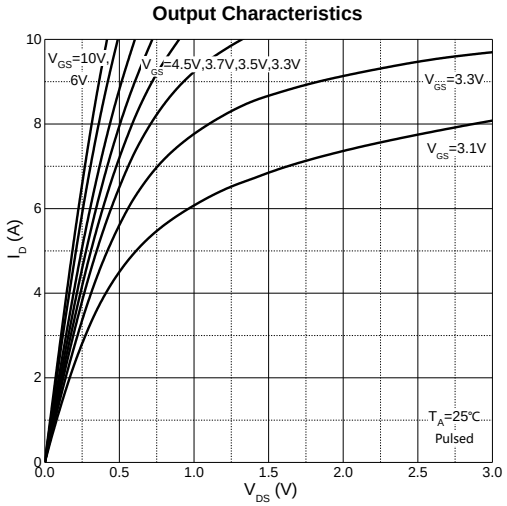
3.Pulse Test : Pulse Width ≤ 300μs, duty cycle ≤ 2%.

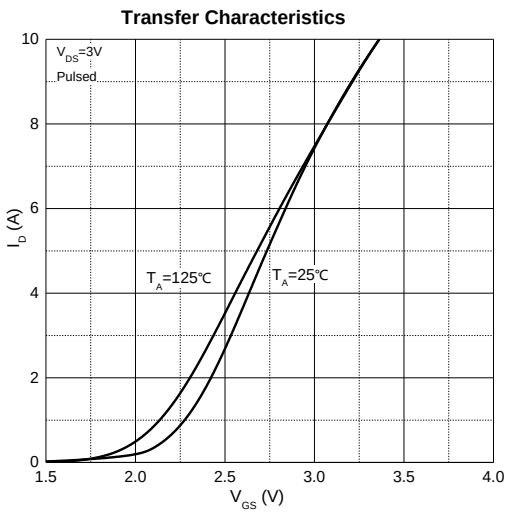
4.The power dissipation P_D is limited by $T_{J(MAX)}$ = 150°C.And device mounted on a large heatsink

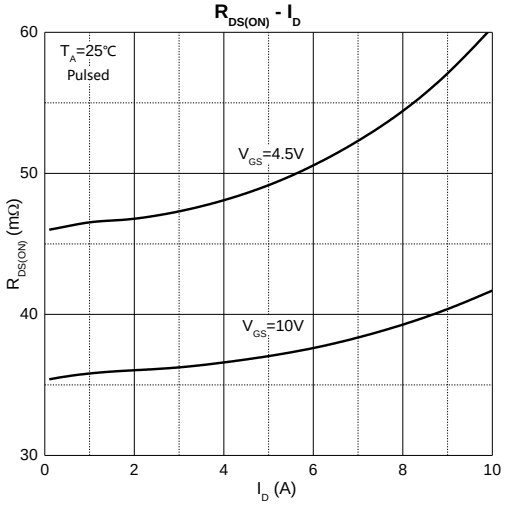
5.Device mounted on 1in^2 FR-4 board with 2oz. Copper, in a still air environment with T_A =25°C.

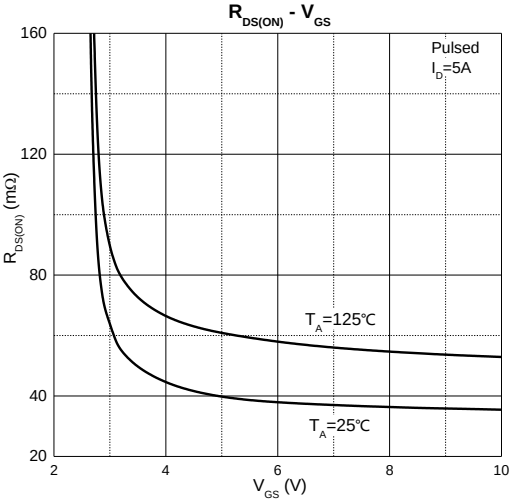
Typical Characteristics

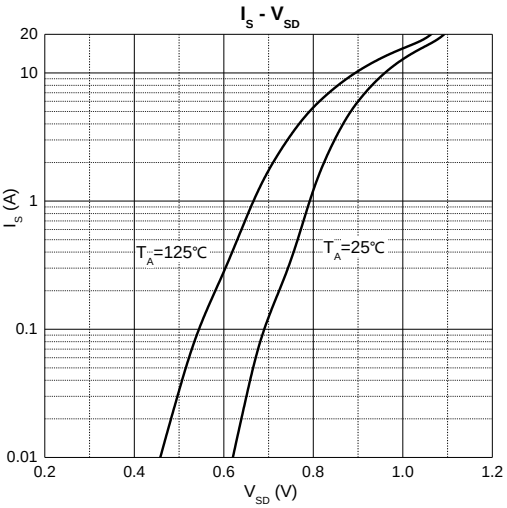
NMOS:

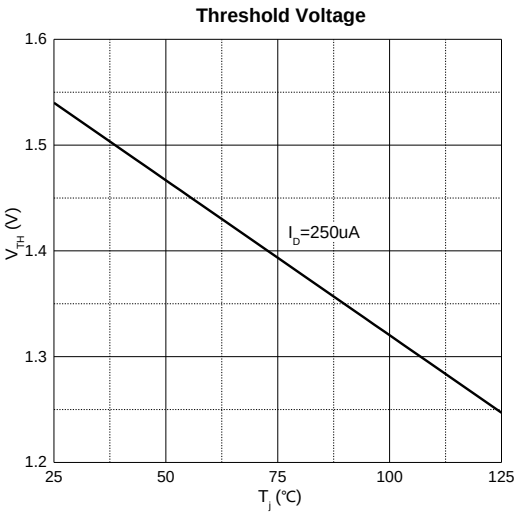




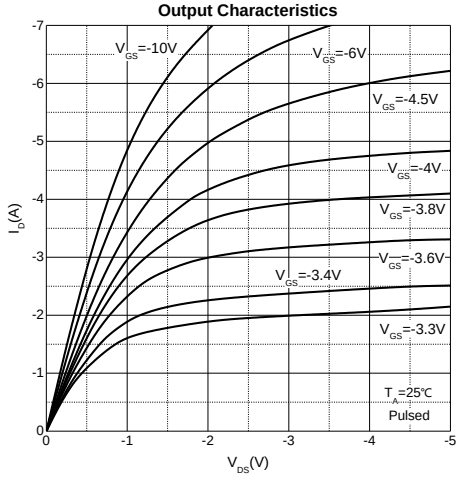


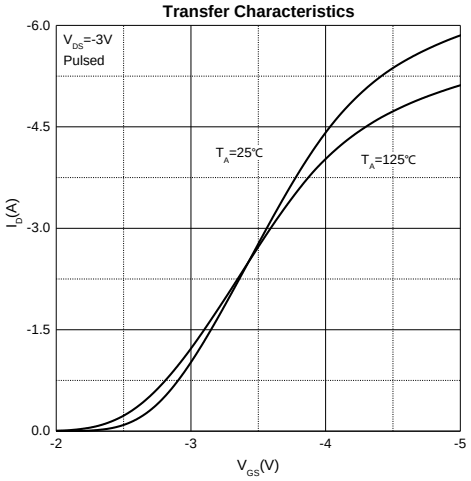


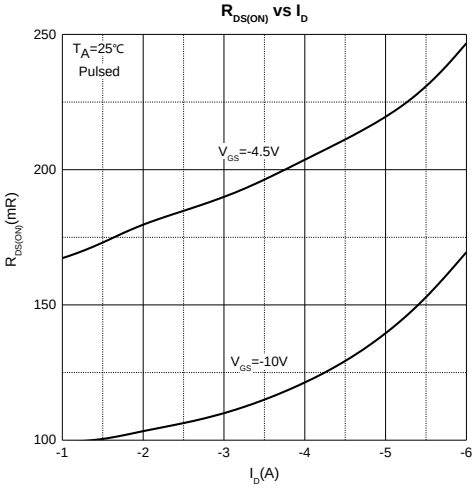


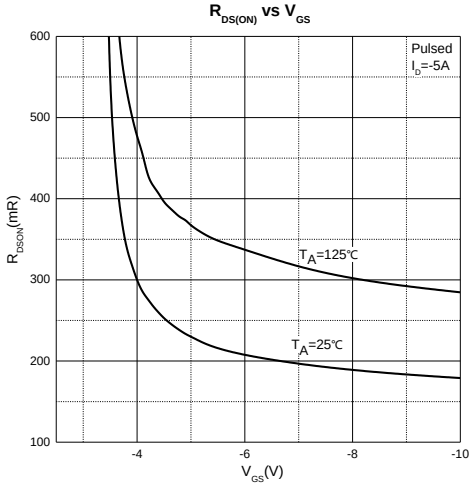


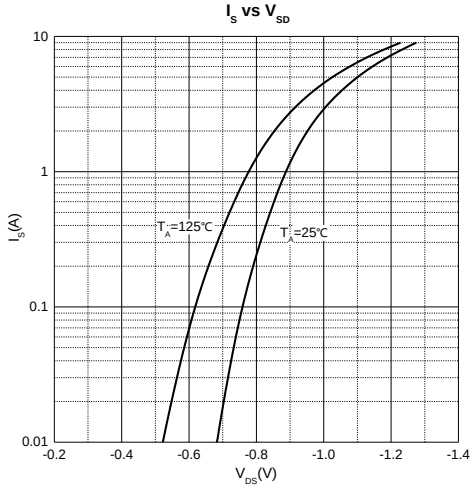
PMOS:

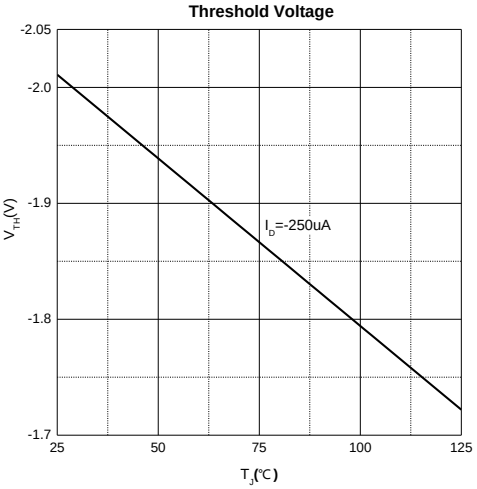

Output Characteristics
V_GS=-10V
V_GS=-6V
V_GS=-4.5V
V_GS=-4V
V_GS=-3.8V
V_GS=-3.6V
V_GS=-3.4V
V_GS=-3.3V
T_A=25℃
Pulsed
I_D(A)
V_DS(V)


Transfer Characteristics
V_DS=-3V
Pulsed
T_A=25℃
T_A=125℃
I_D(A)
V_GS(V)

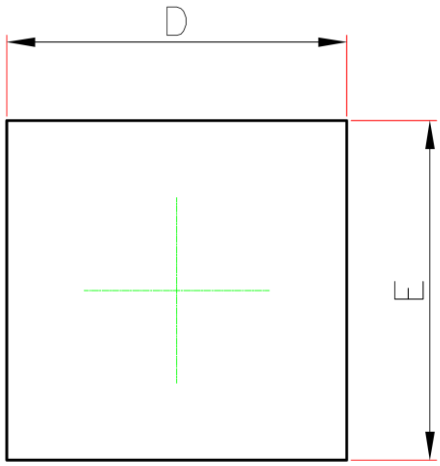

R_DS(ON) vs I_D
T_A=25℃
Pulsed
V_GS=-4.5V
V_GS=-10V
R_DS(ON)(mR)
I_D(A)


R_DS(ON) vs V_GS
Pulsed
I_D=-5A
T_A=125℃
T_A=25℃
R_DS(ON)(mR)
V_GS(V)

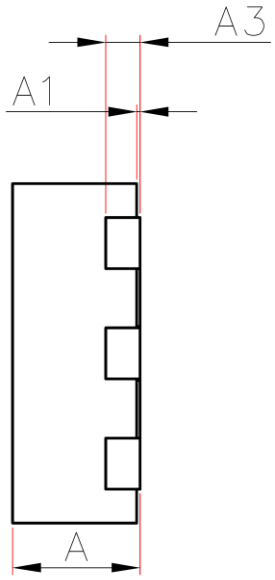

I_S vs V_SD
T_A=125℃
T_A=25℃
I_S(A)
V_DS(V)


Threshold Voltage
I_D=-250uA
V_TH(V)
T_J(℃)

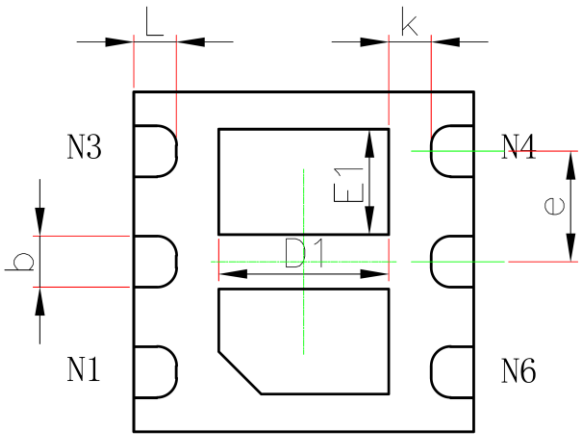
DFN2×2-6L Package Information



TOP VIEW



SIDE VIEW



BOTTOM VIEW

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.700	0.800	0.028	0.031
A1	0	0.050	0	0.002
A3	2.03REF		0.008REF	
D	1.900	2.100	0.075	0.083
E	1.900	2.100	0.075	0.083
D1	0.900	1.100	0.035	0.043
E1	0.520	0.720	0.020	0.028
k	0.200MIN		0.008MIN	
b	0.250	0.350	0.010	0.014
e	0.65BSC		0.026TYP	
L	0.174	0.326	0.007	0.013