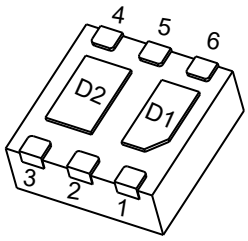
GPM20NP1K1

20V N-Channel + P-Channel MOSFET

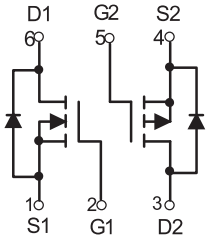
Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
-20V	68mΩ@-4.5V	-2.3A
	95mΩ@-2.5V	
20V	32mΩ@4.5V	3.5A
	49mΩ@2.5V	

DFN2×2-6L



Schematic diagram



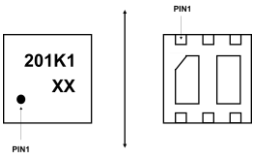
Feature

- TrenchFET Power MOSFET
- High Density Cell Design for Low $R_{DS(ON)}$
- Voltage Controlled Small Signal Switch

Application

- Load Switch for Portable Devices
- DC/DC Converter

MARKING:



ABSOLUTE MAXIMUM RATINGS (T_a=25℃ unless otherwise noted)

Parameter	Symbol	Value	Unit
P-MOSFET			
Drain-Source Voltage	V_{DS}	-20	V
Gate-Source Voltage	V_{GS}	±12	V
Continuous Drain Current	I_D	-2.3	A
Pulsed Drain Current(1)	I_{DM}	-9	A
Power Dissipation	P_D	0.75	W
N-MOSFET			
Drain-Source Voltage	V_{DS}	20	V
Gate-Source Voltage	V_{GS}	±12	V
Continuous Drain Current	I_D	3.5	A
Pulsed Drain Current(1)	I_{DM}	14	A
Power Dissipation	P_D	0.75	W
Temperature and Thermal Resistance			
Thermal Resistance from Junction to Ambient(2)	$R_{\theta JA}$	167	℃/W
Junction Temperature	T_J	150	℃
Storage Temperature	T_{STG}	-55~ +150	℃

P-channel MOSFET ELECTRICAL CHARACTERISTICS(T_a=25℃ unless otherwise noted)

Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Static Characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D =-250μA	-20			V
Zero gate voltage drain current	I_{DSS}	V_{DS} =-16V,V_{GS} = 0V			-1	μA
Gate-body leakage current	I_{GSS}	V_{GS} =±8V, V_{DS} = 0V			±100	nA
Gate threshold voltage	$V_{GS(th)}$	V_{DS} =V_{GS}, I_D =-250μA	-0.4	-0.7	-1.0	V
Drain-source on-resistance(3)	$R_{DS(on)}$	V_{GS} =-4.5V, I_D =-2.8A		68	110	mΩ
		V_{GS} =-2.5V, I_D =-2.0A		95	140	
Forward tranconductance	g_{FS}	V_{DS} =-5V, I_D =-2.0A	3			S
Diode forward voltage(3)	V_{DS}	I_S=-0.7A, V_{GS} = 0V			-1.2	V
Dynamic characteristics(4)						
Input Capacitance	C_{iss}	V_{DS} =-10V,V_{GS} =0V,f =1MHz		363		pF
Output Capacitance	C_{oss}			70		
Reverse Transfer Capacitance	C_{rss}			60		
Total gate charge	Q_g	V_{DS} =-10V,V_{GS} =-2.5V,I_D=-3A		3.2		nC
Gate-source charge	Q_{gs}			0.6		
Gate-drain charge	Q_{gd}			1.2		
Switching Characteristics(4)						
Turn-on delay time	$t_{d(on)}$	V_{DD}=-10V,V_{GEN}=-4.5V,I_D=-1A R_L=10Ω,R_{GEN}=1Ω		9		nS
Turn-on rise time	t_r			33		
Turn-off delay time	$t_{d(off)}$			29		
Turn-off fall time	t_f			9		

N-channel MOSFET ELECTRICAL CHARACTERISTICS(T_a=25℃ unless otherwise noted)

Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Static Characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D =250μA	20			V
Zero gate voltage drain current	I_{DSS}	V_{DS} =16V,V_{GS} = 0V			1	μA
Gate-body leakage current	I_{GSS}	V_{GS} =±8V, V_{DS} = 0V			±100	nA
Gate threshold voltage	$V_{GS(th)}$	V_{DS} =V_{GS}, I_D =250μA	0.6	0.8	1.2	V
Drain-source on-resistance(3)	$R_{DS(on)}$	V_{GS} =4.5V, I_D =3.6A		32	60	mΩ
		V_{GS} =2.5V, I_D =3.1A		49	80	
Forward tranconductance	g_{FS}	V_{DS} =5V, I_D =3.6A		8		S
Diode Forward voltage(3)	V_{DS}	V_{GS} =0V, I_S=0.94A			1.2	V
Dynamic characteristics(4)						
Input Capacitance	C_{iss}	V_{DS} =10V,V_{GS} =0V,f=1MHz		260		pF
Output Capacitance	C_{oss}			48		
Reverse Transfer Capacitance	C_{rss}			27		
Total gate charge	Q_g	V_{DS} =10V,V_{GS} =4.5V,I_D =3.0A		2.9	5	nC
Gate-source charge	Q_{gs}			0.4		
Gate-drain charge	Q_{gd}			0.6		
Switching Characteristics(4)						
Turn-on delay time	$t_{d(on)}$	V_{DD}=10V, R_L=3.3Ω, V_{GEN}=4.5V,Rg=6Ω		2.5		ns
Turn-on rise time	t_r			3.2		
Turn-off delay time	$t_{d(off)}$			21		
Turn-off fall time	t_f			3		

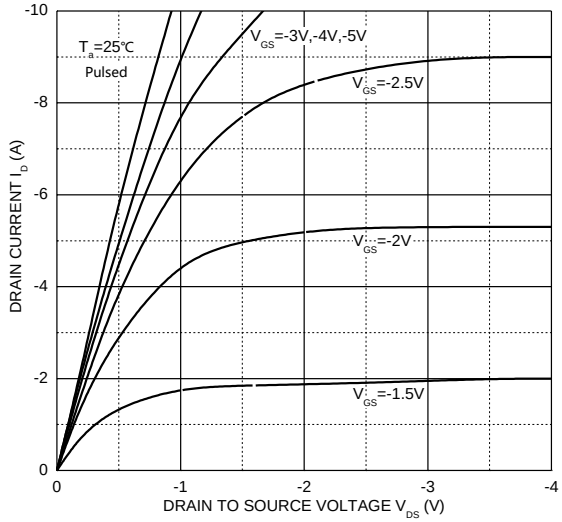
Notes:

1. Repetitive Rating : Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t < 5 sec.
3. Pulse Test : Pulse Width≤300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production testing.

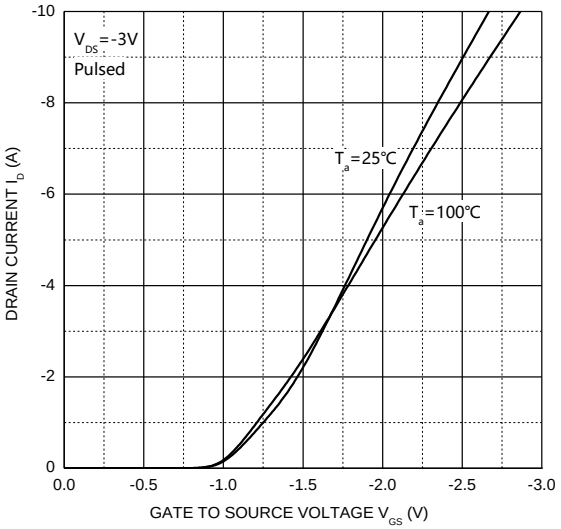
Typical Electrical and Thermal Characteristics

P-Channel MOS

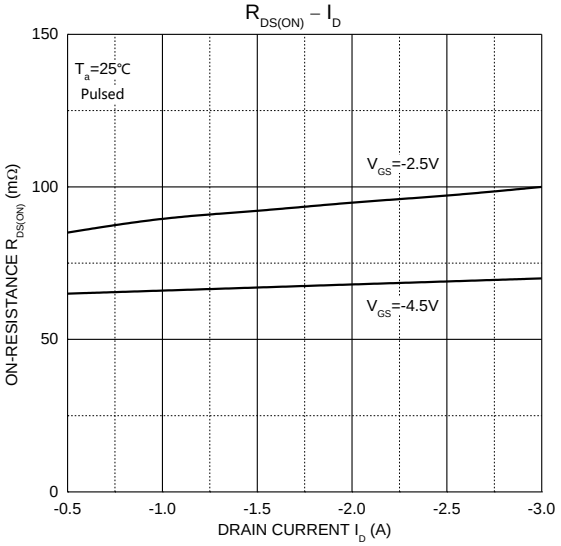
Output Characteristics



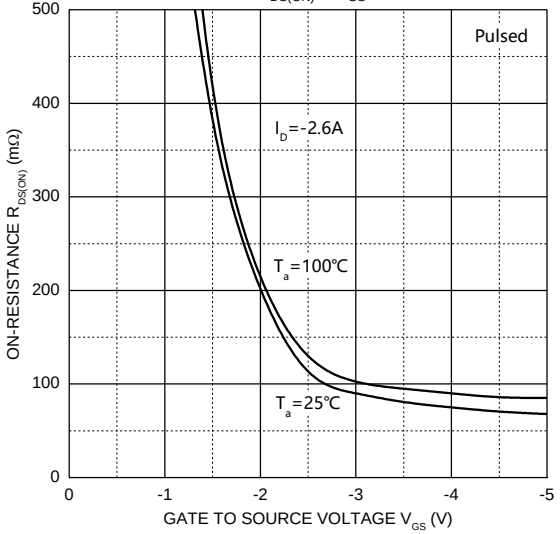
Transfer Characteristics



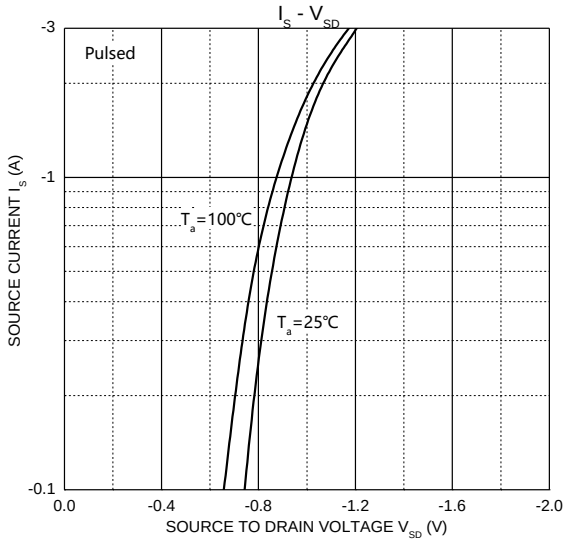
$R_{DS(ON)}$ – I_D



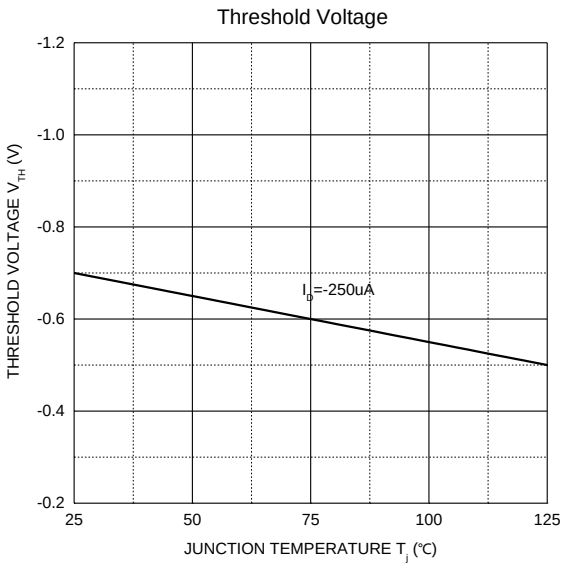
$R_{DS(ON)}$ - V_{GS}



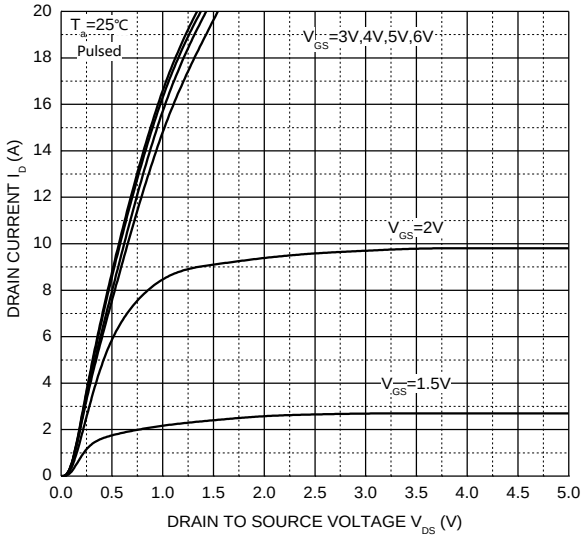
I_S - V_{SD}



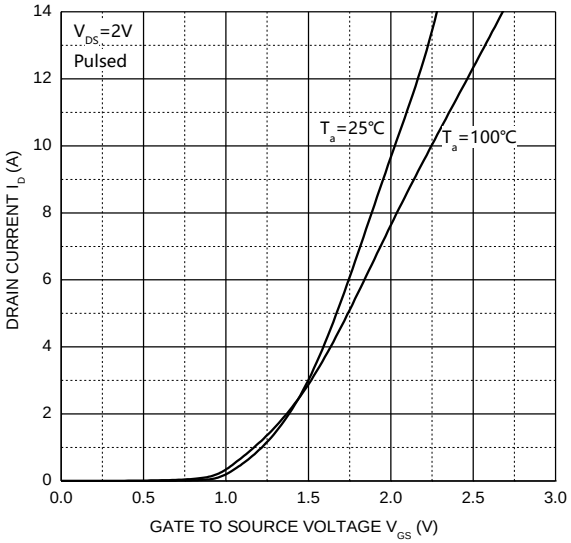
Threshold Voltage



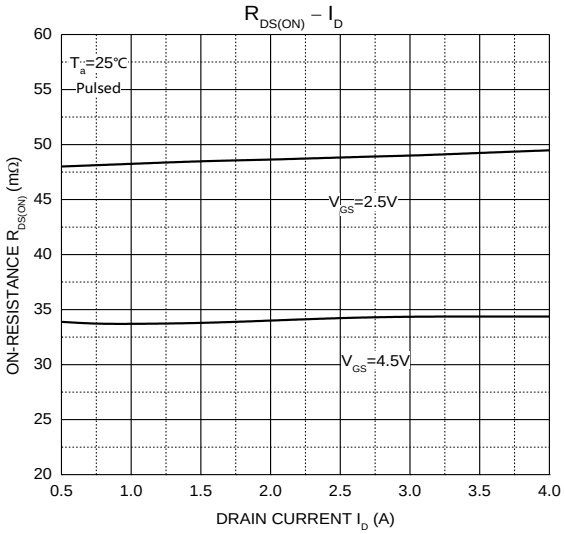
Output Characteristics



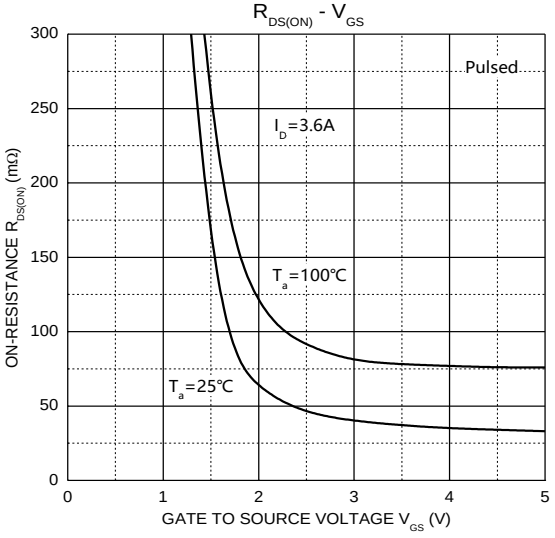
Transfer Characteristics



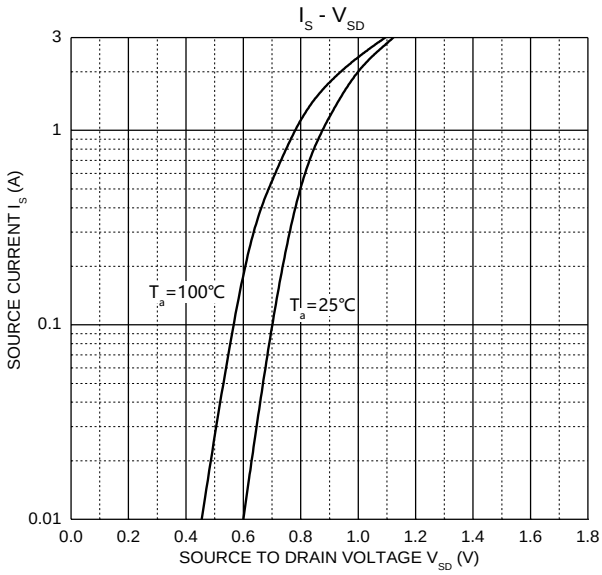
$R_{DS(ON)}$ – I_D



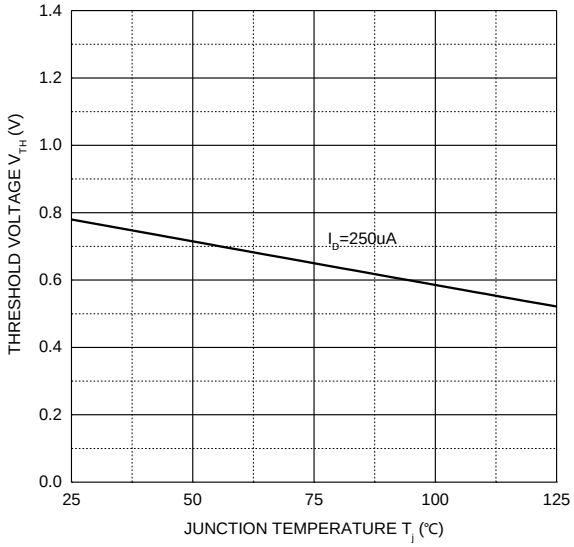
$R_{DS(ON)}$ - V_{GS}



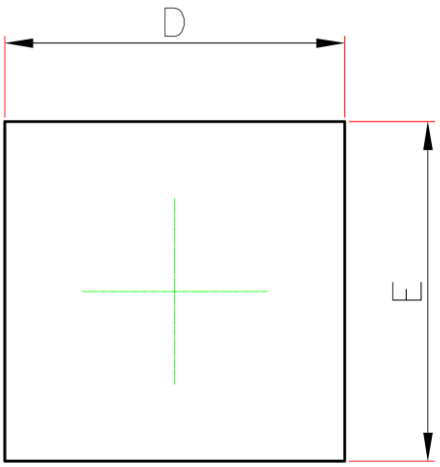
I_S - V_{SD}



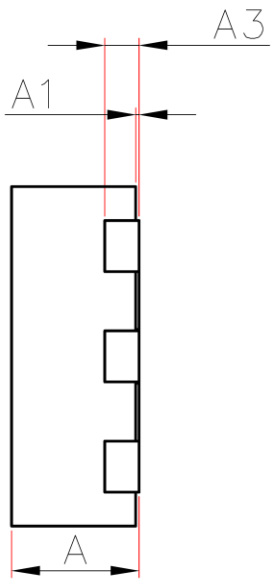
Threshold Voltage



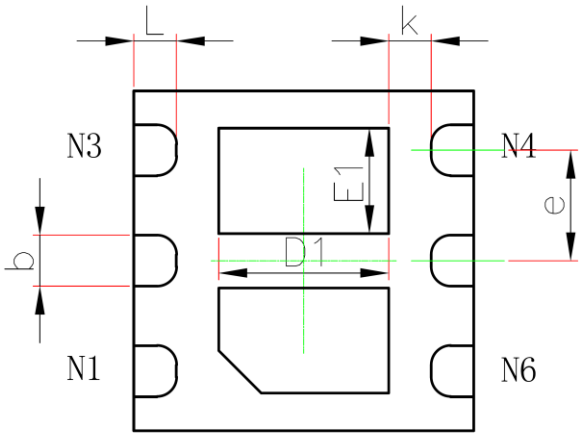
DFN2×2-6L Package Information



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