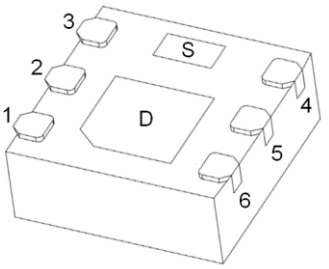
GP20N09D22

20V N-Channel MOSFET

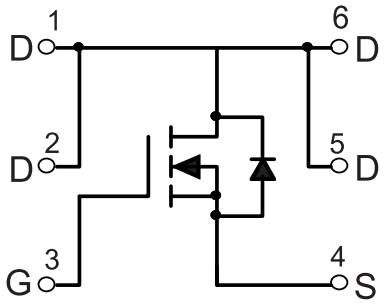
Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
20V	6.0mΩ@4.5V	15A
	6.6mΩ@4.0V	
	6.7mΩ@3.8V	
	7.2mΩ@3.1V	
	7.0mΩ@2.5V	

DFN2×2-6L



Schematic diagram



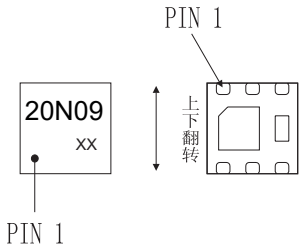
FEATURES

- TrenchFET Power MOSFET
- Excellent $R_{DS(on)}$
- Low Gate Charge
- High Power and Current Handing Capability

APPLICATION

- Battery Protection
- Load Switch
- Power Management

MARKING:



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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	20	V
Gate-Source Voltage	V_{GS}	±12	V
Continuous Drain Current[1,2]	I_D	15	A
Plused Drain Current	I_{DM}	56	A
Power Dissipation	P_D	0.75	W
Thermal Resistance from Junction to Ambient[1,2]	$R_{\theta JA}$	167	℃/W
Junction Temperature	T_J	150	℃
Storage Temperature	T_{STG}	-55 ~ +150	℃

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

Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Off Characteristics						
Drainsource 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
Gatebody leakage current	I_{GSS}	V_{GS} = ±12V, V_{DS} = 0V			±100	nA
On Characteristics						
Gate threshold voltage[3]	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	0.4	0.7	1	V
Drainsource onresistance[3]	$R_{DS(on)}$	V_{GS} = 4.5V, I_D = 5A		6.0	8.0	mΩ
		V_{GS} = 4.0V, I_D = 5A		6.6	8.5	
		V_{GS} = 3.8V, I_D = 5A		6.7	9.0	
		V_{GS} = 3.1V, I_D = 5A		7.2	10.0	
		V_{GS} = 2.5V, I_D = 5A		7.0	11.0	
Forward tranconductance[3]	g_{FS}	V_{DS} =5V, I_D = 5A	5			S
Dynamic characteristics						
Input Capacitance	C_{iss}	V_{DS} = 10V,V_{GS} = 0V,f = 1MHz		1750		pF
Output Capacitance	C_{oss}			230		
Reverse Transfer Capacitance	C_{rss}			200		
Total Gate Charge	Q_g	V_{DS} = 10V,V_{GS} = 4.5V,I_D = 7A		16		nC
GateSource Charge	Q_{gs}			2.4		
GateDrain Charge	Q_{gd}			6.3		
SWITCHING CHARACTERISTICS						
Turnon delay time	$t_{d(on)}$	V_{GEN} = 5V,V_{DD} = 10V, R_g = 3Ω, R_L = 1.2Ω		2.0		ns
Turnon rise time	t_r			6		
Turnoff delay time	$t_{d(off)}$			35		
Turnoff fall time	t_f			77		
Drain Source Diode Characteristics						
Diode Forward Current	I_S				14	A
Diode Forward Voltage	V_{SD}	V_{GS} = 0V, I_S = 10A			1.2	V

Notes:

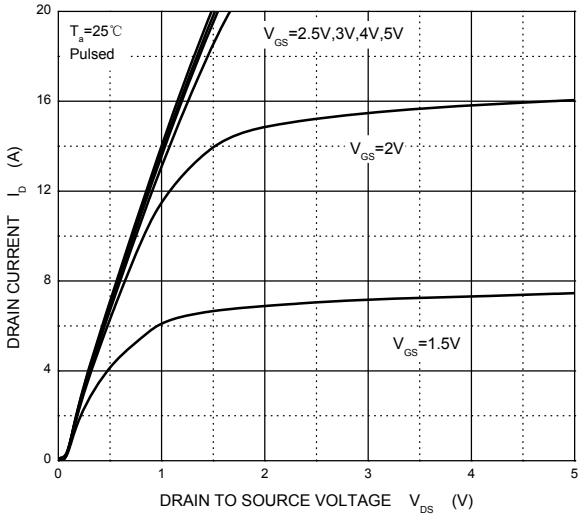
1.$R_{\theta JA}$ is measured with the device mounted on 1 in^2 FR4 board with 1oz. single side copper, in a still air environment with T_A = 25°C.

2. $R_{\theta JA}$ is measured in the steady state

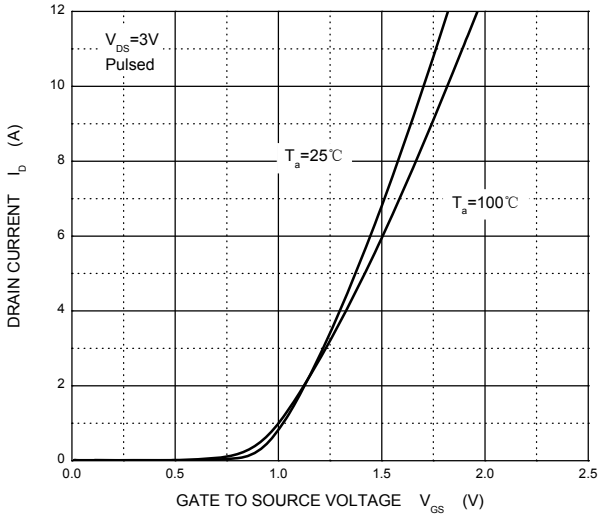
3.Pulse test : Pulse width ≤ 380μs, duty cycle ≤ 2%.

Typical Electrical and Thermal Characteristics

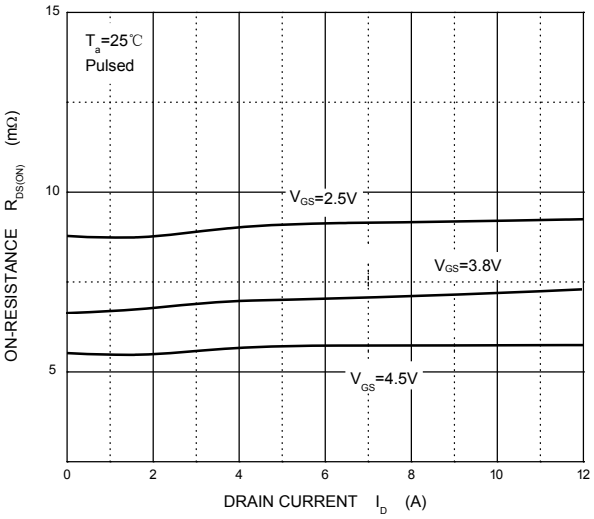
Output Characteristics



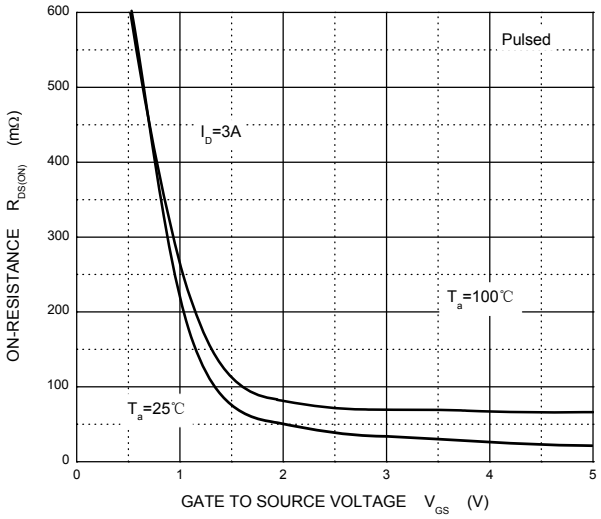
Transfer Characteristics



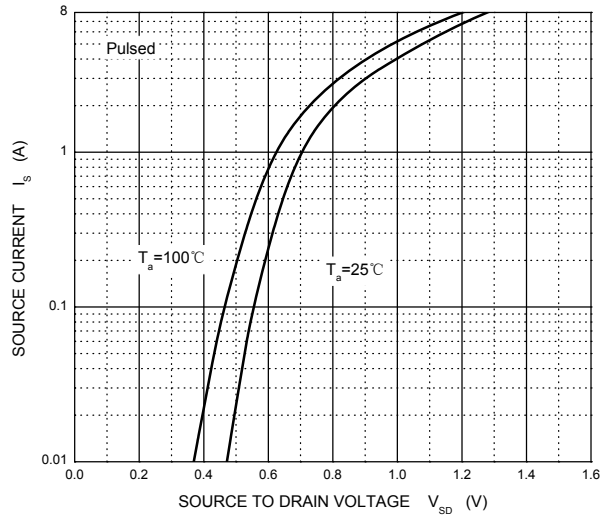
$R_{DS(ON)}$ —— I_D



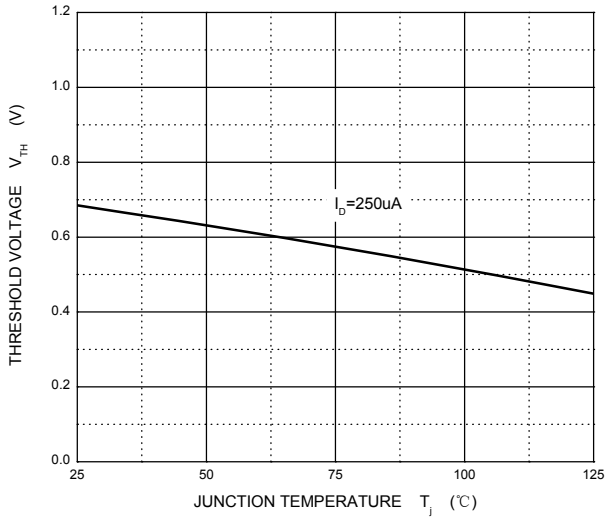
$R_{DS(ON)}$ —— V_{GS}



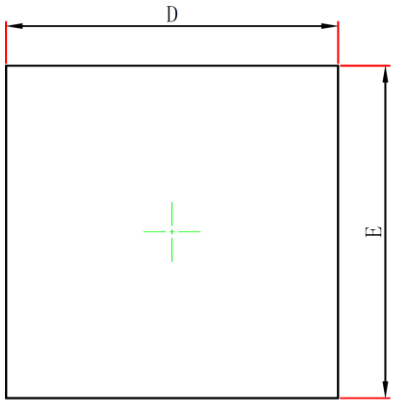
I_S —— V_{SD}



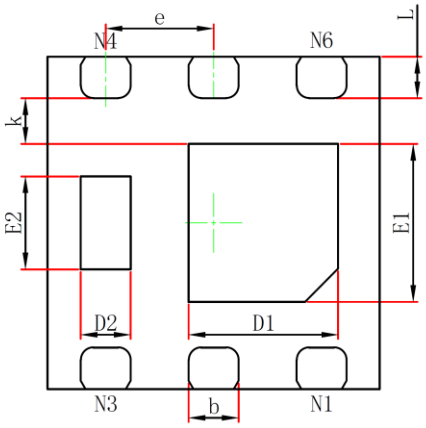
Threshold Voltage



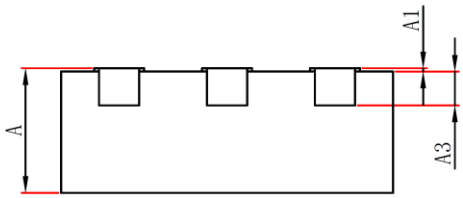
DFN2×2-6L- Package Information



TOP VIEW



BOTTOM VIEW



SIDE 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	0.800	1.000	0.031	0.039
E1	0.850	1.050	0.033	0.041
D2	0.200	0.400	0.008	0.016
E2	0.460	0.660	0.018	0.026
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