



GP
ELECTRONICS

GPM820NP02UQA

20V N-Channel + P-Channel MOSFET

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
-20V	70m Ω @-4.5V	-3.5A
	100m Ω @-2.5V	
20V	29m Ω @4.5V	5.0A
	40m Ω @2.5V	

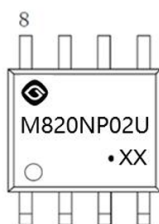
Feature

- 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:

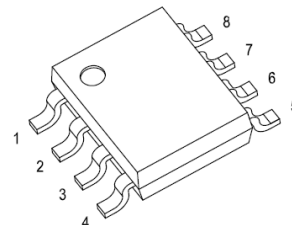


M820NP02U = Device Code

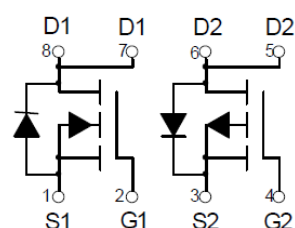
XX = Date Code

Solid dot = Green Device

SOP8



Schematic diagram



ABSOLUTE MAXIMUM RATINGS ($T_A=25^{\circ}\text{C}$ 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	-3.5	A
Pulsed Drain Current ¹	I_{DM}	-14	A
Power Dissipation	P_D	1.4	W
N-MOSFET			
Drain-Source Voltage	V_{DS}	20	V
Gate-Source Voltage	V_{GS}	± 12	V
Continuous Drain Current	I_D	5.0	A
Pulsed Drain Current ¹	I_{DM}	20	A
Power Dissipation	P_D	1.4	W
Temperature and Thermal Resistance			
Thermal Resistance from Junction to Ambient ²	$R_{\theta JA}$	89	$^{\circ}\text{C/W}$
Junction Temperature	T_J	150	$^{\circ}\text{C}$
Storage Temperature	T_{STG}	-55~ +150	$^{\circ}\text{C}$

P-channel MOSFET ELECTRICAL CHARACTERISTICS($T_A=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = -250\mu A$	-20			V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = -16V, V_{GS} = 0V$			-1	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS} = \pm 8V, V_{DS} = 0V$			± 100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\mu A$	-0.4	-0.7	-1.0	V
Drain-Source On-Resistance ³	$R_{DS(on)}$	$V_{GS} = -4.5V, I_D = -2.8A$		70	104	m Ω
		$V_{GS} = -2.5V, I_D = -2.0A$		100	149	
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	$t_{d(on)}$	$V_{DD} = -10V, V_{GEN} = -4.5V, I_D = -1A$ $R_L = 10\Omega, R_{GEN} = 1\Omega$		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($T_A=25^{\circ}\text{C}$ unless otherwise noted)

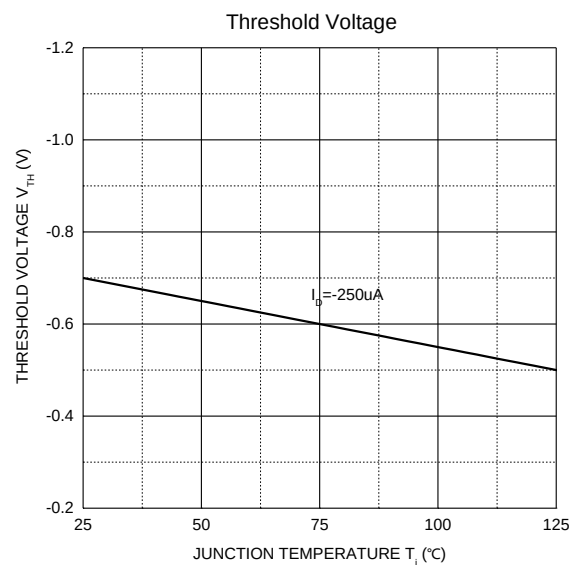
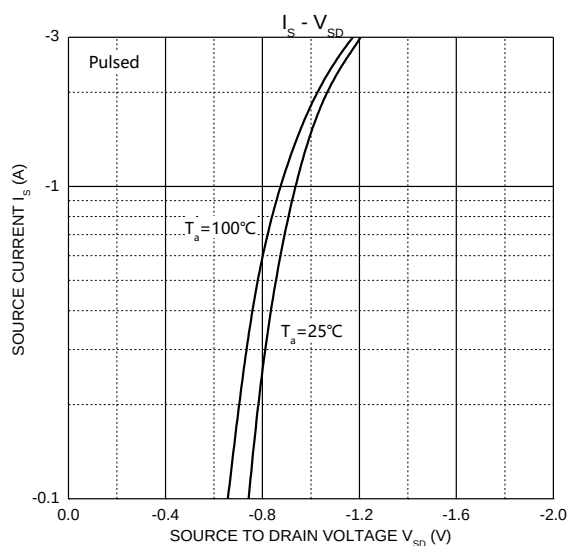
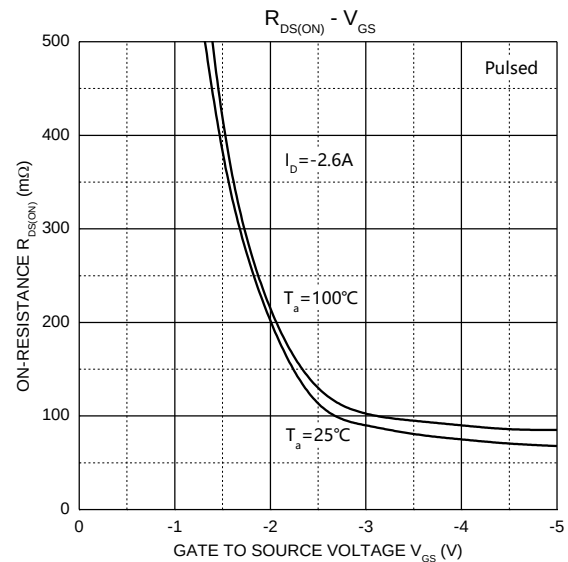
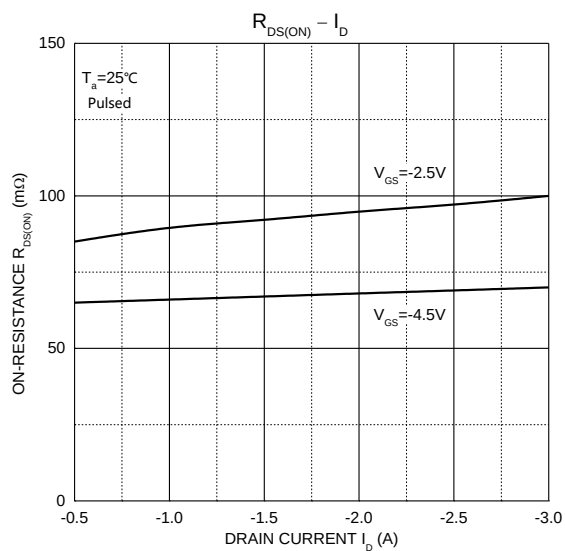
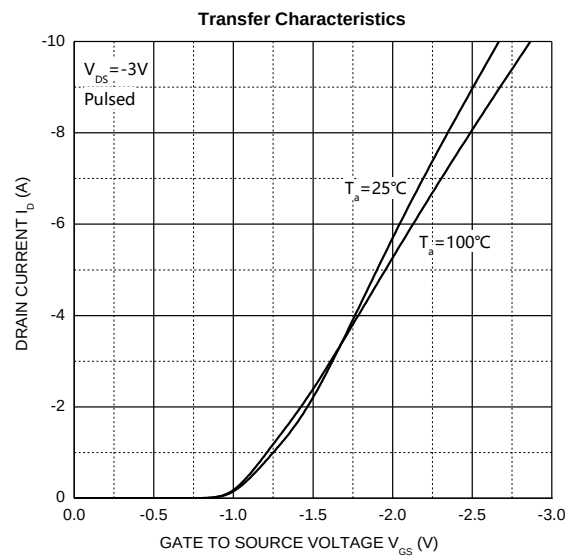
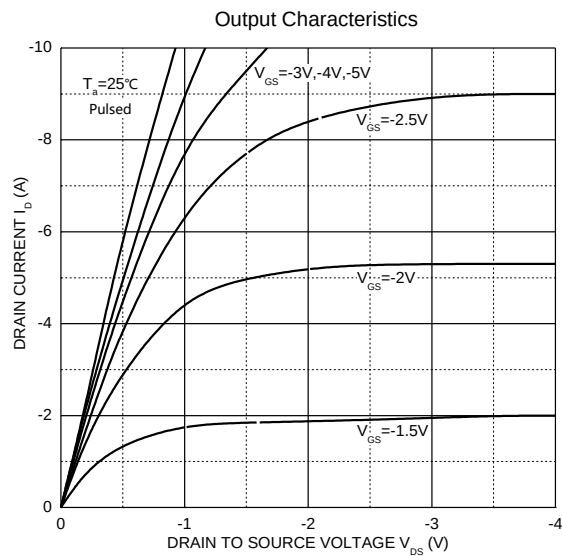
Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	20			V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 16V, V_{GS} = 0V$			1	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS} = \pm 8V, V_{DS} = 0V$			± 100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	0.6	0.8	1.2	V
Drain-Source On-Resistance ³	$R_{DS(on)}$	$V_{GS} = 4.5V, I_D = 3.6A$		29	41	m Ω
		$V_{GS} = 2.5V, I_D = 3.1A$		40	59	
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		nC
Gate-Source Charge	Q_{gs}			0.4		
Gate-Drain Charge	Q_{gd}			0.6		
Switching Characteristics ⁴						
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 10V, R_L = 3.3\Omega,$ $V_{GEN} = 4.5V, R_g = 6\Omega$		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 $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to production testing.

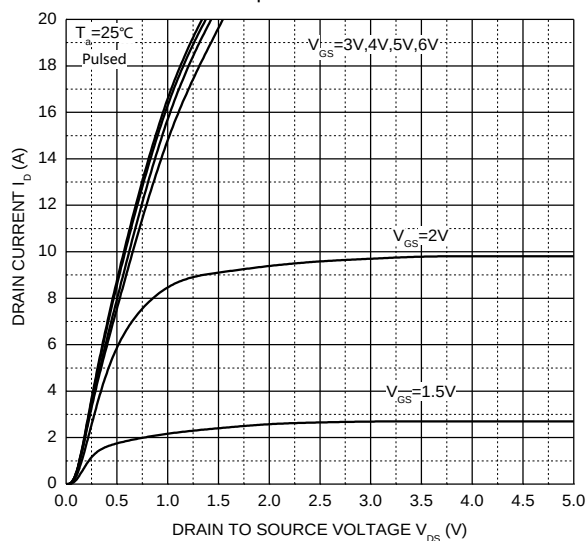
Typical Electrical and Thermal Characteristics

P-Channel MOS

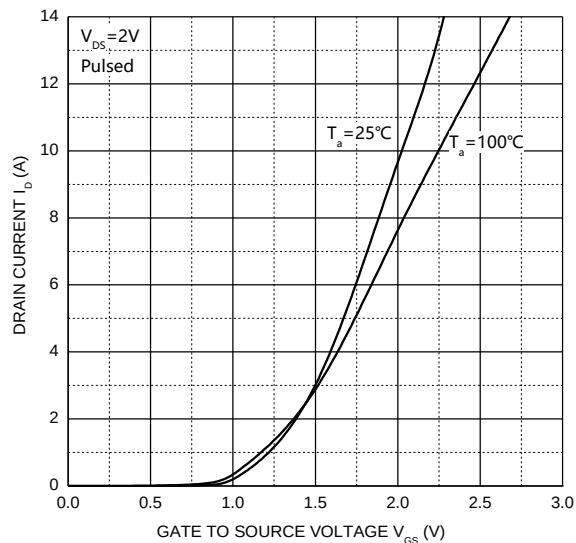


N-Channel MOS

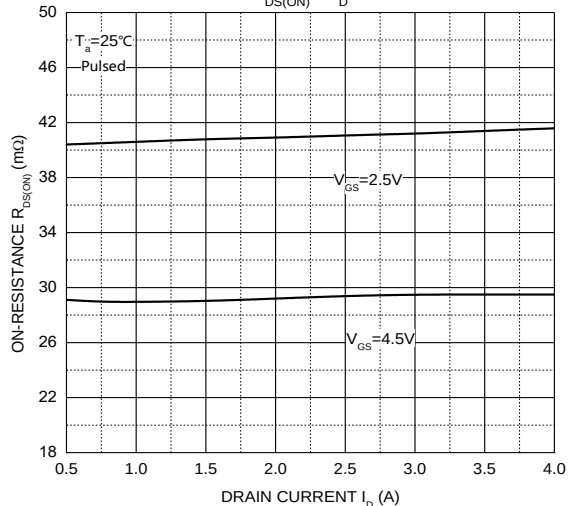
Output Characteristics



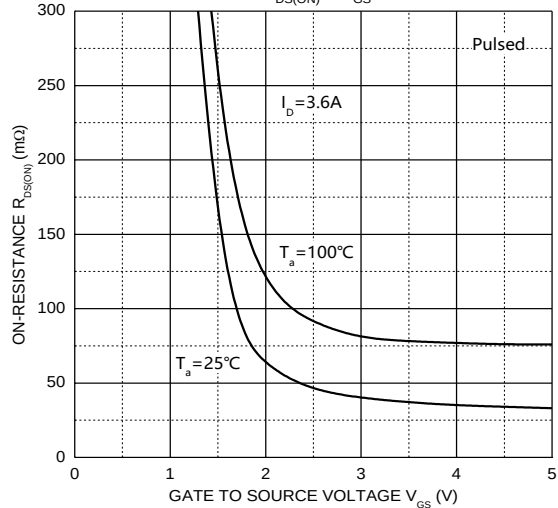
Transfer Characteristics



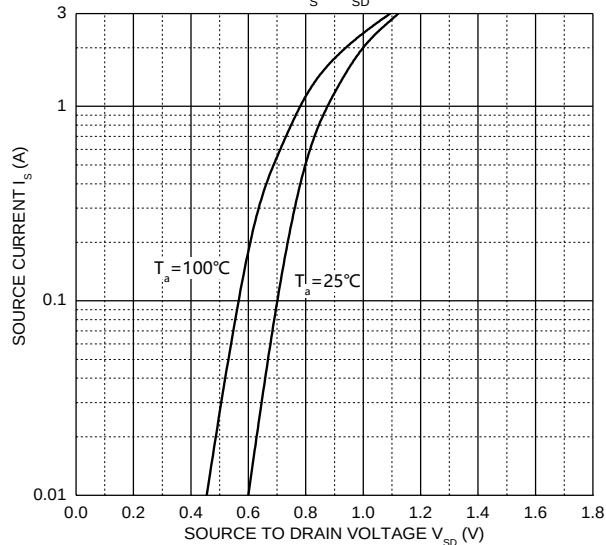
$R_{DS(ON)} - I_D$



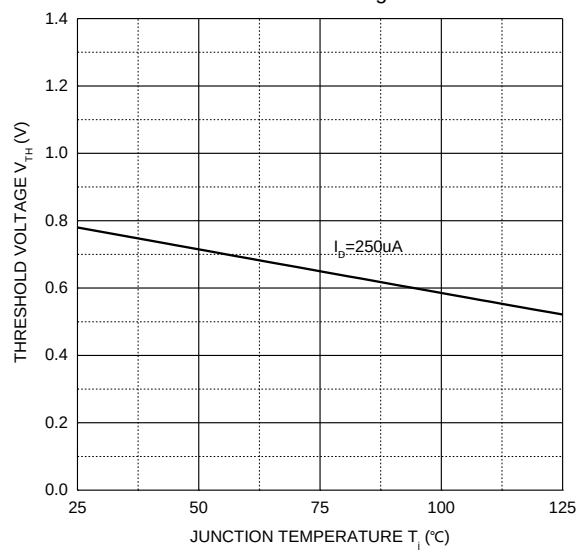
$R_{DS(ON)} - V_{GS}$

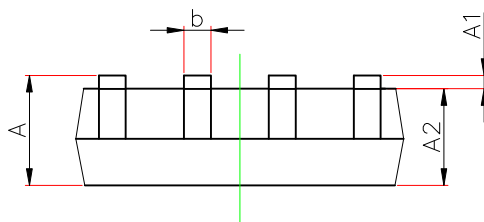
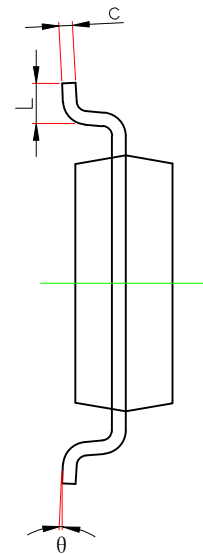
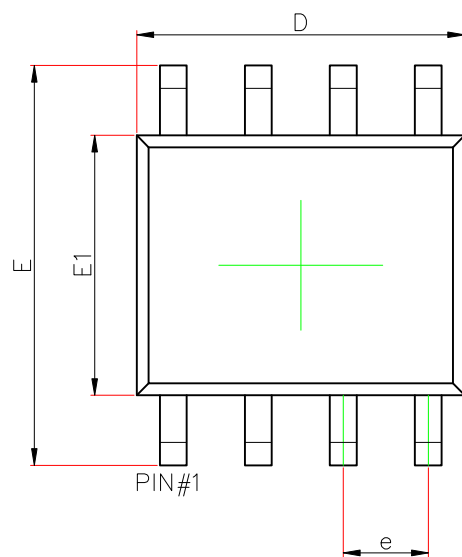


$I_S - V_{SD}$



Threshold Voltage



SOP8 Package Information


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.156	0.250	0.006	0.010
D	4.700	5.100	0.185	0.201
e	1.270(BSC)		0.050(BSC)	
E	5.800	6.200	0.228	0.244
E1	3.700	4.100	0.146	0.161
L	0.400	1.270	0.016	0.05
θ	0°	8°	0°	8°

Attention:

- GreenPower Electronics reserves the right to improve product design function and reliability without notice.
- Any and all semiconductor products have certain probability to fail or malfunction, which may result in personal injury, death or property damage. Customer are solely responsible for providing adequate safe measures when design their systems.
- GreenPower Electronics products belong to consumer electronics or other civilian electronic products.