



GP ELECTRONICS

GP20NP45Q

20V N-Channel + P-Channel MOSFET

Product Summary

V _{(BR)DSS}	R _{DS(on)} TYP	I _D
-20V	31mΩ@-4.5V	-6A
	44mΩ@-2.5V	
	70mΩ@-1.8V	
20V	13mΩ@4.5V	10A
	16mΩ@2.5V	
	24mΩ@1.8V	

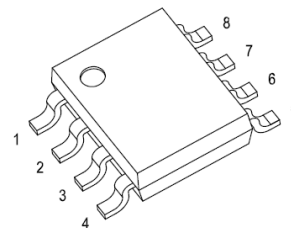
Feature

- Low drain-source ON-resistance
- High forward transfer admittance
- Low leakage current

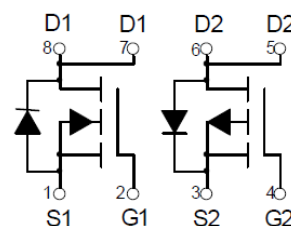
Application

- Low voltage applications

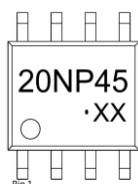
SOP8



Schematic diagram



MARKING:



20NP45 = Device Code

XX = Date Code

Solid dot = Green Device

ABSOLUTE MAXIMUM RATINGS (T_A=25°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 ¹	I _D	-6	A
Pulsed Drain Current	I _{DM}	-24	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	10	A
Pulsed Drain Current ¹	I _{DM}	40	A
Power Dissipation	P _D	1.4	W
Temperature and Thermal Resistance			
Thermal Resistance from Junction to Ambient ²	R _{θJA}	89	°C/W
Junction Temperature	T _J	150	°C
Storage Temperature	T _{STG}	-55~ +150	°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}	$V_{GS} = \pm 12V, V_{DS} = 0V$			± 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	$R_{DS(on)}$	$V_{GS} = -4.5V, I_D = -3.0A$		31	38	m Ω
		$V_{GS} = -2.5V, I_D = -3.0A$		44	53	
		$V_{GS} = -1.8V, I_D = -3.0A$		70	83	
Forward Tranconductance	g_{FS}	$V_{DS} = -5V, I_D = -6.0A$	6			S
Diode Forward Voltage ³	V_{DS}	$I_S = -6.0A, V_{GS} = 0V$			-1.2	V
Dynamic Characteristics ⁴						
Input Capacitance	C_{iss}	$V_{DS} = -10V, V_{GS} = 0V, f = 1MHz$		990		pF
Output Capacitance	C_{oss}			157		
Reverse Transfer Capacitance	C_{rss}			122		
Total Gate Charge	Q_g	$V_{DS} = -10V, V_{GS} = -4.5V, I_D = -3A$		11		nC
Gate-Source Charge	Q_{gs}			1.5		
Gate-Drain Charge	Q_{gd}			2.9		
Switching Characteristics ⁴						
Turn-On Delay Time	$t_{d(on)}$	$V_{GEN} = -4.5V, V_{DD} = -10V,$ $R_G = 6\Omega, R_L = 5\Omega$		13		nS
Turn-On Rise Time	t_r			20		
Turn-Off Delay Time	$t_{d(off)}$			23		
Turn-Off Fall Time	t_f			7		

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

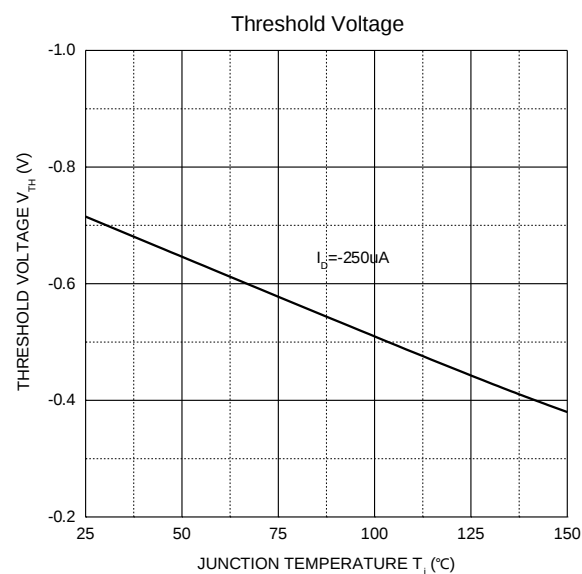
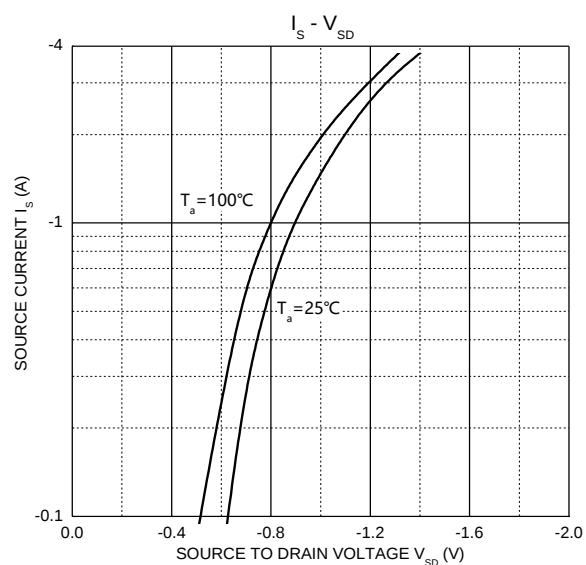
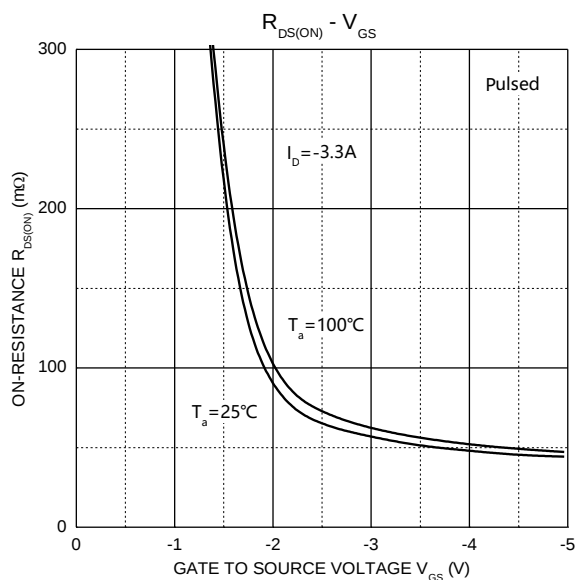
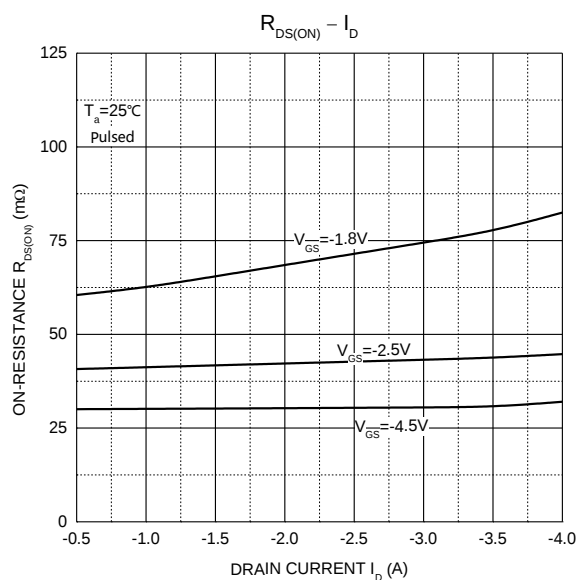
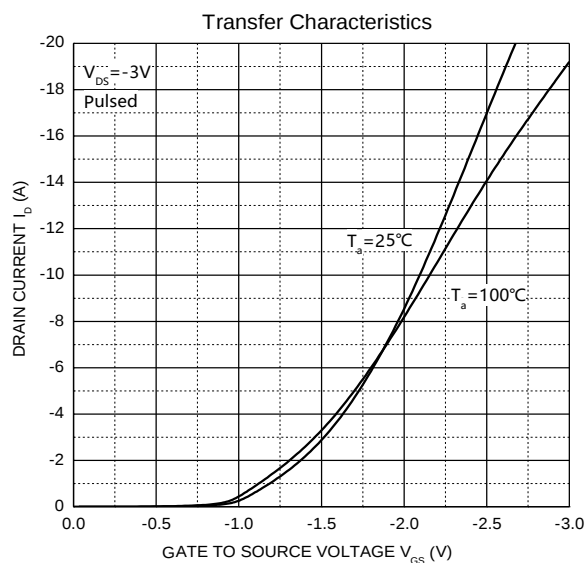
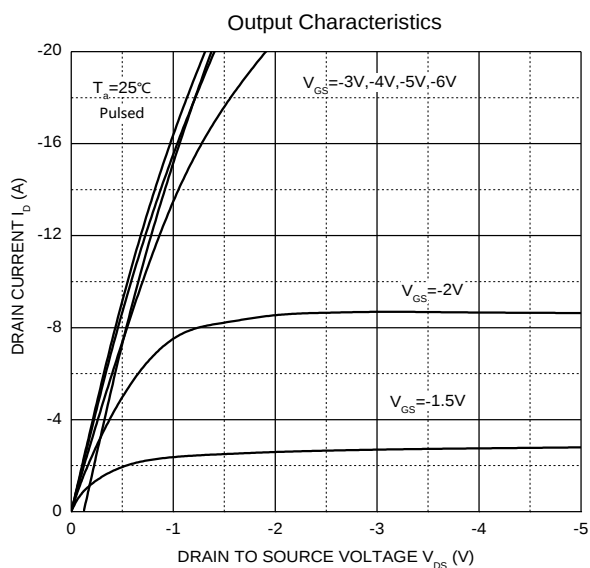
Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	20			V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 16V, V_{GS} = 0V$			1	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS} = \pm 12V, V_{DS} = 0V$			± 100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	0.4	0.7	1	V
Drain-Source on-Resistance ³	$R_{DS(on)}$	$V_{GS} = 4.5V, I_D = 5.0A$		13	17	m Ω
		$V_{GS} = 2.5V, I_D = 5.0A$		16	25	
		$V_{GS} = 1.8V, I_D = 4.0A$		24	32	
Forward Tranconductance	g_{FS}	$V_{DS} = 10V, I_D = 5A$	6			S
Diode Forward Voltage ³	V_{DS}	$I_S = 10A, V_{GS} = 0V$			1.2	V
Dynamic Characteristics ⁴						
Input Capacitance	C_{iss}	$V_{DS} = 10V, V_{GS} = 0V, f = 1.0MHz$		478		pF
Output Capacitance	C_{oss}			120		
Reverse Transfer Capacitance	C_{rss}			109		
Total Gate Charge	Q_g	$V_{DS} = 10V, I_D = 5A, V_{GS} = 4.5V$		8.7		nC
Gate-Source Charge	Q_{gs}			0.7		
Gate-Drain Charge	Q_{gd}			3.1		
Switching Characteristics ⁴						
Turn-On Delay Time	$t_{d(on)}$	$V_{GEN} = 4.5V, V_{DD} = 10V,$ $R_G = 3\Omega, R_L = 2\Omega$		10		ns
Turn-On Rise Time	t_r			20		
Turn-Off Delay Time	$t_{d(off)}$			19		
Turn-Off Fall Time	t_f			6		

Notes:

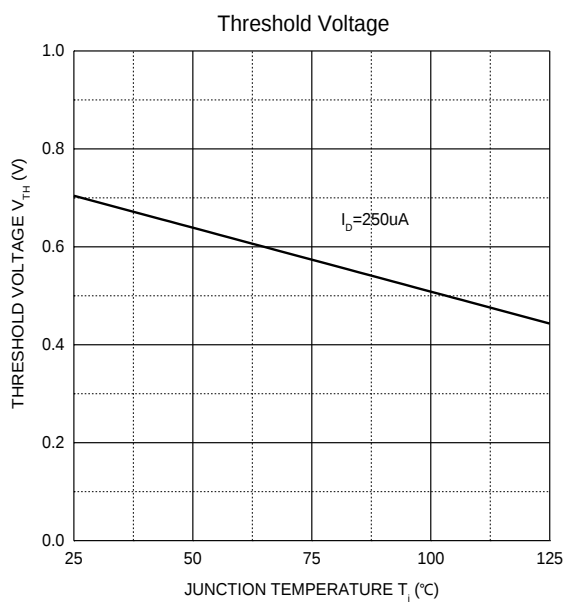
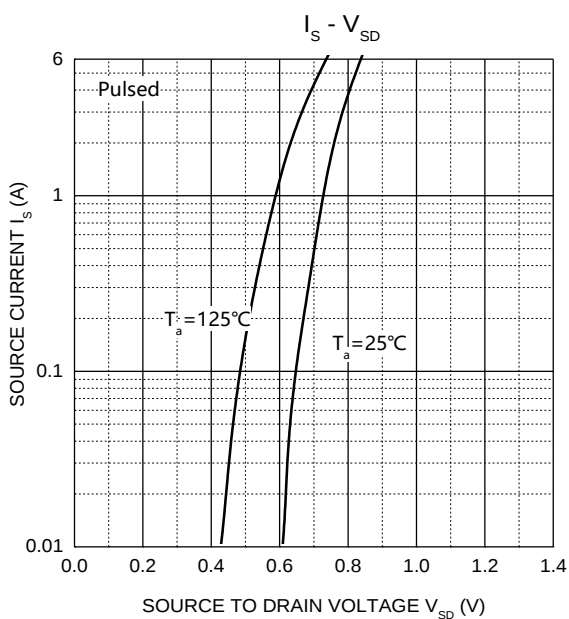
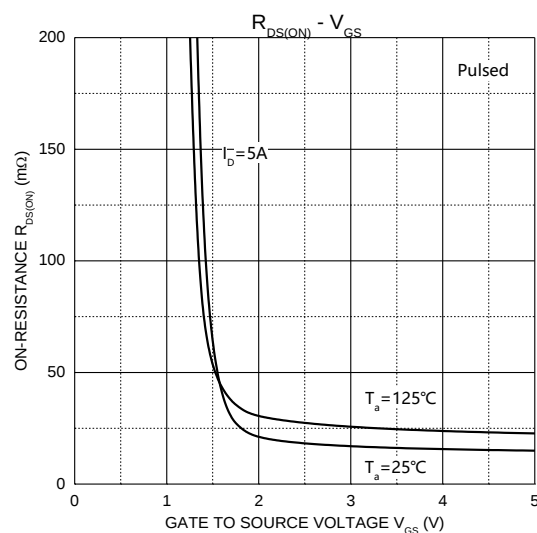
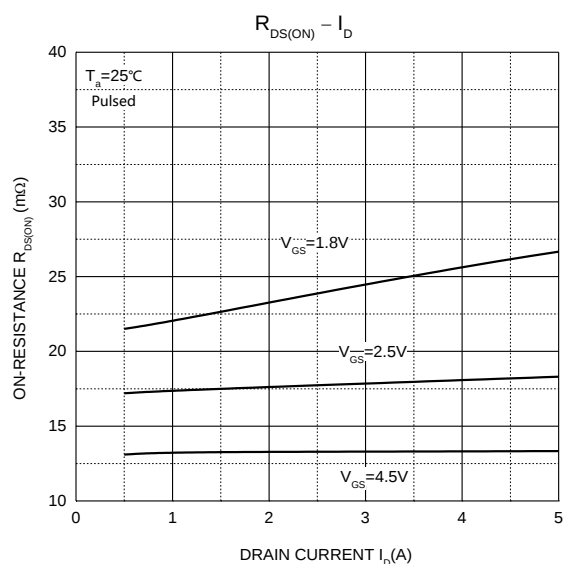
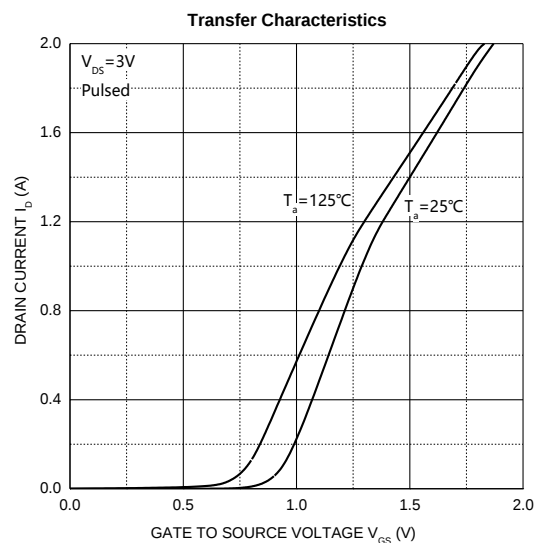
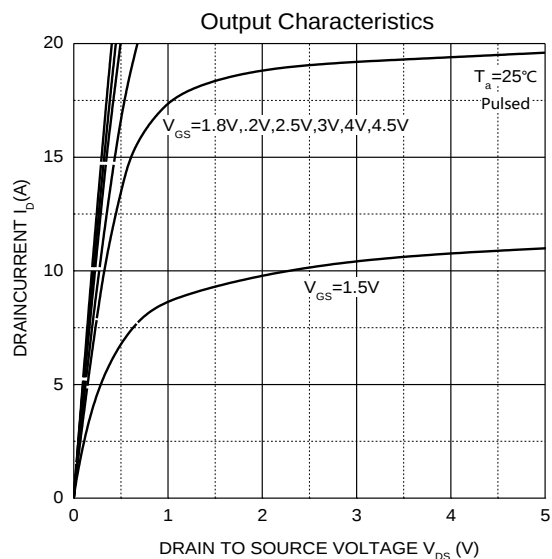
1. Repetitive Rating : Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, $t < 5$ sec.
3. Pulse Test : Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to production testing.

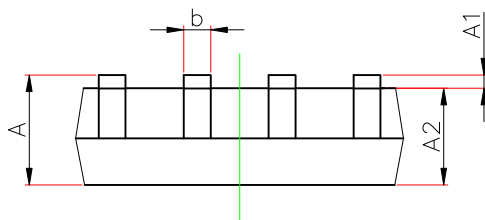
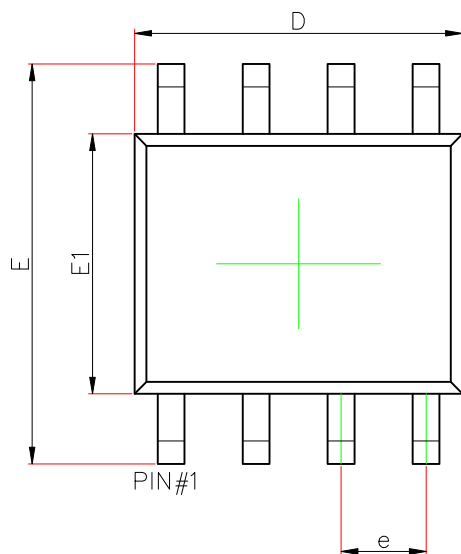
Typical Electrical and Thermal Characteristics

P-Channel MOS



N-Channel MOS



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.