



Product Summary

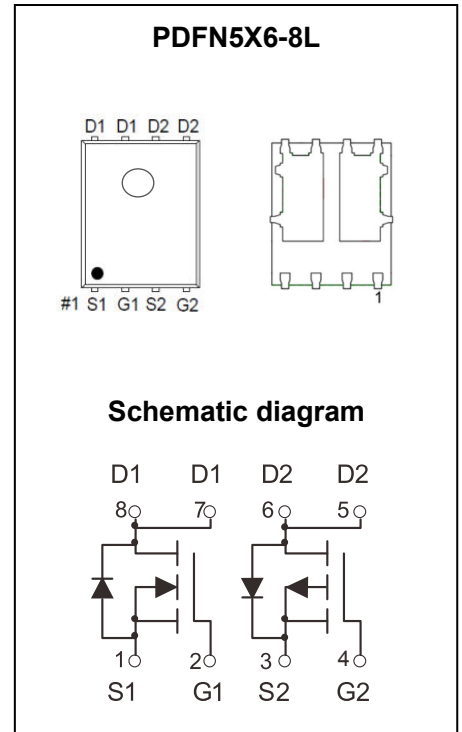
$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
40V	14mΩ@10V	16A
	17mΩ@4.5V	
-40V	24mΩ@-10V	-16A
	29mΩ@-4.5V	

Feature

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

Application

- PWM Applications
- Loas Switch
- Power Management



MARKING:



M250NP04L = Device Code
 XX = Data Code
 Solid Dot = Green Device Indicator

ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	NMOS	PMOS	Unit
Drain - Source Voltage	V_{DS}	40	-40	V
Gate - Source Voltage	V_{GS}	± 20	± 20	V
Continuous Drain Current ^{1,5}	I_D	16	-16	A
Pulsed Drain Current ²	I_{DM}	64	-64	A
Single Pulsed Avalanche Current ³	I_{AS}	15	-15	A
Single Pulsed Avalanche Energy ³	E_{AS}	56	56	mJ
Power Dissipation ^{4,5}	P_D	43	54	W
Thermal Resistance from Junction to Ambient ⁵	$R_{\theta JA}$	57	59	$^\circ\text{C}/\text{W}$
Thermal Resistance from Junction to Case	$R_{\theta JC}$	2.9	2.3	$^\circ\text{C}/\text{W}$
Junction Temperature	T_J	150	150	$^\circ\text{C}$
Storage Temperature	T_{STG}	-55~ +150	-55~ +150	$^\circ\text{C}$

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

NMOS:

Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Off Characteristics						
Drain - Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	40			V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 40V, V_{GS} = 0V$			1	μA
Gate - Body Leakage Current	I_{GSS}	$V_{GS} = \pm 20V, V_{DS} = 0V$			± 100	nA
On Characteristics³						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	1.0	1.7	2.5	V
Drain-source On-resistance	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 16A$		14	20	m Ω
		$V_{GS} = 4.5V, I_D = 10A$		17	24	
Dynamic Characteristics						
Input Capacitance	C_{iss}	$V_{DS} = 20V, V_{GS} = 0V, f = 1MHz$		1380		pF
Output Capacitance	C_{oss}			89		
Reverse Transfer Capacitance	C_{rss}			69		
Gate Resistance	R_g	$V_{DS} = 0V, V_{GS} = 0V, f = 1MHz$		1.8		Ω
Switching Characteristics						
Total Gate Charge	Q_g	$V_{DS} = 20V, V_{GS} = 10V, I_D = 20A$		28.2		nC
Gate-source Charge	Q_{gs}			5.0		
Gate-drain Charge	Q_{gd}			5.1		
Turn-on Delay Time	$t_{d(on)}$	$V_{DD} = 20V, V_{GS} = 10V, I_D = 5A$ $R_G = 3\Omega$		5		ns
Turn-on Rise Time	t_r			5		
Turn-off Delay Time	$t_{d(off)}$			25		
Turn-off Fall Time	t_f			4		
Source - Drain Diode Characteristics						
Diode Forward Voltage ³	V_{SD}	$V_{GS} = 0V, I_S = 3.0A$			1.2	V

PMOS:

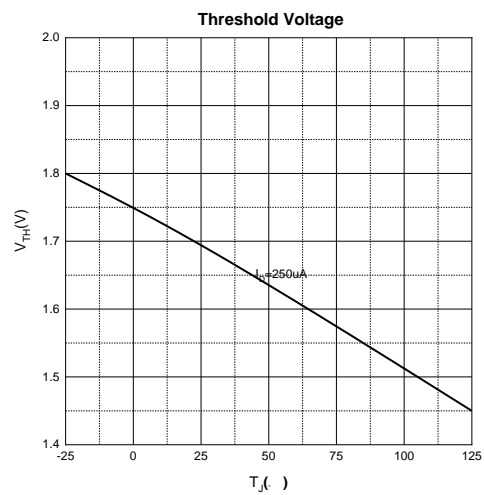
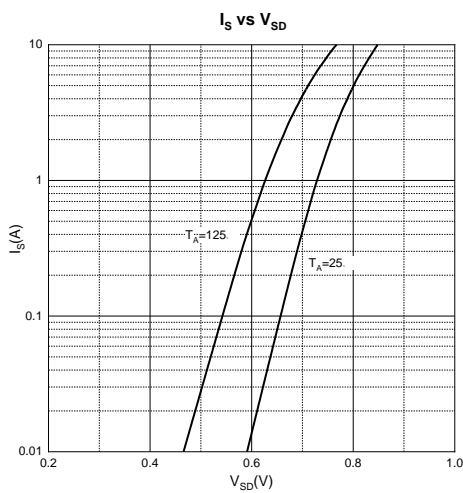
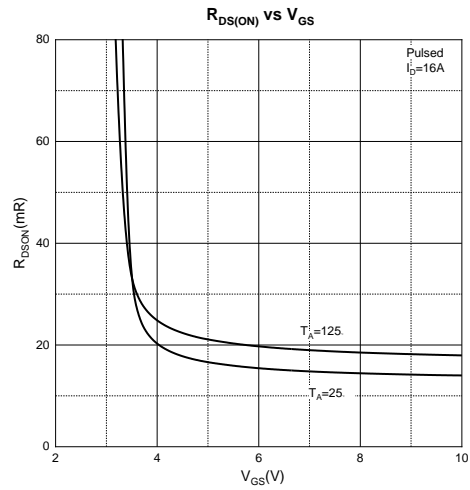
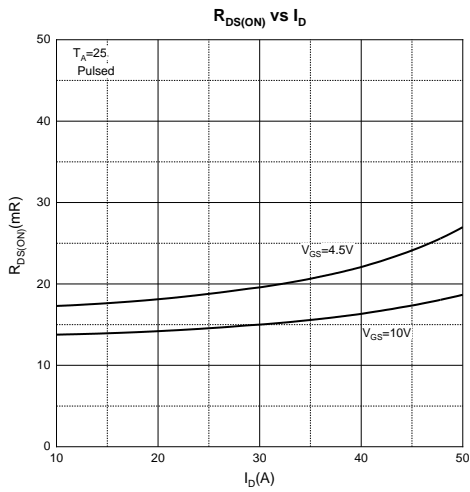
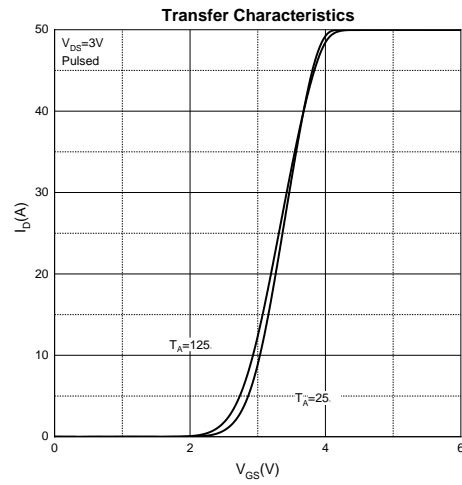
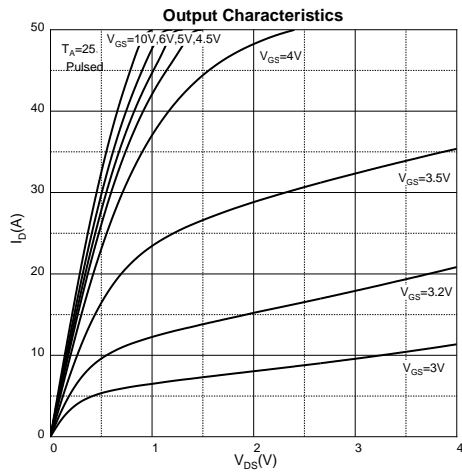
Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Off Characteristics						
Drain - Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = -250\mu A$	-40			V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = -40V, V_{GS} = 0V$			-1	μA
Gate - Body Leakage Current	I_{GSS}	$V_{GS} = \pm 20V, V_{DS} = 0V$			± 100	nA
On Characteristics³						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\mu A$	-1.0	-1.6	-3.0	V
Drain-source On-resistance	$R_{DS(on)}$	$V_{GS} = -10V, I_D = -6.0A$		24	33	m Ω
		$V_{GS} = -4.5V, I_D = -5.0A$		29	42	
Dynamic Characteristics						
Input Capacitance	C_{iss}	$V_{DS} = -20V, V_{GS} = 0V, f = 1MHz$		1066		pF
Output Capacitance	C_{oss}			102		
Reverse Transfer Capacitance	C_{rss}			86		
Gate Resistance	R_g	$V_{DS} = 0V, V_{GS} = 0V, f = 1MHz$		20		Ω
Switching Characteristics						
Total Gate Charge	Q_g	$V_{DS} = -20V, V_{GS} = -10V, I_D = -6A$		25		nC
Gate-source Charge	Q_{gs}			3.1		
Gate-drain Charge	Q_{gd}			4.7		
Turn-on Delay Time	$t_{d(on)}$	$V_{DD} = -20V, V_{GS} = -10V, I_D = -5A$ $R_G = 2.7\Omega$		5		ns
Turn-on Rise Time	t_r			2		
Turn-off Delay Time	$t_{d(off)}$			60		
Turn-off Fall Time	t_f			25		
Source - Drain Diode Characteristics						
Diode Forward Voltage ³	V_{SD}	$V_{GS} = 0V, I_S = -4.0A$			-1.2	V

Notes :

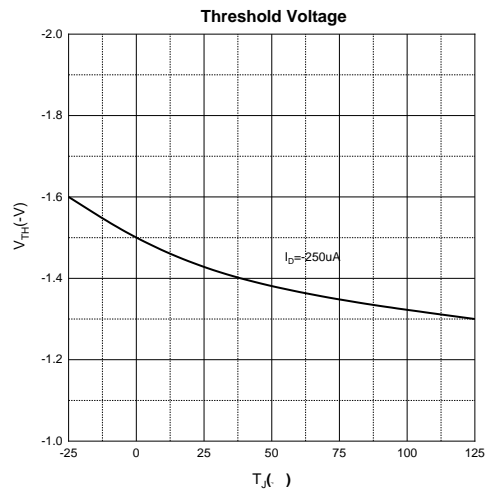
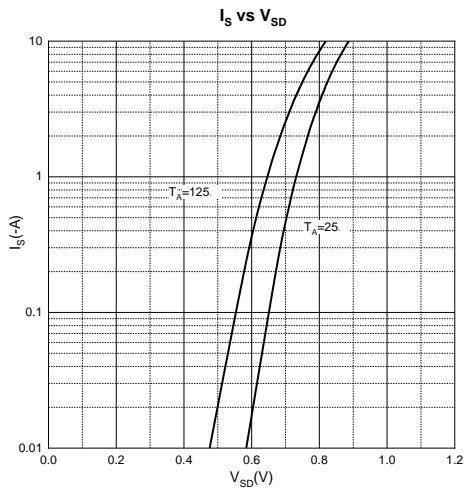
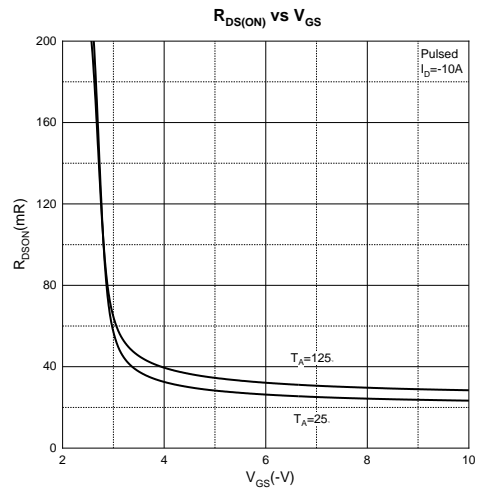
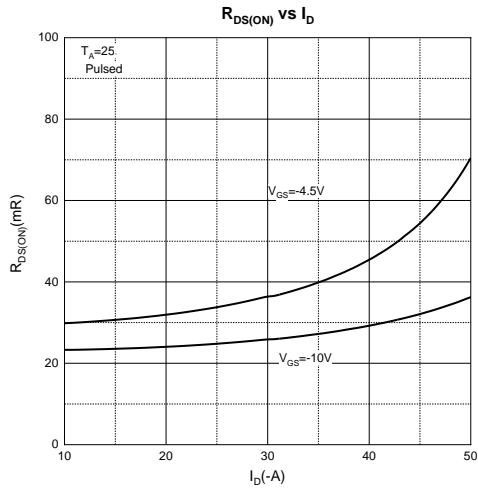
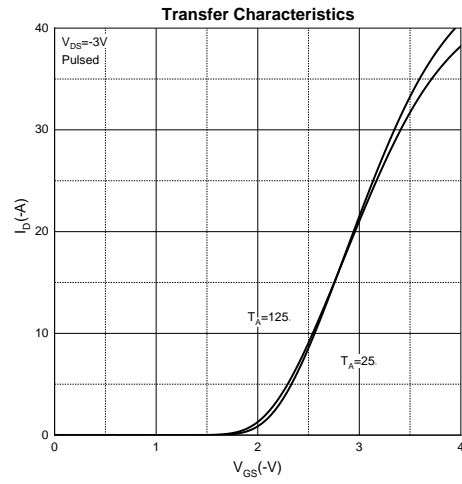
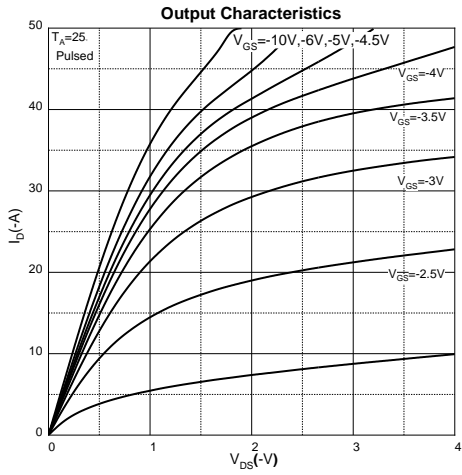
- 1.The maximum current rating is limited by package.And device mounted on a large heatsink
- 2.Pulse Test : Pulse Width $\leq 10\mu s$, duty cycle $\leq 1\%$.
- 3.EAS condition: $V_{DD} = \pm 20V, V_{GS} = \pm 10V, L = 0.5mH, R_G = 25\Omega$ Starting $T_J = 25^\circ C$.
- 4.Pulse Test : Pulse Width $\leq 300\mu s$, duty cycle $\leq 2\%$.
- 5.The power dissipation P_D is limited by $T_{J(MAX)} = 150^\circ C$.And device mounted on a large heatsink
- 6.Device mounted on $1in^2$ FR-4 board with 2oz. Copper, in a still air environment with $T_A = 25^\circ C$.

Typical Characteristics

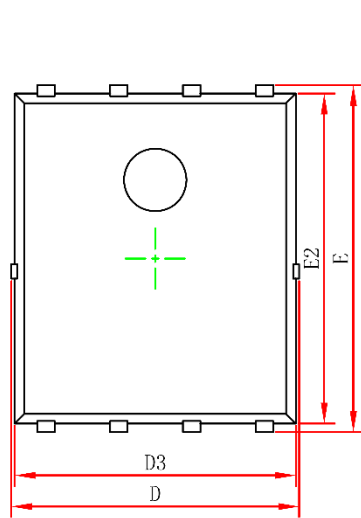
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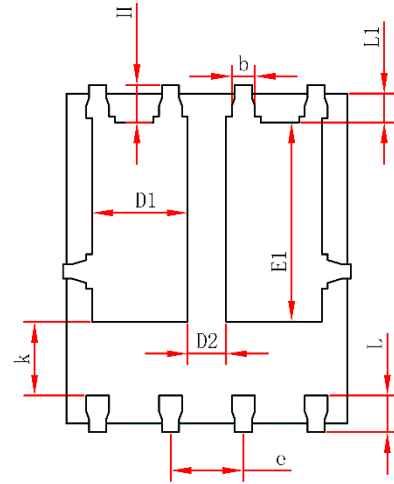
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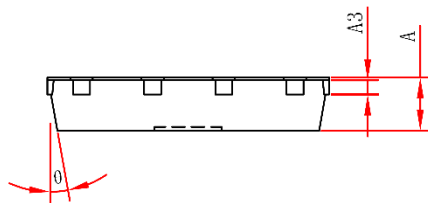
PDFN5X6-8L Package Information



Top View
[顶视图]



Bottom View
[背视图]



Side View
[侧视图]

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.900	1.100	0.035	0.043
A3	0.210	0.340	0.008	0.013
D	4.900	5.100	0.193	0.201
E	5.900	6.100	0.232	0.240
D1	1.470	1.870	0.058	0.074
D2	0.470	0.870	0.019	0.034
E1	3.340	3.640	0.131	0.143
D3	4.800	5.000	0.189	0.197
E2	5.674	5.826	0.223	0.229
k	1.100	-	0.043	-
b	0.300	0.500	0.012	0.020
e	1.270TYB		0.050TYB	
L	0.510	0.710	0.020	0.028
L1	0.424	0.576	0.017	0.023
H	0.549	0.726	0.022	0.029
θ	8°	12°	8°	12°

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.