GPM10DNP04LQA

40V N- and P-Channel MOSFET

Product Summary

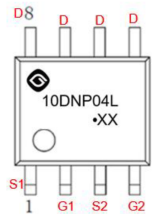| $V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
40V	44mΩ@10V	4.0A
	61mΩ@4.5V	
-40V	100mΩ@-10V	-2.5A
	149mΩ@-4.5V	

Feature

- Trench Technology Power MOSFET
- Low $R_{DS(ON)}$
- Low Gate Charge
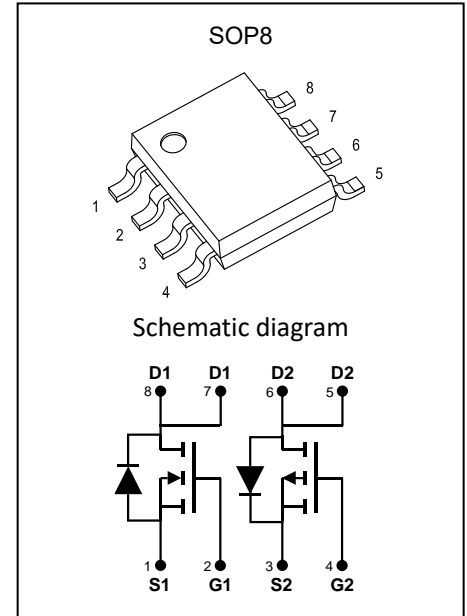- Low Gate Resistance
- 100% UIS Tested

Application

- Power Switching Application

MARKING:

10DNP04L = Device Code

XX = Date Code

Solid Dot = Green Indicater

SOP8

Schematic diagram

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

Parameter		Symbol	Value	Value	Unit
Drain - Source Voltage		V_{DS}	40	-40	V
Gate - Source Voltage		V_{GS}	±20	±20	V
Continuous Drain Current[1]	T_C = 25℃	I_D	4.0	-2.5	A
	T_C = 100℃	I_D	2.6	-1.6	A
Pulsed Drain Current[2]		I_{DM}	16	-10	A
Single Pulsed Avalanche Current[3]		I_{AS}	7.7	8.1	A
Single Pulsed Avalanche Energy[3]		E_{AS}	15	16	mJ
Power Dissipation[5]	T_C = 25℃	P_D	1.7		W
Thermal Resistance from Junction to Ambient[6]		$R_{θJA}$	75		℃/W
Junction Temperature		T_J	150	150	℃
Storage Temperature		T_{STG}	-55~ +150	-55~ +150	℃

MOSFET ELECTRICAL CHARACTERISTICS (T_J = 25℃ 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 = 250µA	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} = ±20V, V_{DS} = 0V			±100	nA
On Characteristics[4]						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250µA	1.0	2.0	3.0	V
Drain-source On-resistance	$R_{DS(on)}$	V_{GS} = 10V, I_D = 2A		44	57	mΩ
		V_{GS} = 4.5V, I_D = 2A		61	79	
Dynamic Characteristics						
Input Capacitance	C_{iss}	V_{DS} = 20V, V_{GS} = 0V, f = 1MHz		307		pF
Output Capacitance	C_{oss}			31		
Reverse Transfer Capacitance	C_{rss}			25		
Gate Resistance	R_g	V_{DS} = 0V, V_{GS} = 0V, f = 1MHz		1.8		Ω
Switching Characteristics						
Total Gate Charge	Q_g	V_{DS} = 15V, V_{GS} = 10V, I_D = 2A		7.3		nC
Gate-source Charge	Q_{gs}			1.1		
Gate-drain Charge	Q_{gd}			1.7		
Turn-on Delay Time	$t_{d(on)}$	V_{DD} = 15V, V_{GS} = 10V, R_L = 3.3Ω R_G = 3Ω		7		ns
Turn-on Rise Time	t_r			4		
Turn-off Delay Time	$t_{d(off)}$			23		
Turn-off Fall Time	t_f			18		
Source - Drain Diode Characteristics						
Diode Forward Voltage[4]	V_{SD}	V_{GS} = 0V, I_S = 2A			1.2	V

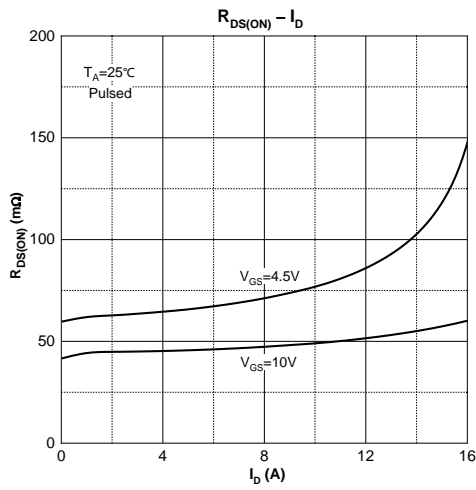**MOSFET ELECTRICAL CHARACTERISTICS (T$_J$ = 25℃ unless otherwise noted)**

PMOS:

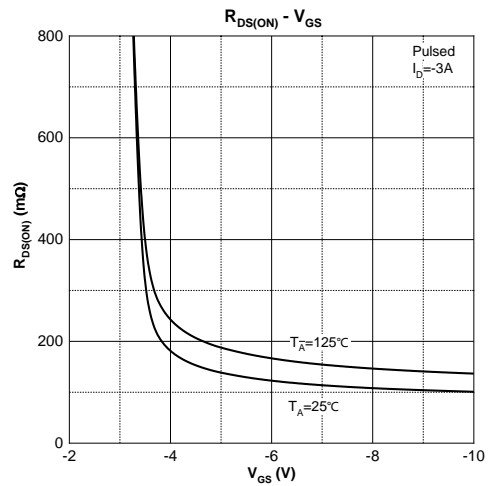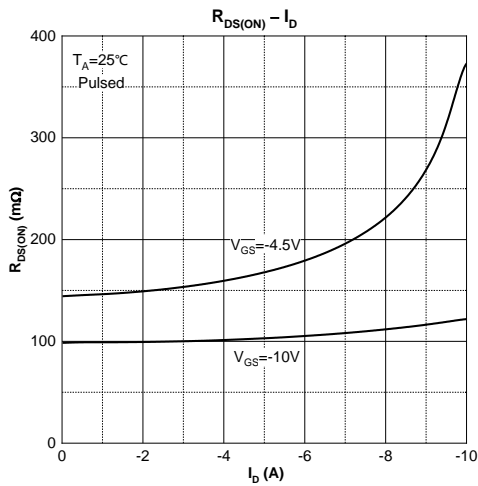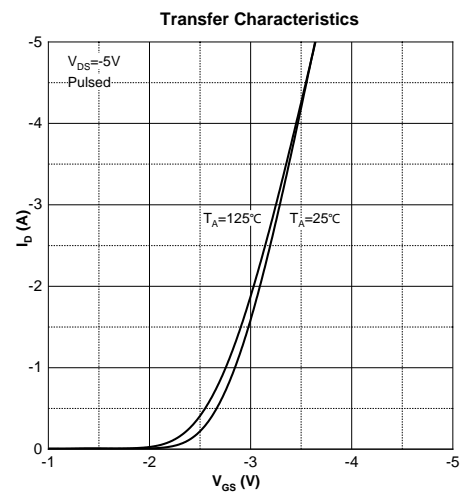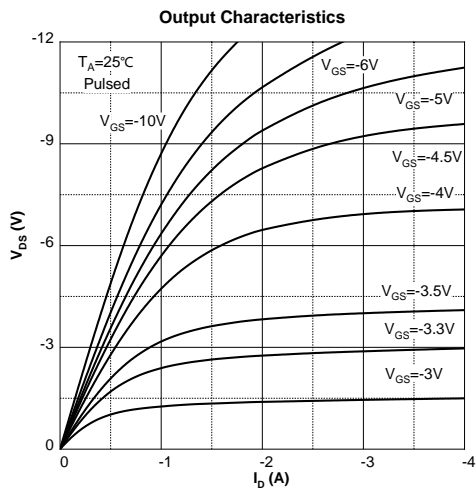| Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Off Characteristics						
Drain - Source Breakdown Voltage	V$_{(BR)DSS}$	V$_{GS}$ = 0V, I$_D$ = -250µA	-40			V
Zero Gate Voltage Drain Current	I$_{DSS}$	V$_{DS}$ = -40V, V$_{GS}$ = 0V			-1	µA
Gate - Body Leakage Current	I$_{GSS}$	V$_{GS}$ = ±20V, V$_{DS}$ = 0V			±100	nA
On Characteristics[4]						
Gate Threshold Voltage	V$_{GS(th)}$	V$_{DS}$ = V$_{GS}$, I$_D$ = -250µA	-1.0	-2.0	-3.0	V
Drain-source On-resistance	R$_{DS(on)}$	V$_{GS}$ = -10V, I$_D$ = -2A		100	120	mΩ
		V$_{GS}$ = -4.5V, I$_D$ = -2A		149	180	
Dynamic Characteristics						
Input Capacitance	C$_{iss}$	V$_{DS}$ = -20V, V$_{GS}$ = 0V, f = 1MHz		334		pF
Output Capacitance	C$_{oss}$			35		
Reverse Transfer Capacitance	C$_{rss}$			29		
Gate Resistance	R$_g$	V$_{DS}$ = 0V, V$_{GS}$ = 0V, f = 1MHz		6.1		Ω
Switching Characteristics						
Total Gate Charge	Q$_g$	V$_{DS}$ = -20V, V$_{GS}$ = -10V, I$_D$ = -2A		7.7		nC
Gate-source Charge	Q$_{gs}$			1.2		
Gate-drain Charge	Q$_{gd}$			1.8		
Turn-on Delay Time	t$_{d(on)}$	V$_{DD}$ = -15V, V$_{GS}$ = -10V, R$_L$ = 4Ω, R$_G$ = 3Ω		11		ns
Turn-on Rise Time	t$_r$			7		
Turn-off Delay Time	t$_{d(off)}$			18		
Turn-off Fall Time	t$_f$			6		
Source - Drain Diode Characteristics						
Diode Forward Voltage[4]	V$_{SD}$	V$_{GS}$ = 0V, I$_S$ = -2A			-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 ≤ 10µs, duty cycle ≤ 1%.

3.E$_{AS}$ condition: V$_{DD}$ = ±20V,V$_{GS}$ = ±10V, L = 0.5mH, R$_G$ = 25Ω Starting T$_J$ = 25°℃.

4.Pulse Test : Pulse Width ≤ 300µs, duty cycle ≤ 2%.

5.The power dissipation P$_D$ is limited by T$_{J(MAX)}$ = 150°C.And device mounted on a large heatsink

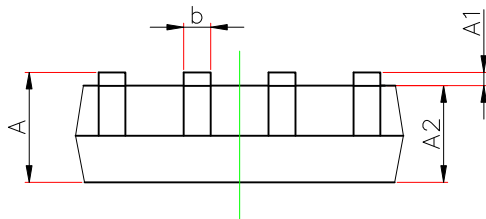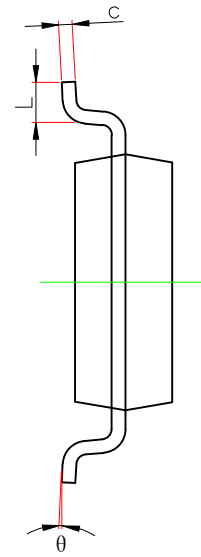6.Device mounted on 1in^2 FR-4 board with 2oz. Copper, in a still air environment with T$_A$ =25°C.

Typical Characteristics

Output Characteristics

Transfer Characteristics

$R_{DS(ON)} - I_D$

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

$I_S - V_{SD}$

Threshold Voltage

Typical Characteristics

Output Characteristics

Transfer Characteristics

$R_{DS(ON)} - I_D$

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

$I_S - V_{SD}$

Threshold Voltage
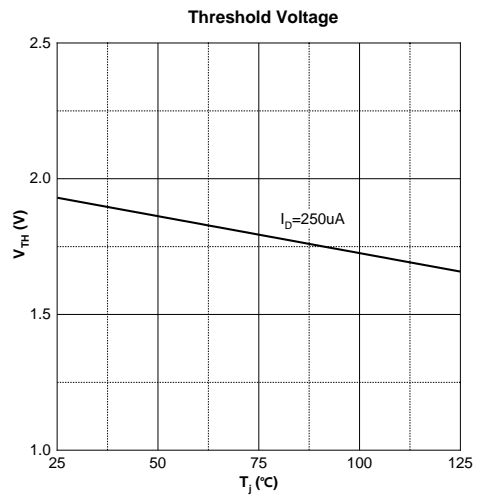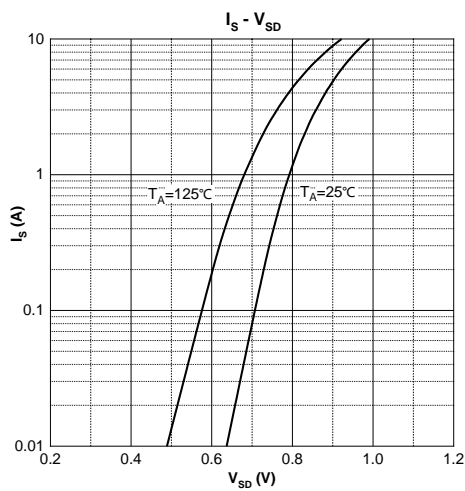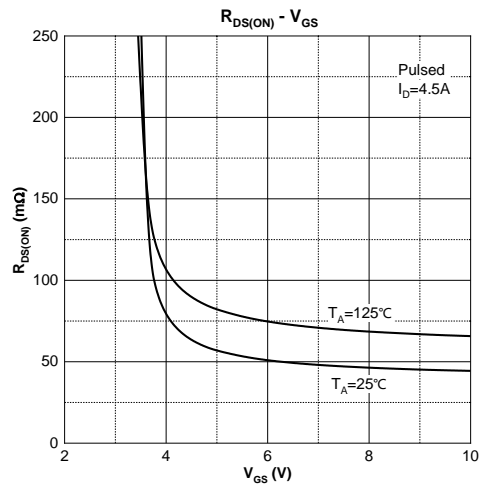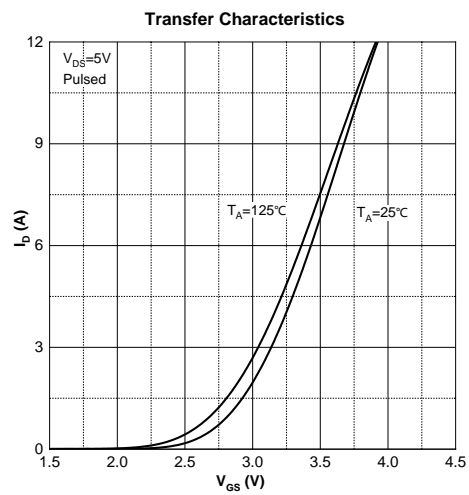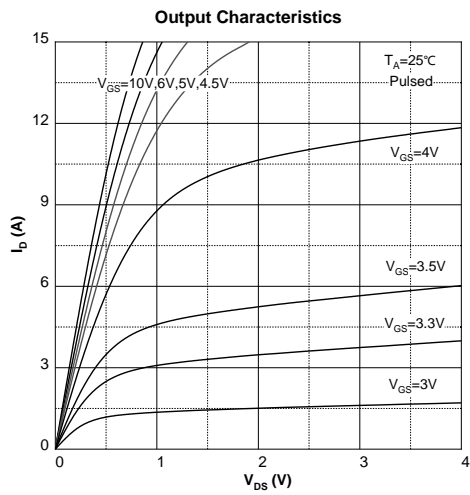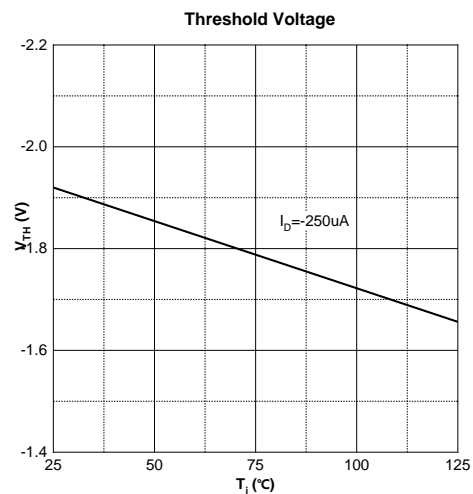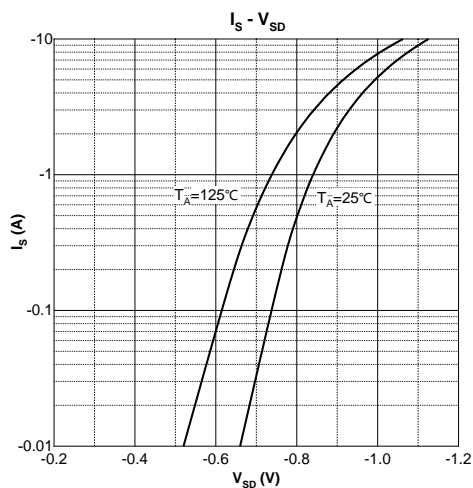
SOP8 Package Information
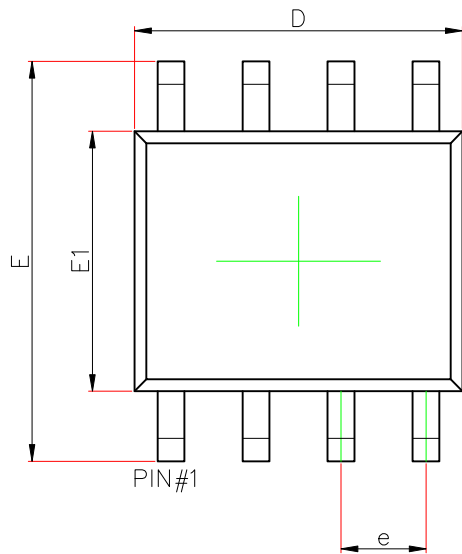
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.156	0.250	0.006	0.010
D	4.700	5.100	0.185	0.201
e	1.270(BSC)		0.050(BSC)	
E	5.800	6.200	0.228	0.244
E1	3.700	4.100	0.146	0.161
L	0.400	1.270	0.016	0.05
θ	0°	8°	0°	8°