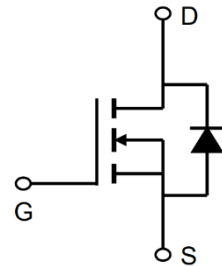


Description

The LM5D120N12 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 10V. This device is suitable for use as a Battery protection or in other Switching application.



General Features

$V_{DS} = 120V$ $I_D = 120A$

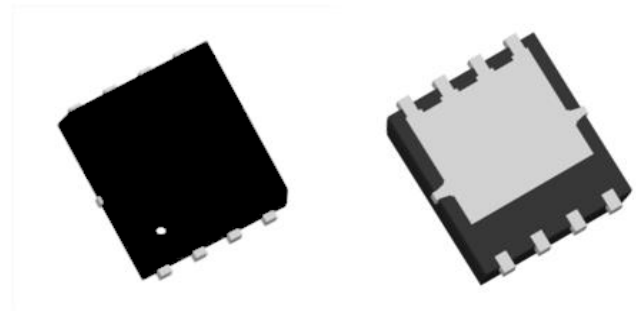
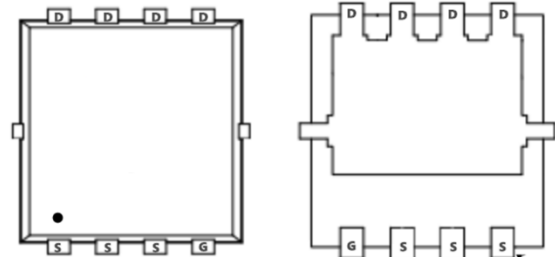
$R_{DS(ON)} < 7.5m\Omega @ V_{GS}=10V$

Application

Battery protection

Load switch

Uninterruptible power supply



Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
LM5D120N12	DFN5*6-8	APG120N12NF XXX YYYY	5000

Absolute Maximum Ratings ($T_C=25^\circ C$ unless otherwise noted)

Symbol	Parameter	Value	Units
V_{DS}	Drain-to-Source Voltage	120	V
$I_D @ T_A=25^\circ C$	Continuous Drain Current ¹	120	A
$I_D @ T_A=70^\circ C$	Continuous Drain Current ¹	70	A
I_{DM}^{a1}	Pulsed Drain Current	320	A
E_{ASa2}	Single pulse avalanche energy	240	mJ
I_{AR}	Single pulse avalanche current	40	A
V_{GS}	Gate-to-Source Voltage	± 20	V
P_D	Power Dissipation	125	W
T_J, T_{stg}	Operating Junction and Storage Temperature Range	-55 to 150	$^\circ C$
T_L	Maximum Temperature for Soldering	300	$^\circ C$
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	1.0	$^\circ C/W$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	50	$^\circ C/W$

Electrical Characteristics (T_J=25°C, unless otherwise noted)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
VDSS	Drain to Source Breakdown Voltage	V _{GS} =0V, I _D =250μA	120	--	--	V
IDSS	Drain to Source Leakage Current	V _{DS} = 120V, V _{GS} = 0V	--	--	1	μA
IGSS(F)	Gate to Source Forward Leakage	V _{GS} =+20V	--	--	100	nA
IGSS(R)	Gate to Source Reverse Leakage	V _{GS} =-20V	--	--	-100	nA
VGS(TH)	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D = 250μA	2.5	3.0	3.5	V
RDS(ON)1	Drain-to-Source On-Resistance	V _{GS} =10V, I _D =20A	--	6.0	6.8	mΩ
gFS	Forward Transconductance	V _{DS} =5V, I _D =50A		130	--	S
Ciss	Input Capacitance	V _{GS} = 0V V _{DS} = 50V f = 1.0MHz	--	4282	--	pF
Coss	Output Capacitance		--	429	--	pF
Crss	Reverse Transfer Capacitance		--	17	--	pF
R _g	Gate resistance		--	2.5	--	Ω
td(ON)	Turn-on Delay Time	I _D =20A V _{DS} = 50V V _{GS} = 10V R _G = 5Ω	--	20	--	ns
tr	Rise Time		--	11	--	ns
td(OFF)	Turn-Off Delay Time		--	55	--	ns
tf	Fall Time		--	28	--	ns
Q _g	Total Gate Charge	V _{GS} =0~10V V _{DS} = 50V I _D =20A	--	61.4	--	nC
Q _{gs}	Gate Source Charge		--	17.4	--	nC
Q _{gd}	Gate Drain Charge		--	14.1	--	nC
I _S	Diode Forward Current	T _C =25 °C	--	--	100	A
I _{SM}	Diode Pulse Current		--	--	320	A
VSD	Diode Forward Voltage	I _S =6.0A, V _{GS} =0V	--	--	1.2	V
trr	Reverse Recovery time	I _S =20A, V _{DD} =50V diF/dt=100A/μs	--	100	--	ns
Q _{rr}	Reverse Recovery Charge		--	250	--	nC

Note :

- 1、 The data tested by surface mounted on a 1 inch 2 FR-4 board with 2OZ copper.
- 2、 The data tested by pulsed , pulse width ≅ 300us , duty cycle ≅ 2%
- 3、 The EAS data shows Max. rating . The test condition is VDD=50V, L=0.3mH, Rg=25Ω, Starting T_J=25 °C
- 4、 The power dissipation is limited by 150°C junction temperature

Typical Characteristics

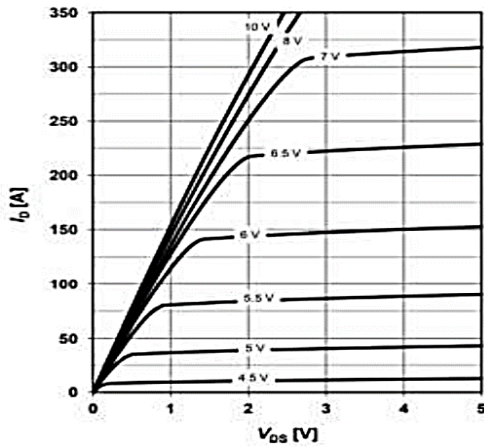


Figure1: output characteristics

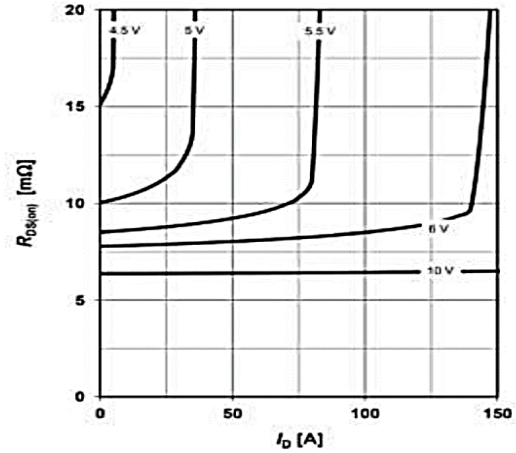


Figure2: Typical drain-source on resistance

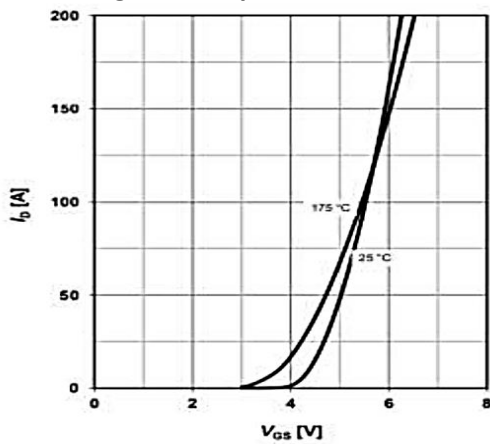


Figure3: transfer characteristics

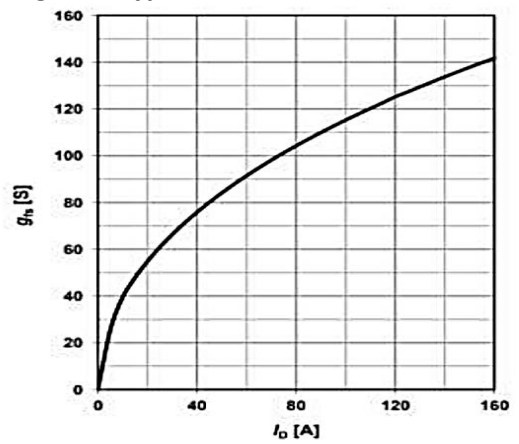


Figure4: forward transconductance

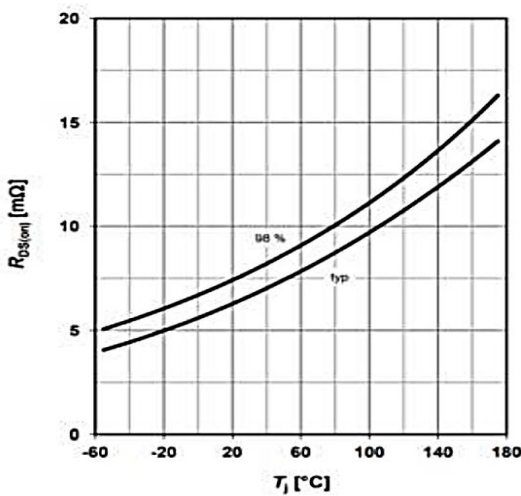


Figure5: Drain-source on-state resistance

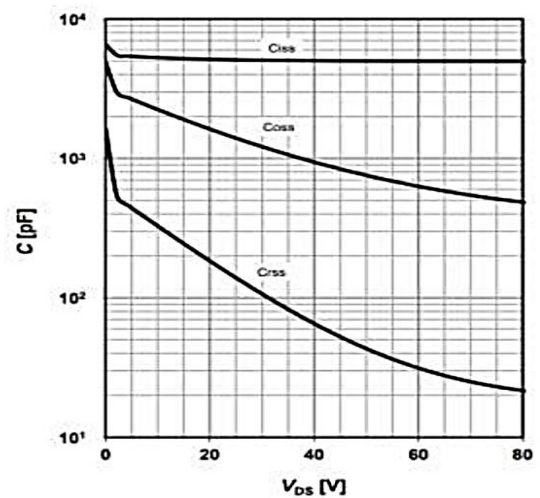


Figure6: Typ. capacitances

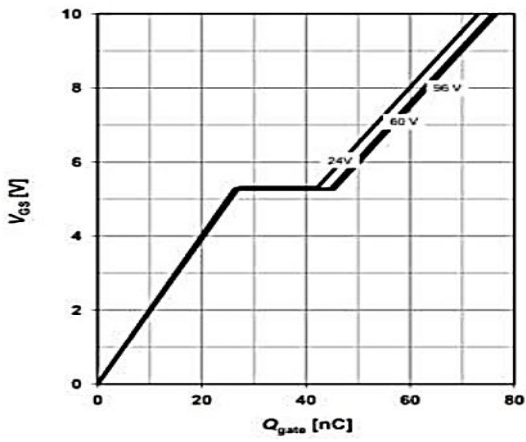


Figure7: Typ. gate charge

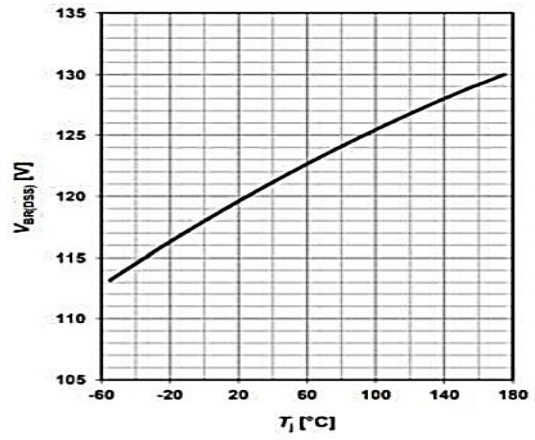


Figure8: Drain-source breakdown voltage

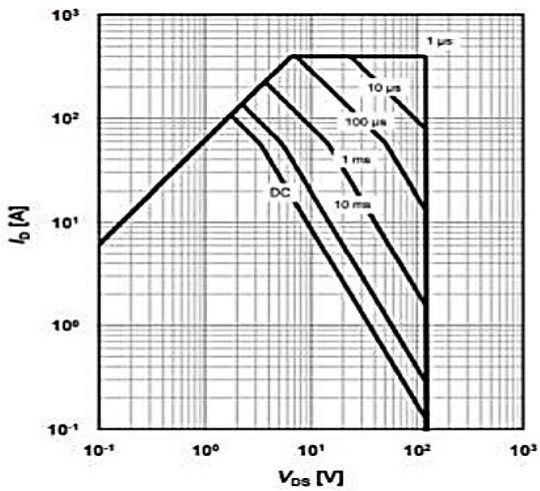


Figure9: Safe operating area

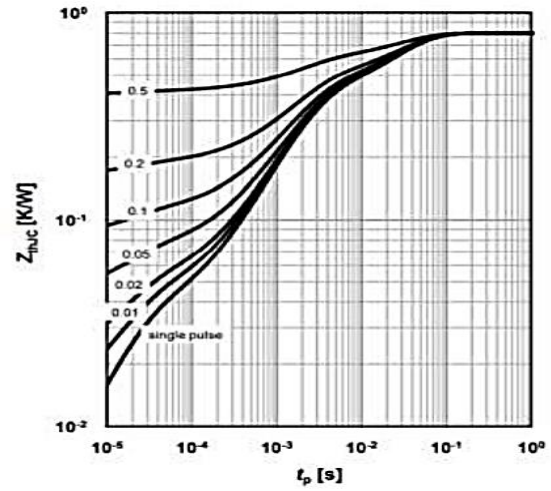
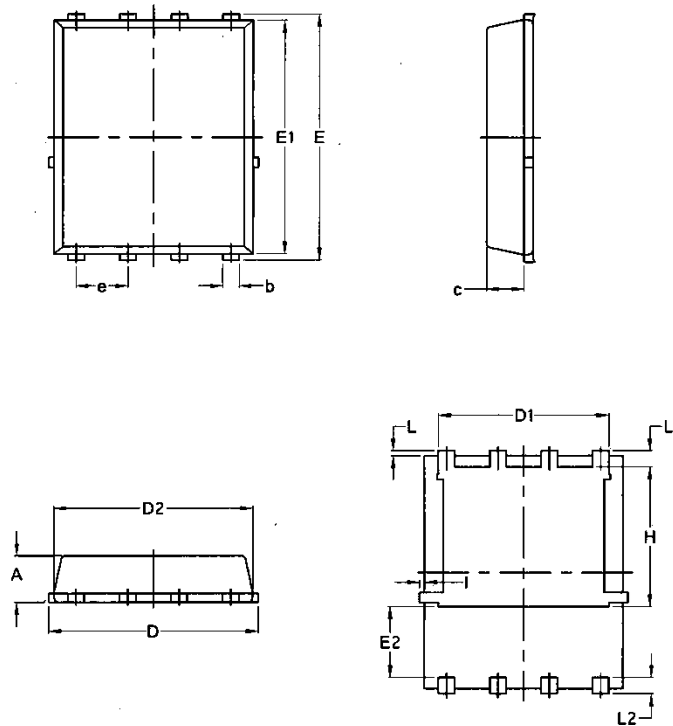


Figure10: Max. transient thermal impedance

Package Mechanical Data-DFN5*6-8



Symbol	Common			
	mm		Inch	
	Min	Max	Min	Max
A	1.03	1.17	0.0406	0.0461
b	0.34	0.48	0.0134	0.0189
c	0.824	0.0970	0.0324	0.082
D	4.80	5.40	0.1890	0.2126
D1	4.11	4.31	0.1618	0.1697
D2	4.80	5.00	0.1890	0.1969
E	5.95	6.15	0.2343	0.2421
E1	5.65	5.85	0.2224	0.2303
E2	1.60	/	0.0630	/
e	1.27 BSC		0.05 BSC	
L	0.05	0.25	0.0020	0.0098
L1	0.38	0.50	0.0150	0.0197
L2	0.38	0.50	0.0150	0.0197
H	3.30	3.50	0.1299	0.1378
I	/	0.18	/	0.0070