

Description

LM5D130N06 use advanced SGT MOSFET technology to provide low RDS(ON), low gate charge, fast switching and excellent avalanche characteristics.

This device is specially designed to get better ruggedness and suitable to use in

General Features

Low RDS(on) & FOM

Extremely low switching loss

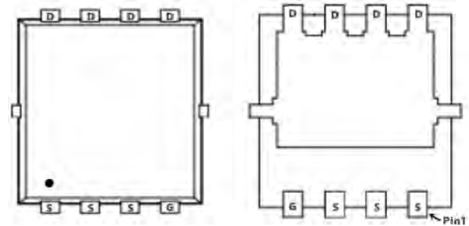
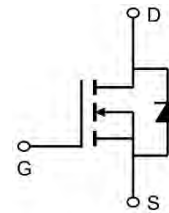
Excellent stability and uniformity of Invertors

Application

Consumer electronic power supply Motor control

Synchronous-rectification Isolated DC

Synchronous-rectification applications



Package Marking and Ordering Information

Device	Device Marking	Device Package	Reel Size	Tape width	Quantity
LM5D130N06	LM5D130N06	DFN5X6-8	-	-	5000 units

Absolute Maximum Ratings (T_c=25°C unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain source voltage	V _{DS}	60	V
Gate source voltage	V _{GS}	±20	V
Continuous drain current ¹⁾	I _D	130	A
Pulsed drain current ²⁾	I _{D, pulse}	390	A
Power dissipation ³⁾	P _D	140	W
Single pulsed avalanche energy ⁵⁾	E _{AS}	80	mJ
Operation and storage temperature	T _{stg} , T _j	-55 to 150	°C
Thermal resistance, junction-case	R _{θJC}	0.89	°C/W
Thermal resistance, junction-ambient ⁴⁾	R _{θJA}	62	°C/W

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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Drain-source breakdown voltage	BVDSS	60			V	V _{GS} =0 V, I _D =250 μA
Gate threshold voltage	V _{GS(th)}	1.0		2.5	V	V _{DS} =V _{GS} , I _D =250 μA
Drain-source on-state resistance	R _{DS(ON)}		2.5	3.0	mΩ	V _{GS} =10 V, I _D =20 A
Drain-source on-state resistance	R _{DS(ON)}		3.5	4.5	mΩ	V _{GS} =4.5 V, I _D =10 A
Gate-source leakage current	I _{GSS}			100	nA	V _{GS} =20 V
				-100		V _{GS} =-20 V
Drain-source leakage current	I _{DSS}			1	μA	V _{DS} =60 V, V _{GS} =0 V
Input capacitance	C _{iss}		5377		pF	V _{GS} =0 V, V _{DS} =25 V, f=100 kHz
Output capacitance	C _{oss}		1666		pF	
Reverse transfer capacitance	C _{rss}		77.7		pF	
Turn-on delay time	t _{d(on)}		22.5		ns	V _{GS} =10 V, V _{DS} =30 V, R _G =2 Ω, I _D =25 A
Rise time	t _r		6.7		ns	
Turn-off delay time	t _{d(off)}		80.3		ns	
Fall time	t _f		26.8		ns	
Gate-source charge	Q _{gs}		10.7		nC	I _D =25 A, V _{DS} =30 V, V _{GS} =10 V
Gate-drain charge	Q _{gd}		10.9		nC	
Gate plateau voltage	V _{plateau}		2.9		V	
Diode forward current	I _s			130	A	V _{GS} <V _{th}
Pulsed source current	I _{SP}			390		
Diode forward voltage	V _{SD}			1.3	V	I _s =20 A, V _{GS} =0 V
Reverse recovery time	t _{rr}		68.3		ns	I _s =25 A, di/dt=100 A/μs
Reverse recovery charge	Q _{rr}		73.0		nC	
Peak reverse recovery current	I _{rrm}		1.9		A	

Note

- 1) Calculated continuous current based on maximum allowable junction temperature.
- 2) Repetitive rating; pulse width limited by max. junction temperature.
- 3) P_d is based on max. junction temperature, using junction-case thermal resistance.
- 4) The value of R_{θJA} is measured with the device mounted on 1 in 2 FR-4 board with 2oz. Copper, in a still air environment with T_a=25 °C.
- 5) V_{DD}=50 V, R_G=25 Ω, L=0.3 mH, starting T_J=25 °C.

Typical Electrical and Thermal Characteristics

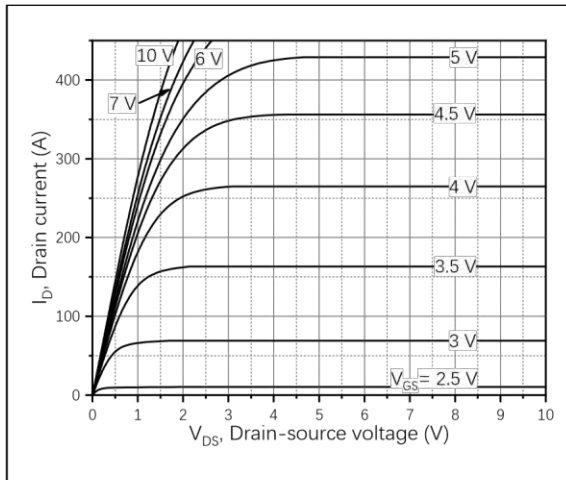


Figure 1, Typ. output characteristics

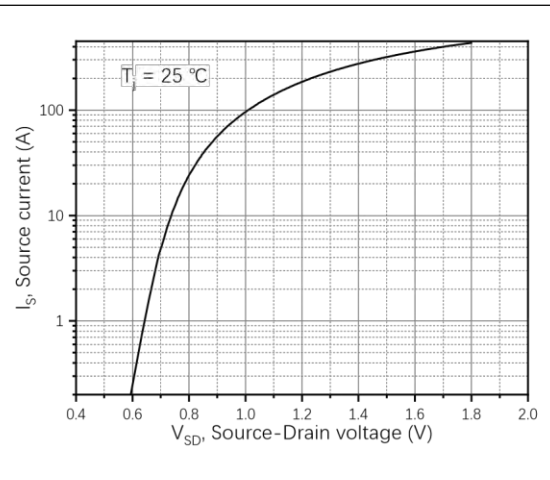


Figure 2, Typ. transfer characteristics

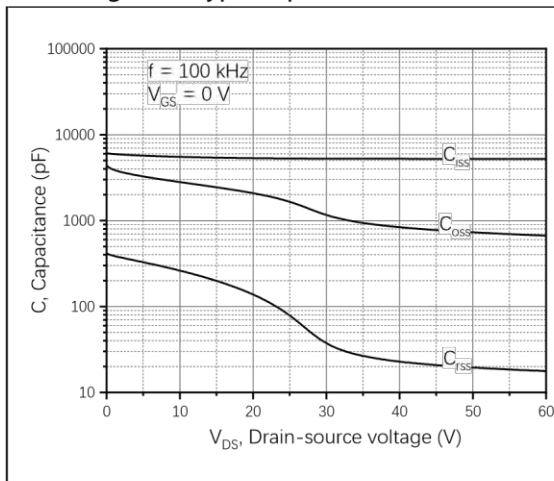


Figure 3, Typ. capacitances

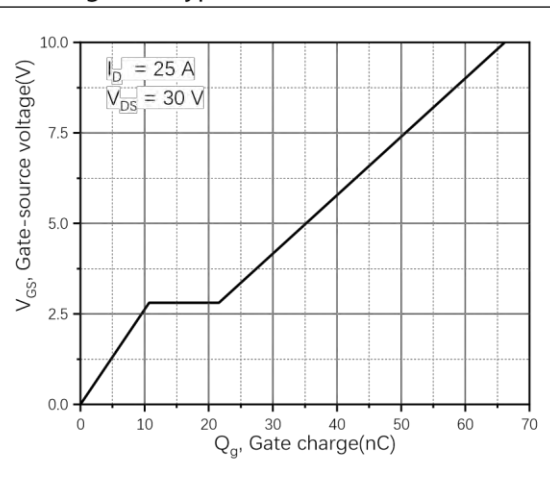


Figure 4, Typ. gate charge

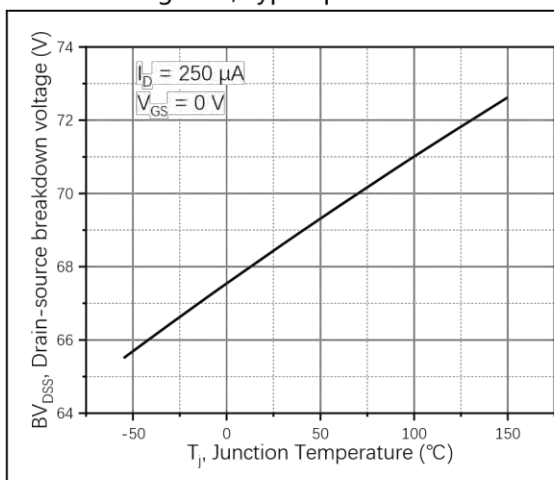


Figure 5, Drain-source breakdown voltage

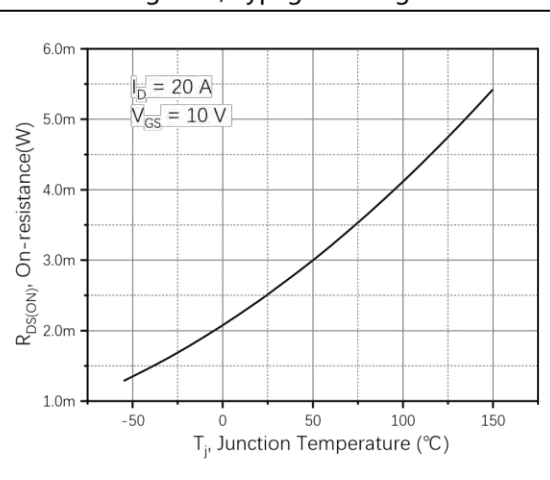


Figure 6, Drain-source on-state resistance

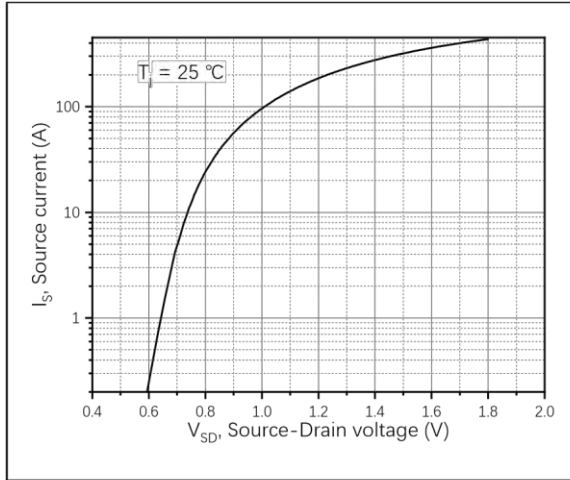


Figure 7, Forward characteristic of body diode

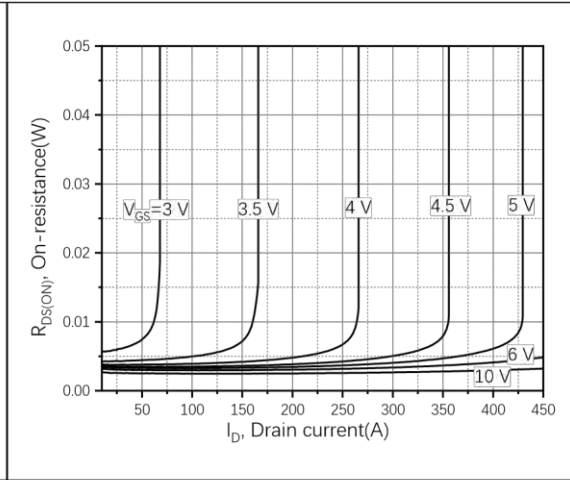


Figure 8, Drain-source on-state resistance

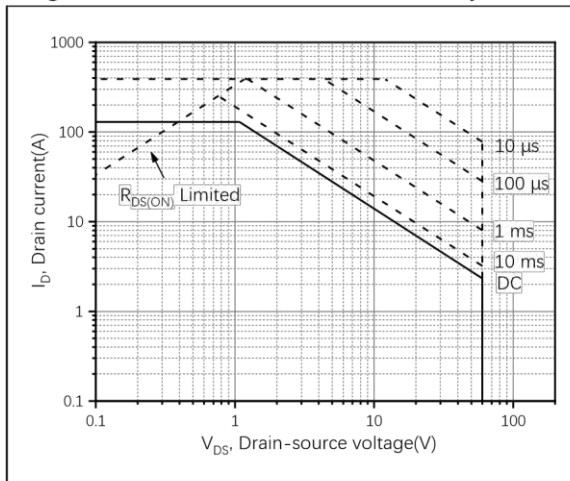


Figure 9, Safe operation area $T_C=25\text{ }^\circ\text{C}$

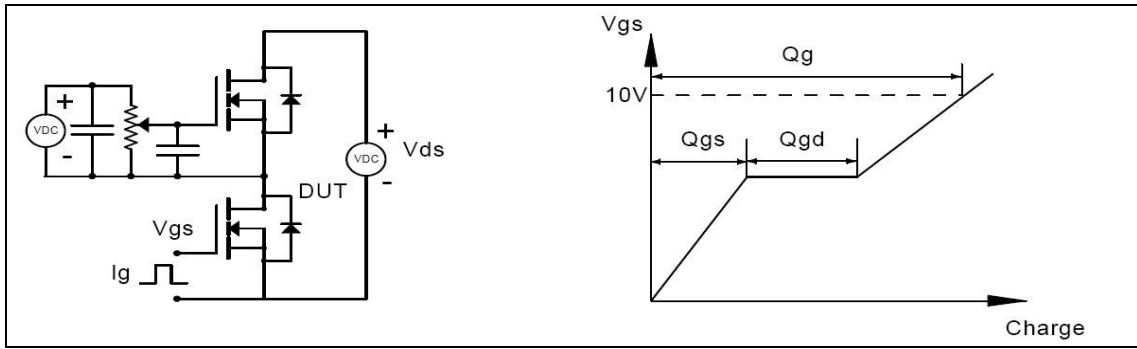


Figure 1, Gate charge test circuit & waveform

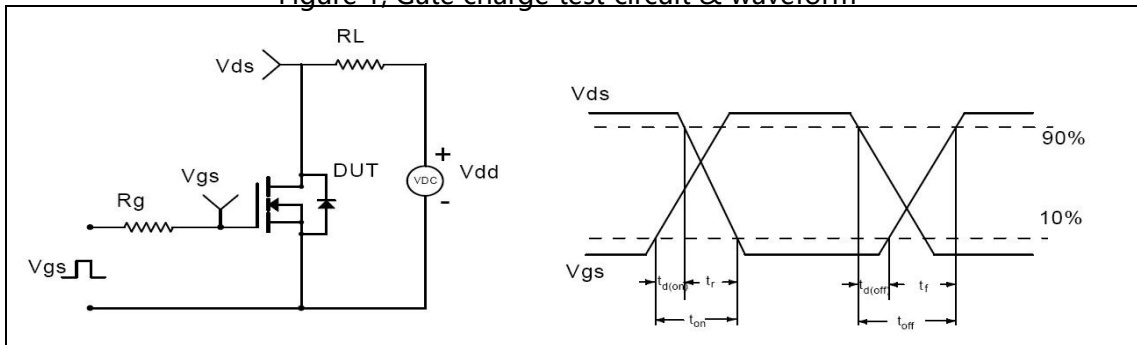


Figure 2, Switching time test circuit & waveforms

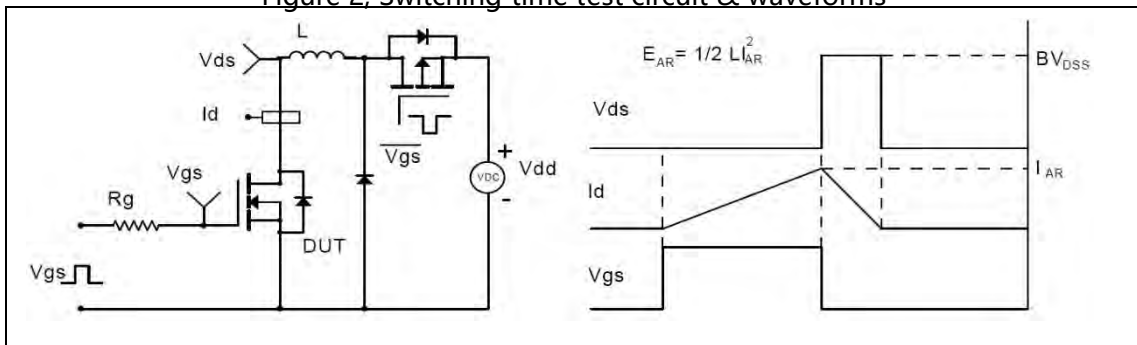


Figure 3, Unclamped inductive switching (UIS) test circuit & waveforms

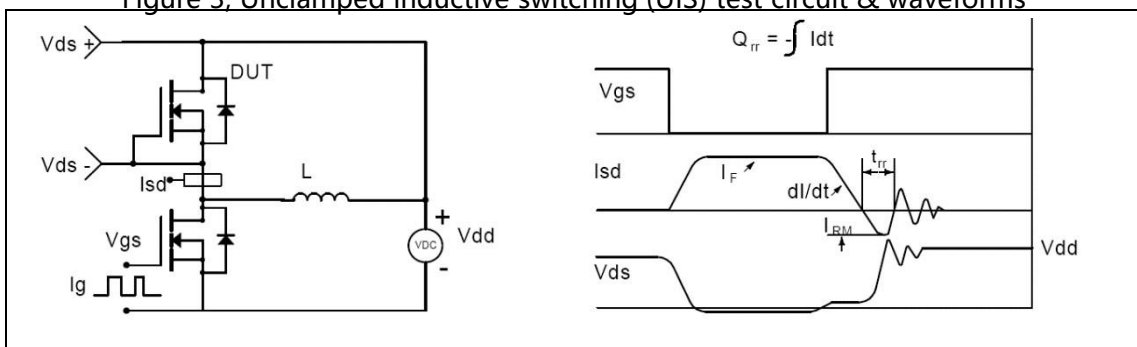
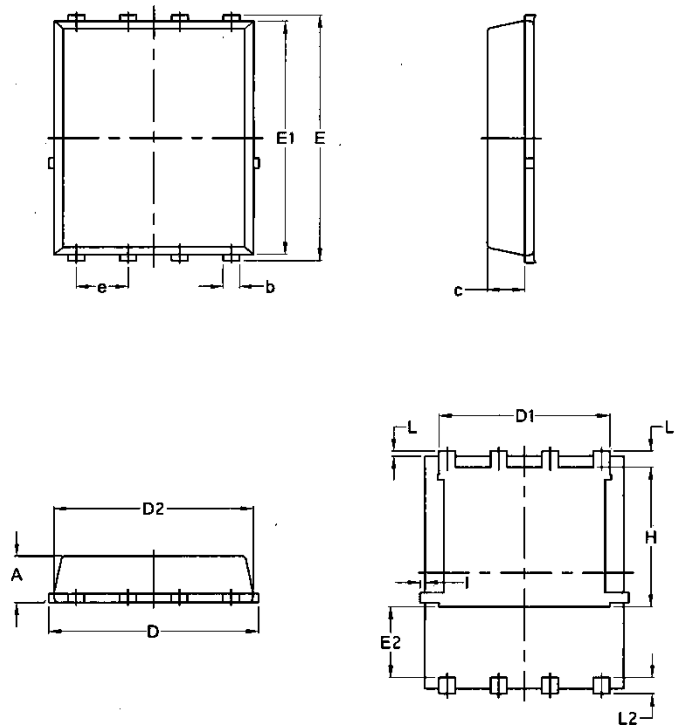


Figure 4, Diode reverse recovery test circuit & waveforms

Package Mechanical Data-DFN5*6-8-JQ Single



Symbol	Common			
	mm		Inch	
	Mim	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

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