

60V N-SGT Enhancement Mode MOSFET

General Description

130N06D 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

Features

Low RDS(on) & FOM

Extremely low switching loss

Excellent stability and uniformity or Invertors

Applications

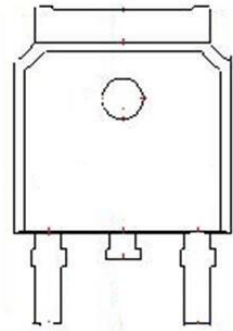
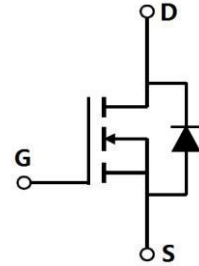
Consumer electronic power supply

Motor control

Synchronous-rectification

Isolated DC

Synchronous-rectification applications



Absolute Maximum Ratings at $T_j=25^{\circ}\text{C}$ unless otherwise note.

Parameter	Symbol	Value	Unit
Drain source voltage	VDS	60	V
Gate source voltage	VGS	± 20	V
Continuous drain current ¹⁾	ID	130	A
Pulsed drain current ²⁾	ID, pulse	390	A
Power dissipation ³⁾	P _D	140	W
Single pulsed avalanche energy ⁵⁾	EAS	80	mJ
Operation and storage temperature	Tstg, Tj	-55 to 150	°C
Thermal resistance, junction-case	R θ JC	0.89	°C/W
Thermal resistance, junction-ambient ⁴⁾	R θ JA	62	°C/W

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Electrical Characteristics at $T_j=25\text{ }^\circ\text{C}$ unless otherwise specified

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test condition
Drain-source breakdown voltage	BV_{DSS}	60			V	$V_{GS}=0\text{ V}, I_D=250\text{ }\mu\text{A}$
Gate threshold voltage	$V_{GS(th)}$	1.0		2.5	V	$V_{DS}=V_{GS}, I_D=250\text{ }\mu\text{A}$
Drain-source on-state resistance	$R_{DS(on)}$		3.0	3.5	m Ω	$V_{GS}=10\text{ V}, I_D=20\text{ A}$
Drain-source on-state resistance	$R_{DS(on)}$		3.5	4.5	m Ω	$V_{GS}=4.5\text{ V}, I_D=10\text{ A}$
Gate-source leakage current	I_{GSS}			100	nA	$V_{GS}=20\text{ V}$
				-100		$V_{GS}=-20\text{ V}$
Drain-source leakage current	I_{DSS}			1	μA	$V_{DS}=60\text{ V}, V_{GS}=0\text{ V}$
Input capacitance	C_{iss}		5377		pF	$V_{GS}=0\text{ V}, V_{DS}=25\text{ V}, f=100\text{ kHz}$
Output capacitance	C_{oss}		1666		pF	
Reverse transfer capacitance	C_{rss}		77.7		pF	
Turn-on delay time	$t_{d(on)}$		22.5		ns	$V_{GS}=10\text{ V},$ $V_{DS}=30\text{ V},$ $R_G=2\text{ }\Omega,$ $I_D=25\text{ A}$
Rise time	t_r		6.7		ns	
Turn-off delay time	$t_{d(off)}$		80.3		ns	
Fall time	t_f		26.8		ns	
Total gate charge	Q_g		66.1		nC	
Gate-source charge	Q_{gs}		10.7		nC	$I_D=25\text{ A},$ $V_{DS}=30\text{ V},$ $V_{GS}=10\text{ V}$
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	$I_S=20\text{ A}, V_{GS}=0\text{ V}$
Reverse recovery time	t_{rr}		68.3		ns	$I_S=25\text{ A}, di/dt=100\text{ A}/\mu\text{s}$
Reverse recovery charge	Q_{rr}		73.0		nC	
Peak reverse recovery current	I_{rrm}		1.9		A	

- 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 $R_{\theta JA}$ is measured with the device mounted on 1 in 2 FR-4 board with 2oz. Copper, in a still air environment with $T_a=25\text{ }^\circ\text{C}$.
- 5、 $V_{DD}=50\text{ V}, R_G=25\text{ }\Omega, L=0.3\text{ mH}$, starting $T_j=25\text{ }^\circ\text{C}$.

Electrical Characteristics Diagrams

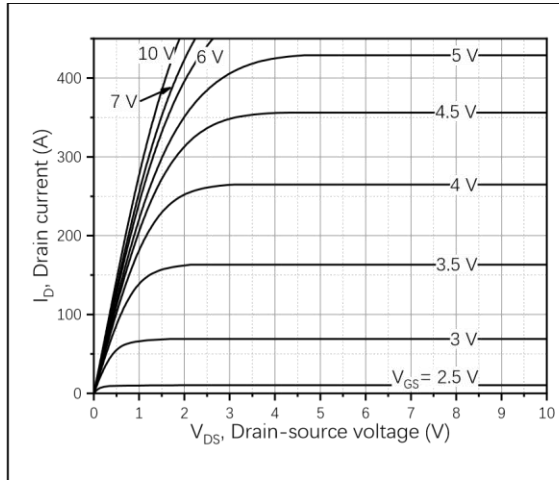


Figure 1, Typ. output characteristics

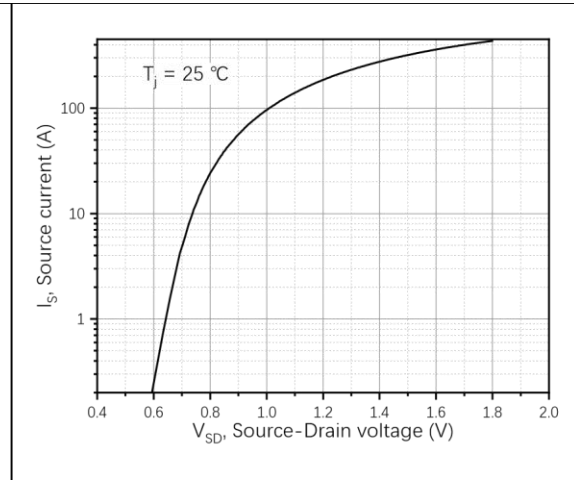


Figure 2, Typ. transfer characteristics

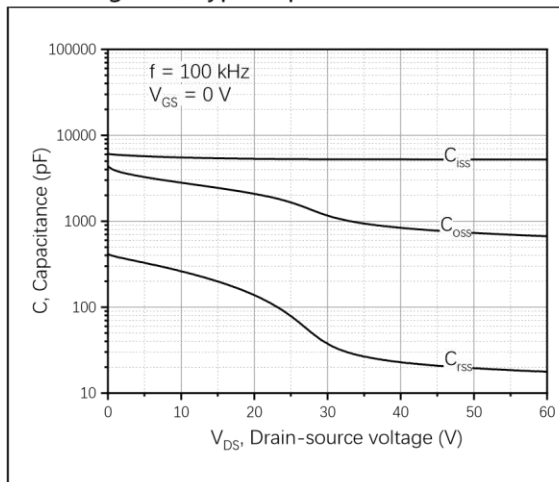


Figure 3, Typ. capacitances

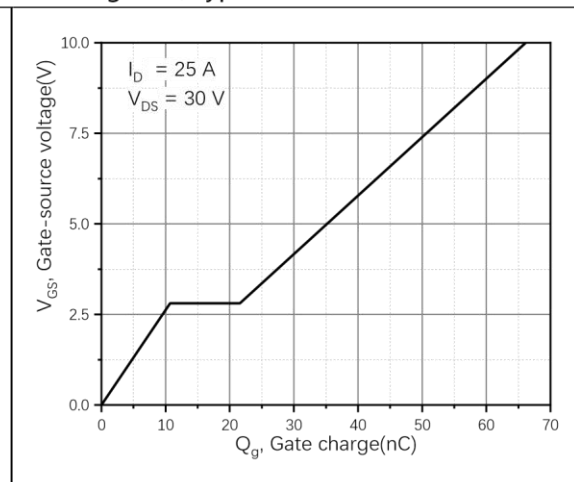


Figure 4, Typ. gate charge

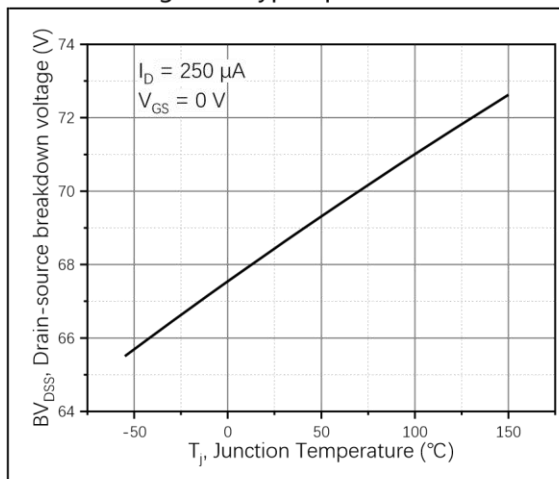


Figure 5, Drain-source breakdown voltage

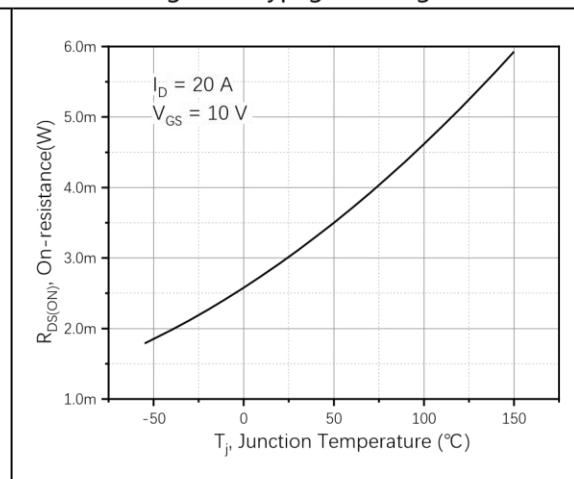


Figure 6, Drain-source on-state resistance

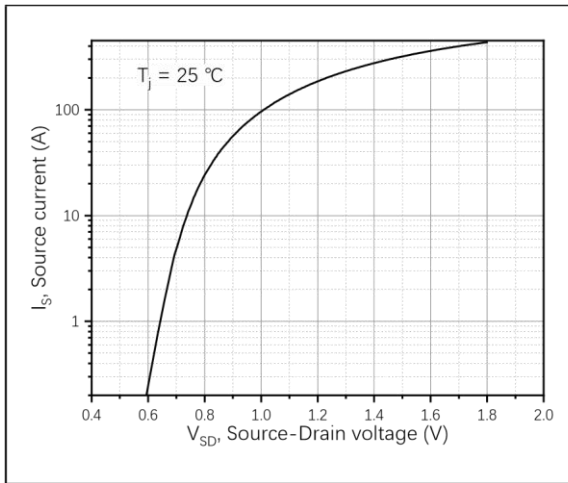


Figure 7, Forward characteristic of body diode

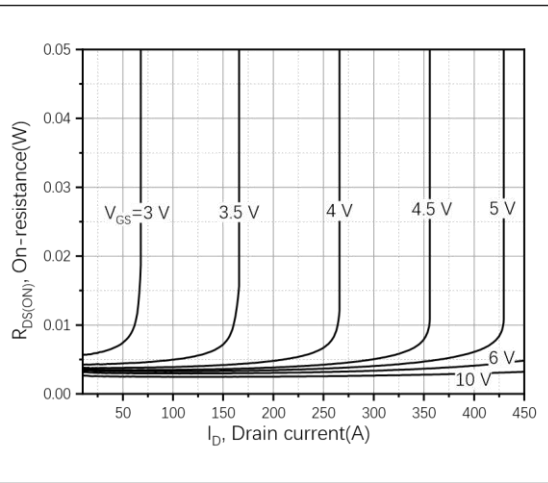


Figure 8, Drain-source on-state resistance

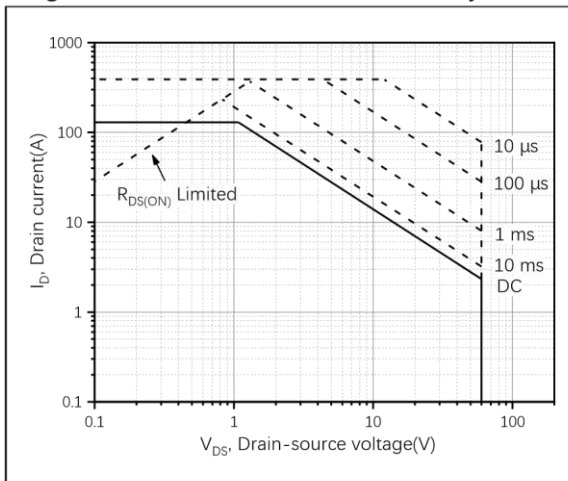


Figure 9, Safe operation area $T_C=25\text{ }^{\circ}\text{C}$

Test circuits and waveforms

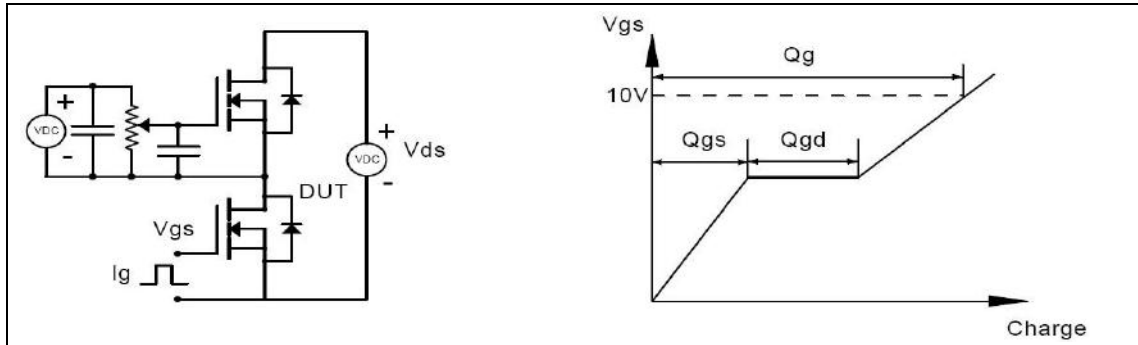


Figure 1, Gate charge test circuit & waveform

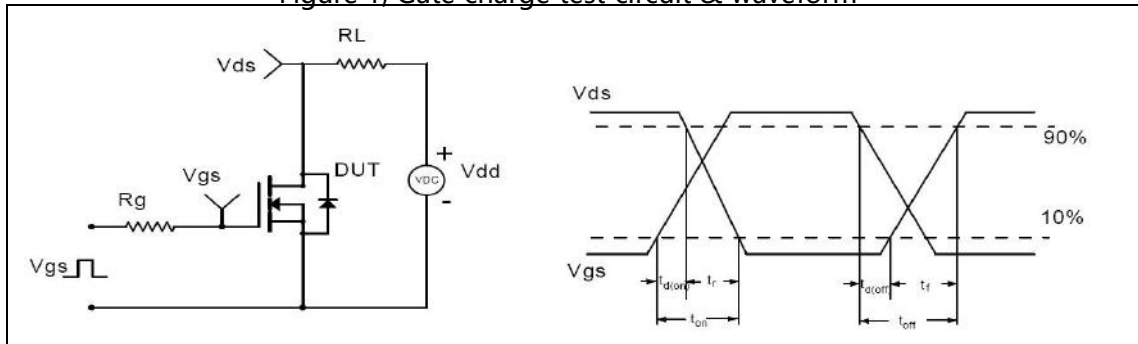


Figure 2, Switching time test circuit & waveforms

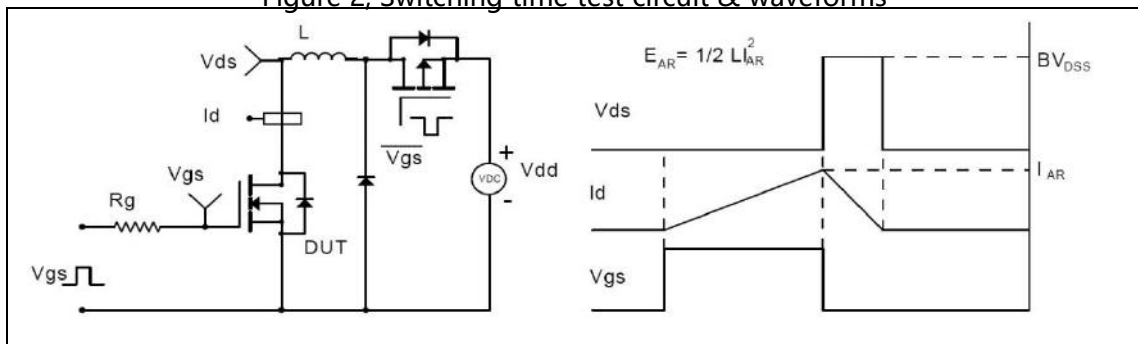


Figure 3, Unclamped inductive switching (UIS) test circuit & waveforms

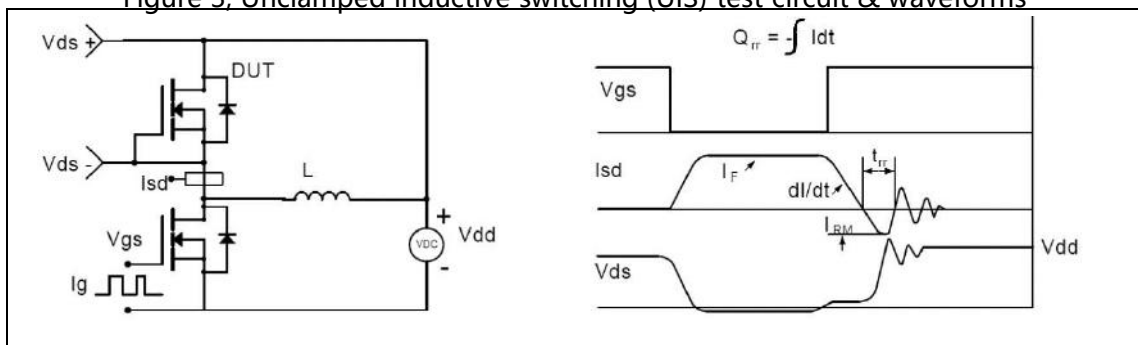
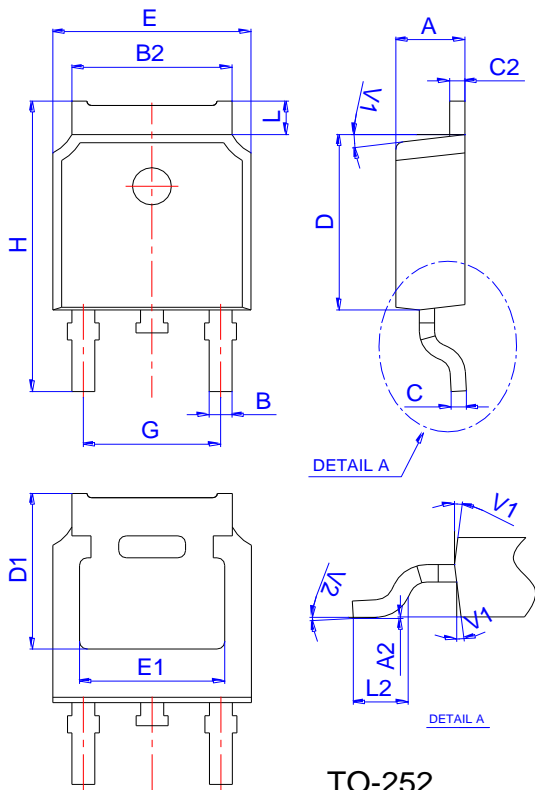


Figure 4, Diode reverse recovery test circuit & waveforms

100V N-SGT Enhancement Mode MOSFET

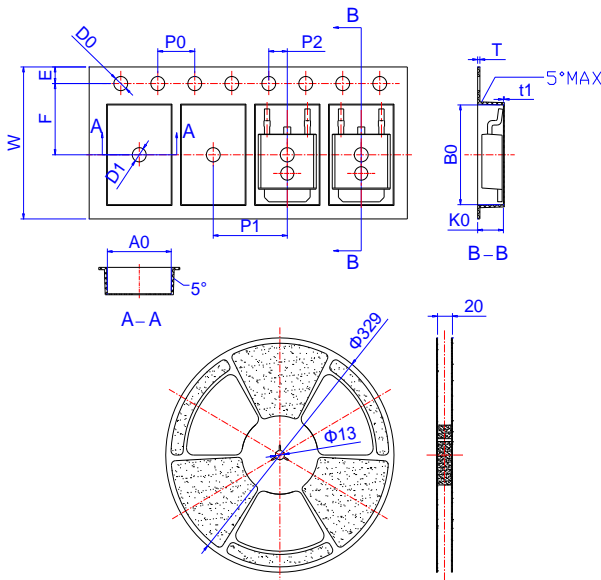
Package Mechanical Data



TO-252

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.10		2.50	0.083		0.098
A2	0		0.10	0		0.004
B	0.66		0.86	0.026		0.034
B2	5.18		5.48	0.202		0.216
C	0.40		0.60	0.016		0.024
C2	0.44		0.58	0.017		0.023
D	5.90		6.30	0.232		0.248
D1	5.30REF			0.209REF		
E	6.40		6.80	0.252		0.268
E1	4.63			0.182		
G	4.47		4.67	0.176		0.184
H	9.50		10.70	0.374		0.421
L	1.09		1.21	0.043		0.048
L2	1.35		1.65	0.053		0.065
V1		7°			7°	
V2	0°		6°	0°		6°

Reel Specification-TO-252



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
W	15.90	16.00	16.10	0.626	0.630	0.634
E	1.65	1.75	1.85	0.065	0.069	0.073
F	7.40	7.50	7.60	0.291	0.295	0.299
D0	1.40	1.50	1.60	0.055	0.059	0.063
D1	1.40	1.50	1.60	0.055	0.059	0.063
P0	3.90	4.00	4.10	0.154	0.157	0.161
P1	7.90	8.00	8.10	0.311	0.315	0.319
P2	1.90	2.00	2.10	0.075	0.079	0.083
A0	6.85	6.90	7.00	0.270	0.271	0.276
B0	10.45	10.50	10.60	0.411	0.413	0.417
K0	2.68	2.78	2.88	0.105	0.109	0.113
T	0.24		0.27	0.009		0.011
t1	0.10			0.004		
10P0	39.80	40.00	40.20	1.567	1.575	1.583