Description

The SI010N10NG1 uses **Super Trench I** technology that is uniquely optimized to provide the most efficient high frequency switching performance. Both conduction and switching power losses are minimized due to an extremely low combination of $R_{DS(ON)}$ and Q_g. This device is ideal for high-frequency switching and synchronous rectification.

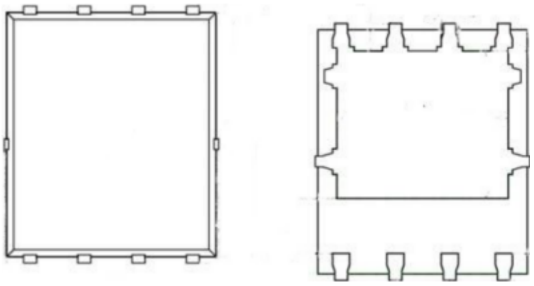
Application

- DC/DC Converter
- Ideal for high-frequency switching and synchronous rectification

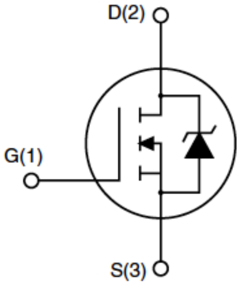
General Features

- V_{DS} =100V,I_D =70A
  $R_{DS(ON)}$=9mΩ (typical) @ V_{GS}=10V
- Excellent gate charge x $R_{DS(on)}$ product(FOM)
- Very low on-resistance $R_{DS(on)}$
- 150 °C operating temperature
- Pb-free lead plating

DFN 5X6



Top View Bottom View



Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
SI010N10NG1	SI010N10NG1	DFN5X6-8L			5000

Absolute Maximum Ratings (T_C=25℃unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	100	V
Gate-Source Voltage	V_{GS}	±20	V
Drain Current-Continuous	I_D	70	A
Drain Current-Continuous(T_C=100℃)	I_D (100℃)	50	A
Pulsed Drain Current	I_{DM}	210	A
Maximum Power Dissipation	P_D	100	W
Derating factor		0.92	W/℃
Single pulse avalanche energy (Note 5)	E_{AS}	29	mJ
Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55 To 150	℃

Thermal Characteristic

Thermal Resistance,Junction-to-Case(Note 2)	$R_{\theta JC}$	1.25	℃/W

Electrical Characteristics (T_C=25℃unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V I_D=250μA	100		-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=100V,V_{GS}=0V	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±20V,V_{DS}=0V	-	-	±100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=250μA	1.0		2.5	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=30A	-	9	10	mΩ
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=4.5V,I_D=12A		10	14	mΩ
Dynamic Characteristics (Note4)						
Input Capacitance	C_{lss}	V_{DS}=50V,V_{GS}=0V, F=1.0MHz	-	2604	-	PF
Output Capacitance	C_{oss}		-	361	-	PF
Reverse Transfer Capacitance	C_{rss}		-	6.5	-	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=50V,I_D=25A V_{GS}=10V,R_G=2.2Ω	-	20	-	nS
Turn-on Rise Time	t_r		-	5.0	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	51	-	nS
Turn-Off Fall Time	t_f		-	9	-	nS
Total Gate Charge	Q_g	V_{DS}=50V,I_D=25A, V_{GS}=10V	-	50	-	nC
Gate-Source Charge	Q_{gs}		-	6.55		nC
Gate-Drain Charge	Q_{gd}		-	12		nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V_{SD}	V_{GS}=0V,I_S=30A	-		1.3	V
Diode Forward Current (Note 2)	I_S		-	-	70	A
Reverse Recovery Time	t_{rr}	T_J = 25°C, I_F = 12A di/dt = 100A/μs(Note3)	-	60	-	nS
Reverse Recovery Charge	Qrr		-	106	-	nC

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production
5. EAS condition : Tj=25℃,V_{DD}=40V,V_G=10V,L=0.5mH,Rg=25Ω

Typical Electrical and Thermal Characteristics

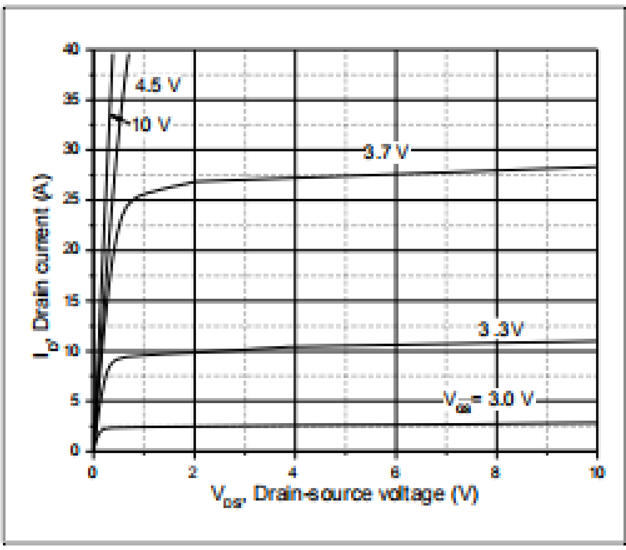


Figure 1, Typ. output characteristics

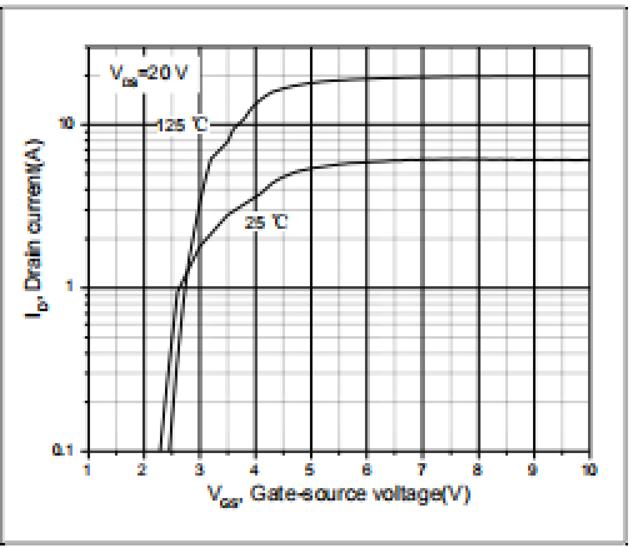


Figure 2, Typ. transfer characteristics

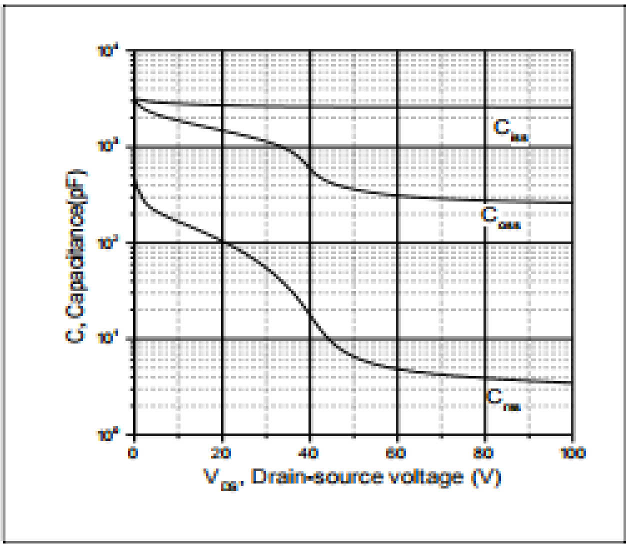


Figure 3, Typ. capacitances

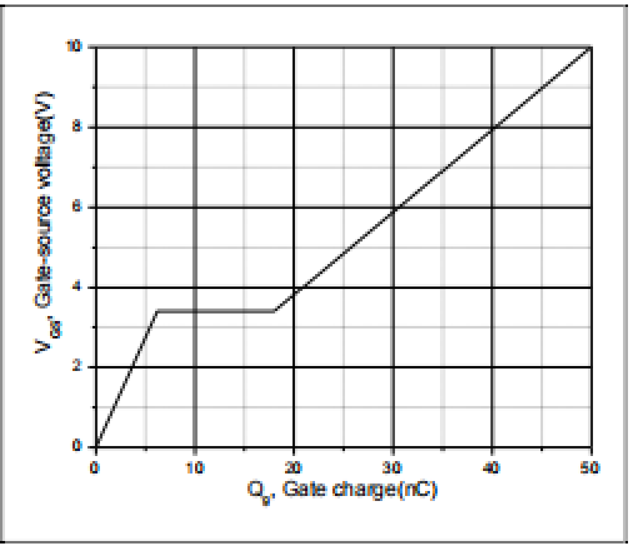


Figure 4, Typ. gate charge

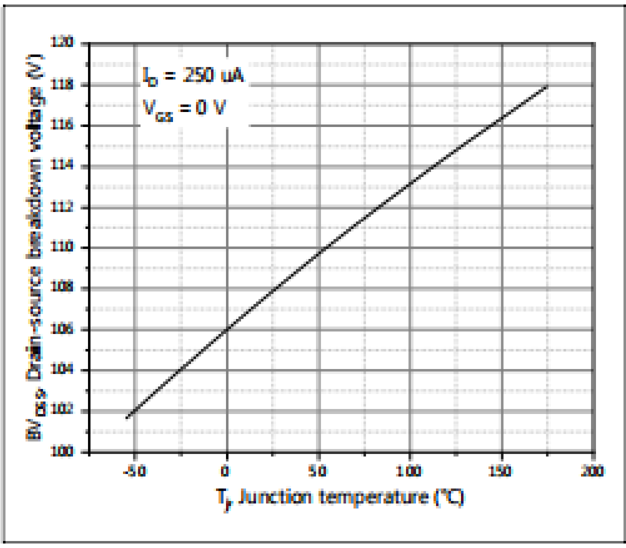


Figure 5, Drain-source breakdown voltage

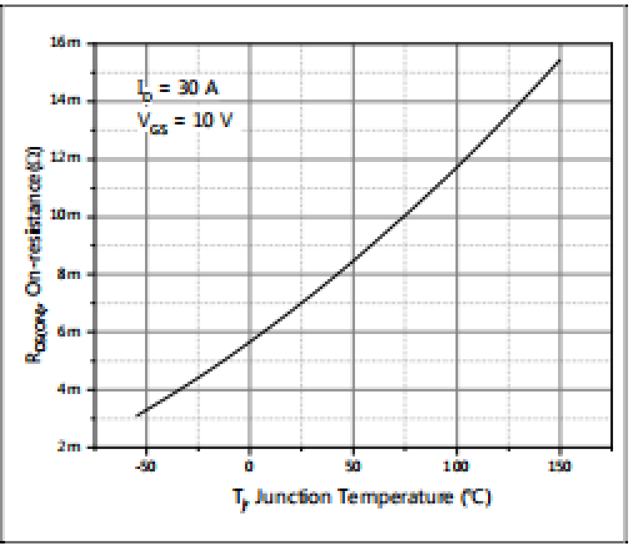


Figure 6, Drain-source on-state resistance

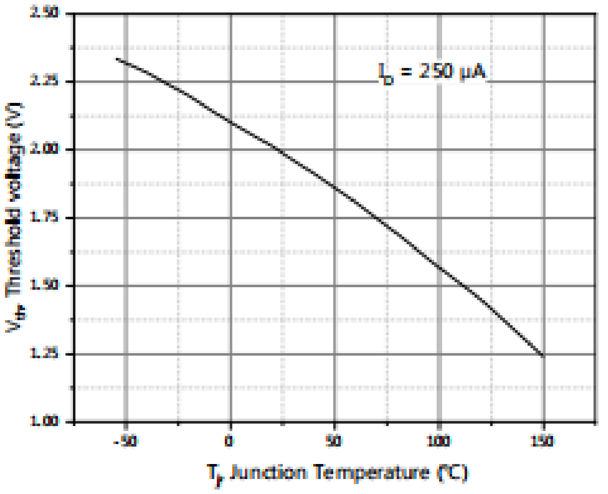


Figure 7, Threshold voltage

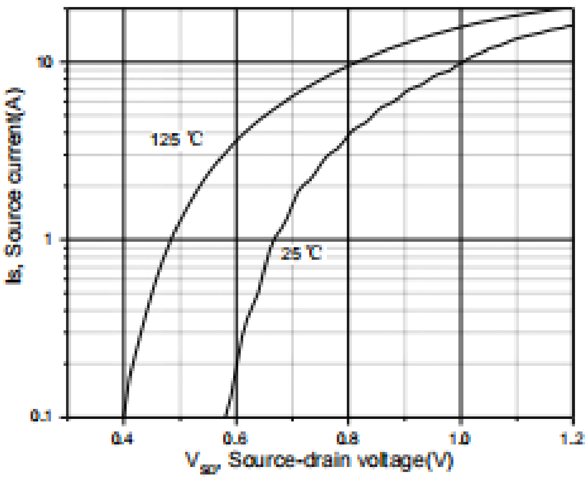


Figure 8, Forward characteristic of body diode

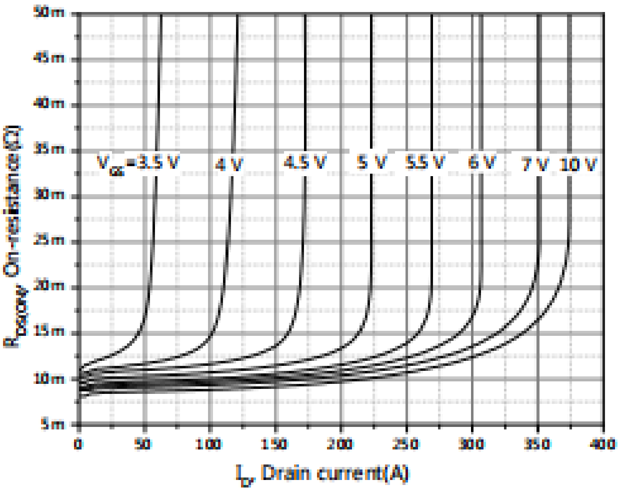


Figure 9, Drain-source on-state resistance

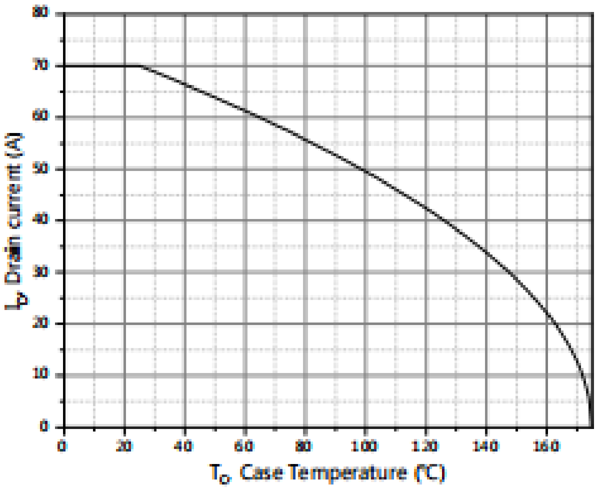


Figure 10, Drain current

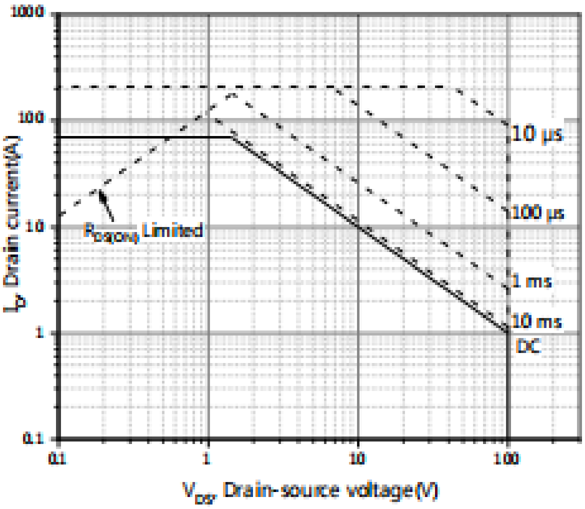


Figure 11, Safe operation area T_C=25 ℃

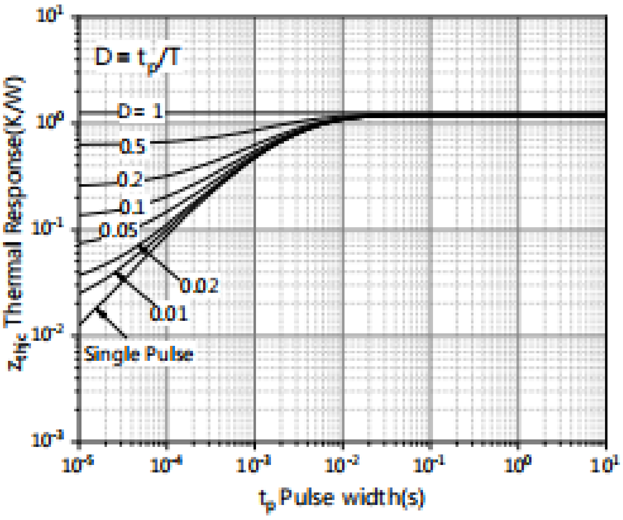
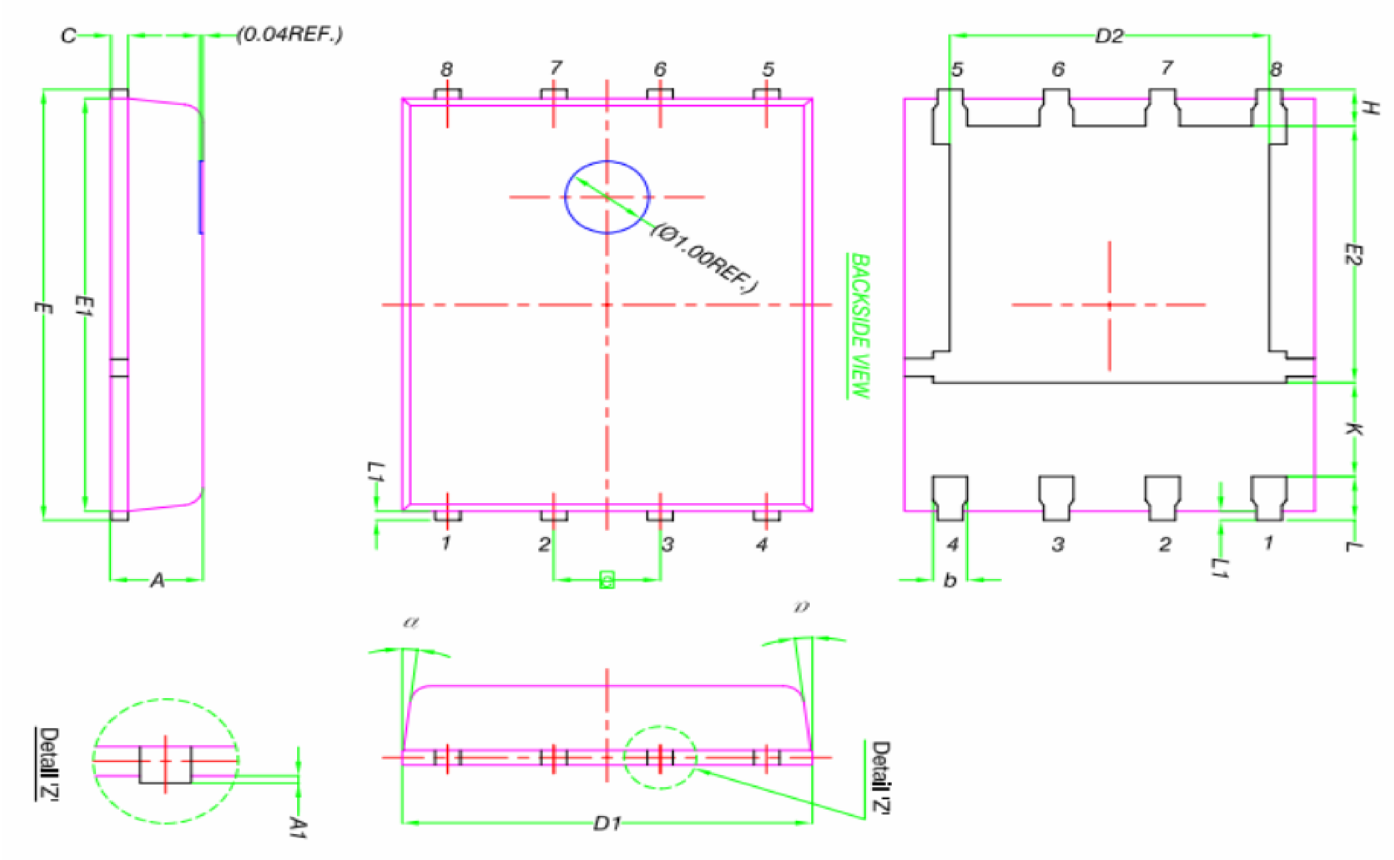
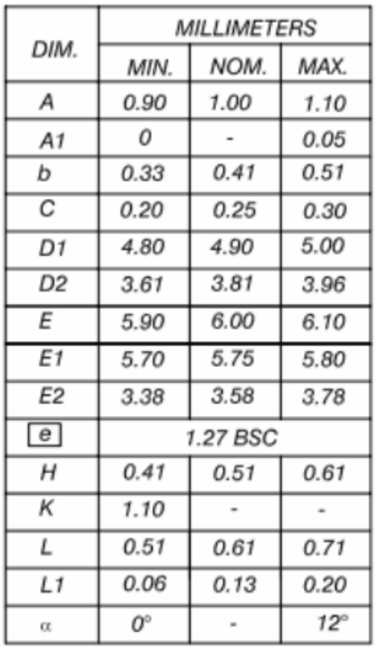


Figure 12, Max. transient thermal impedance

DFN5X6-8L Package Information





DIM.	MILLIMETERS		
	MIN.	NOM.	MAX.
A	0.90	1.00	1.10
A1	0	-	0.05
b	0.33	0.41	0.51
C	0.20	0.25	0.30
D1	4.80	4.90	5.00
D2	3.61	3.81	3.96
E	5.90	6.00	6.10
E1	5.70	5.75	5.80
E2	3.38	3.58	3.78
e	1.27 BSC		
H	0.41	0.51	0.61
K	1.10	-	-
L	0.51	0.61	0.71
L1	0.06	0.13	0.20
α	0°	-	12°

Land Pattern
(Only for Reference)