

General Description

The HSY021N12A uses SGT technology to provide excellent $R_{DS(on)}$, low gate charge and fast switching characteristics. This device is suitable for use as a wide variety of applications.

Product Summary

V_{DS}	120	V
$R_{DS(ON),TYP}$	1.8	m Ω
I_D	200	A

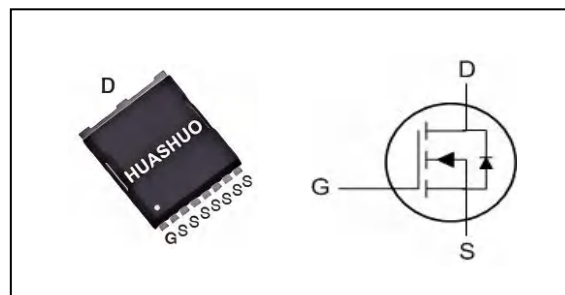
Features

- Low Gate Charge
- 100% UIS Tested, 100% DVDS Tested
- High Power and current handling capability
- Lead free product is acquired

Applications

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

TOLL Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage, $V_{GS}=0V$	120	V
V_{GS}	Gate-Source Voltage, $V_{DS}=0V$	± 20	V
$I_D@T_C=25^\circ C$	Continuous Drain Current	200	A
$I_D@T_C=100^\circ C$	Continuous Drain Current	132	A
I_{DM}	Pulsed Drain Current ¹	832	A
EAS	Single Pulse Avalanche Energy ²	2500	mJ
$P_D@T_C=25^\circ C$	Maximum Power Dissipation	278	W
$P_D@T_C=100^\circ C$	Maximum Power Dissipation	111	W
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ C$
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ C$

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JC}$	Thermal Resistance Junction-Case	---	0.45	$^\circ C/W$

N-Ch 120V Fast Switching MOSFETs
Electrical Characteristics (T_J=25 °C, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250uA	120	---	---	V
R _{DS(ON)}	Static Drain-Source On-Resistance ²	V _{GS} =10V, I _D =20A	---	1.8	2.1	mΩ
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250uA	2.0	2.8	4.0	V
I _{DSS}	Drain-Source Leakage Current	V _{DS} =120V, V _{GS} =0V, T _J =25°C	---	---	1	uA
		V _{DS} =120V, V _{GS} =0V, T _J =125°C	---	---	100	
I _{GSS}	Gate-Source Leakage Current	V _{GS} =±20V, V _{DS} =0V	---	---	±100	nA
g _{fs}	Forward Transconductance	V _{DS} =10V, I _D =20A	---	46	---	S
R _g	Gate resistance	V _{GS} =0V, V _{DS} =0V, f=1MHz	---	0.6	---	Ω
Q _g	Total Gate Charge (10V)	V _{DS} =60V, V _{GS} =10V, I _D =20A	---	204	---	nC
Q _{gs}	Gate-Source Charge		---	60	---	
Q _{gd}	Gate-Drain Charge		---	50	---	
T _{d(on)}	Turn-On Delay Time	V _{DS} =60V, V _{GS} =10V, R _G =6.0Ω, R _L =3Ω	---	40	---	ns
T _r	Rise Time		---	100	---	
T _{d(off)}	Turn-Off Delay Time		---	140	---	
T _f	Fall Time		---	108	---	
C _{iss}	Input Capacitance	V _{DS} =60V, V _{GS} =0V, f=1MHz	---	9860	---	pF
C _{oss}	Output Capacitance		---	2570	---	
C _{rss}	Reverse Transfer Capacitance		---	50	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I _{SD}	Source-Drain Current(Body Diode)	V _G =V _D =0V, Force Current	---	---	200	A
V _{SD}	Diode Forward Voltage ³	V _{GS} =0V, I _S =20A, T _J =25°C	---	---	1.2	V
t _{rr}	Reverse Recovery Time	I _F =20A, dI/dt=500A/μs,	---	55	---	nS
Q _{rr}	Reverse Recovery Charge	T _J =25°C	---	333	---	nC

Note :

1.Repetitive Rating : Plused width limited by maximum junction temperature.

2.EAS condition : T_J=25°C, V_{DD}=40V, V_G=10V, R_g=25Ω, L=0.5mH

3.Repetitive Rating : Plused width limited by maximum junction temperature.

Typical Characteristics

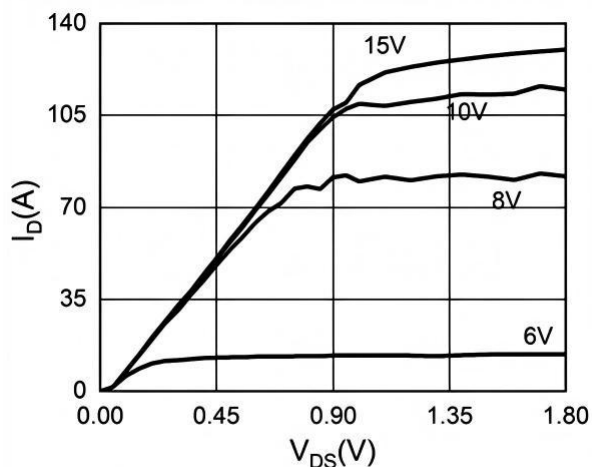


Figure 1. Output Characteristics

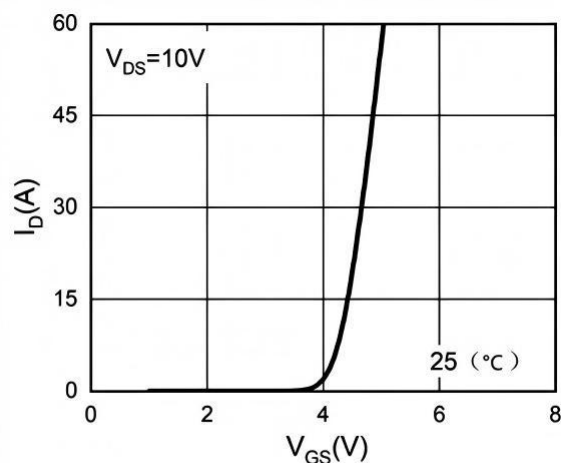


Figure 2. Transfer Characteristics

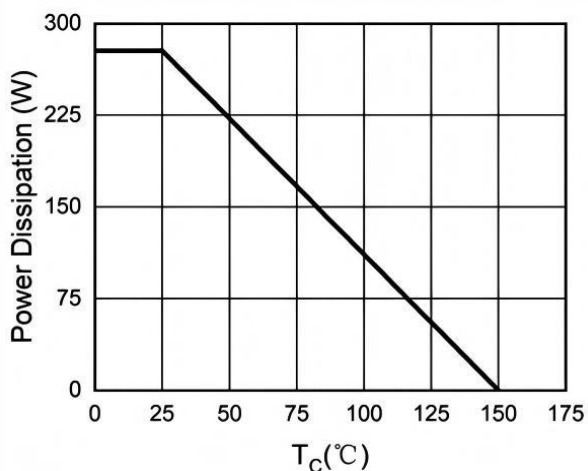


Figure 3. Power Dissipation

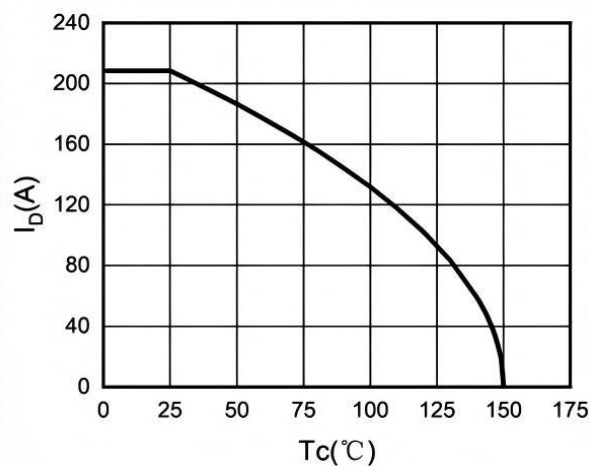


Figure 4. Drain Current

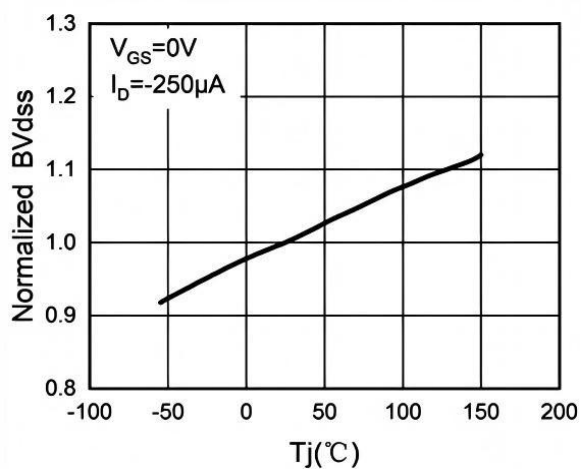


Figure 5. BV_{DS} vs Junction Temperature

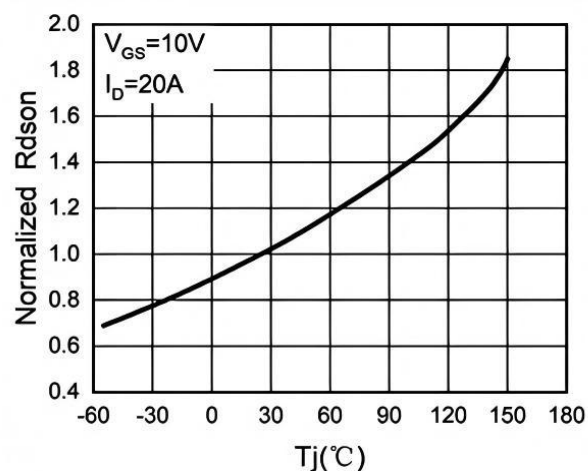


Figure 6. $R_{DS(ON)}$ vs Junction Temperature

N-Ch 120V Fast Switching MOSFETs

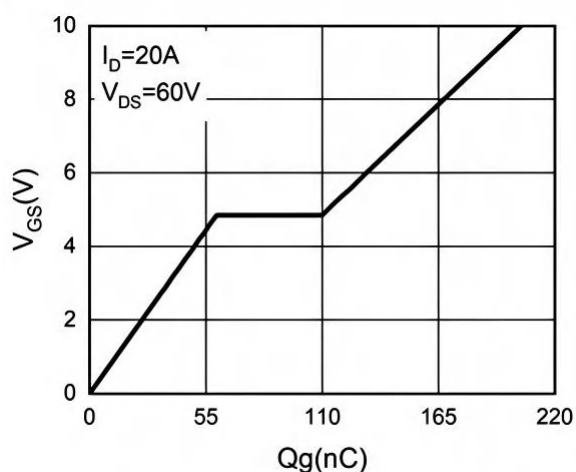


Figure 7. Gate Charge Waveforms

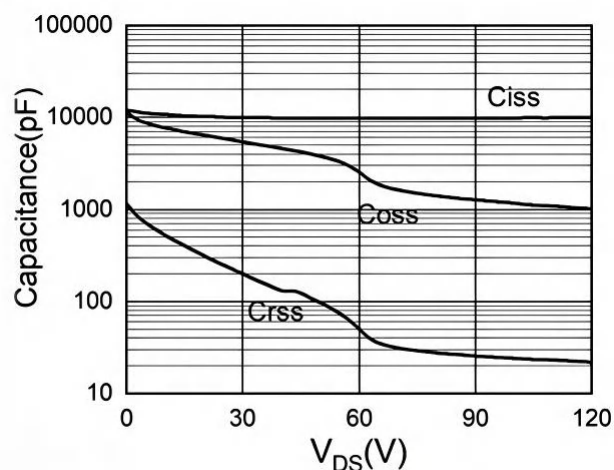


Figure 8. Capacitance

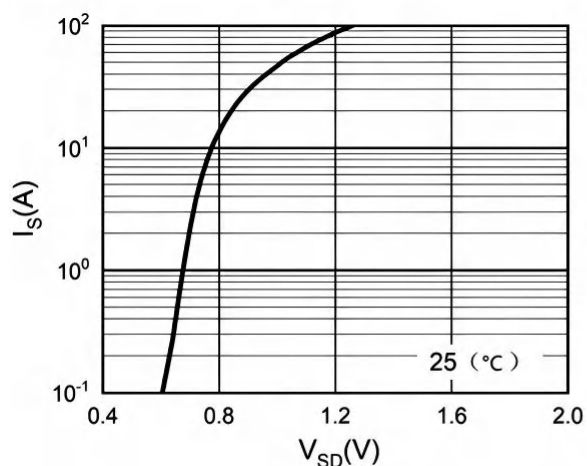


Figure 9. Body-Diode Characteristics

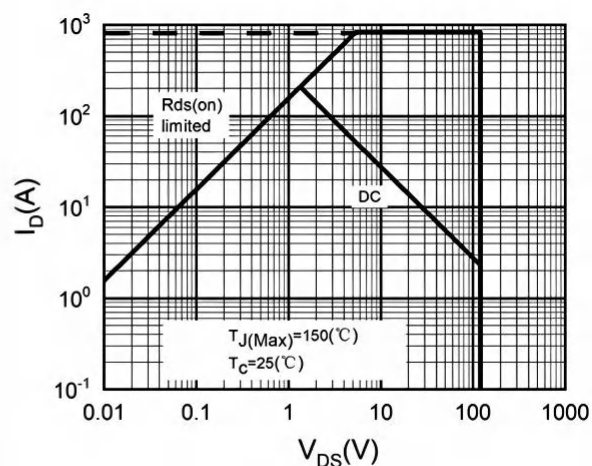
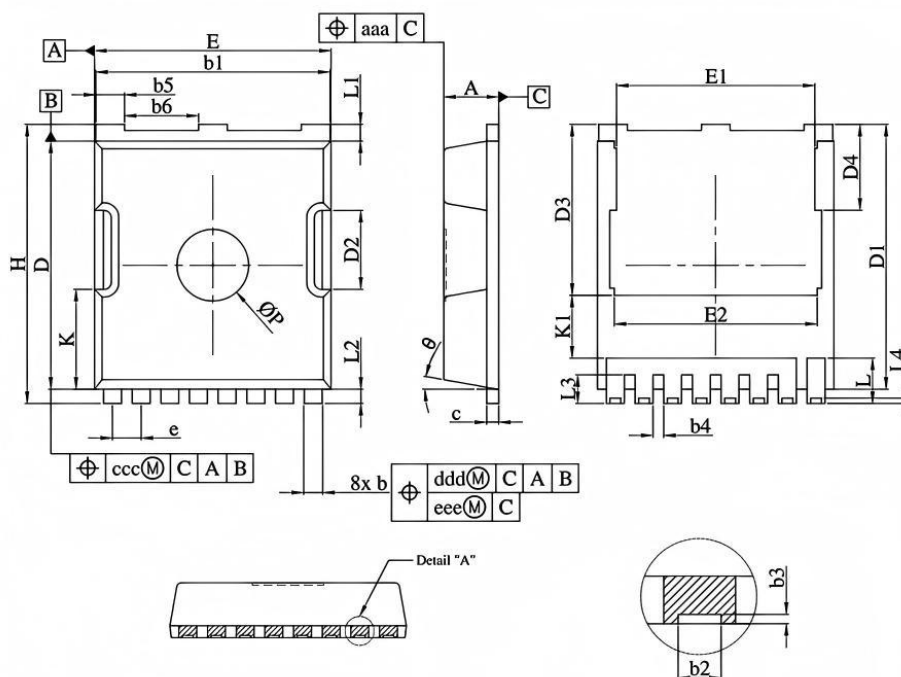


Figure 10. Maximum Safe Operating Area

Ordering Information

Part Number	Package code	Packaging
HSY021N12A	TOLL	2000/Tape&Reel

TOLL Package Outline



COMMON DIMENSIONS(MM)							
SYMBOL	MIN.	NOMINAL	MAX.	SYMBOL	MIN.	NOMINAL	MAX.
A	2.20	2.30	2.40	E1	8.20	8.30	8.40
b	0.70	0.80	0.90	E2	8.35	8.50	8.65
b1	9.70	9.80	9.90	H	11.50	11.68	11.85
b2	0.36	0.45	0.55	K	4.08	4.18	4.28
b3	0.05	0.100	0.35	K1	2.45	---	---
b4	0.30	0.40	0.50	L	1.60	1.90	2.10
b5	1.10	1.20	1.30	L1	0.50	0.70	0.90
b6	3.00	3.10	3.20	L2	0.50	0.60	0.70
C	0.40	0.50	0.60	L3	1.00	1.20	1.30
D	10.28	10.38	10.55	L4	0.13	0.23	0.33
D1	10.98	11.08	11.18	P	2.85	3.00	3.15
D2	3.20	3.30	3.40	θ	10°REF		
D3	7.00	7.15	7.30	aaa	0.20		
D4	3.44	3.59	3.74	ccC	0.20		
e	1.10	1.20	1.30	ddd	0.25		
E	9.80	9.90	10.00	eee	0.20		

HSY021N12A Marking:

