JASENCAN

JSBA78N10

Single N-Ch 100V Fast Switching MOSFETs

Features

- Super Low Gate Charge
- 100% EAS Guaranteed
- Green Device Available
- Excellent CdV/dt effect decline
- Advanced high cell density Trench technology

BVDSS		100	V
ID@VGS= 10V , TC=25℃		70	A
RDSON(MAX)	VGS = 10 V , ID = 20 A	10	mΩ
	VGS = 4.5 V , ID = 15 A	13	

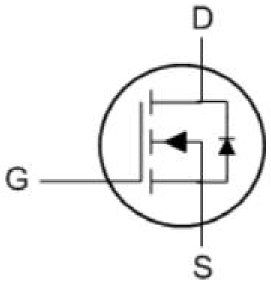
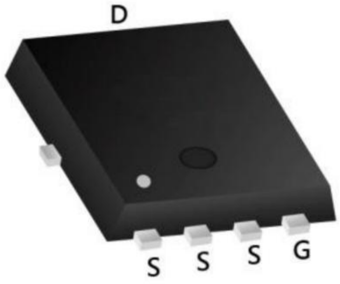
Application

- MB/VGA Vcore
- SMPS 2nd Synchronous Rectifier
- POL application
- BLDC Motor driver

Description

The JSBA78N10is the high cell density trenched N-Ch MOSFETs, which provide excellent RDSON and gate charge for most of the Synchronous Rectifier applications.

The JSBA78N10meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

Equivalent Circuit	**Outline**
	**PRPAK5×6** 

Package Marking and Ordering Information

Device Marking	Date Code	Device Package	Quantity
A078N10	YWWXXX	PRPAK5×6	5000 pcs

Thermal Characteristic

Symbol	Parameter	Value	Unit
$R_{\theta JA}$	Thermal Resistance Junction-Ambient [1]	20	℃/W
$R_{\theta JC}$	Thermal Resistance Junction-Case [1]	1.3	℃/W

Absolute Maximum Ratings

Symbol	Parameter	Rating	Unit
V_{DS}	Drain-Source Voltage	100	V
V_{GS}	Gate-Source Voltage	±20	V
I_D	Continuous Drain Current, V_{GS} @ 10V [1] (T_C=25℃)	70	A
	Continuous Drain Current, V_{GS} @ 10V [1] (T_C=100℃)	44	
	Continuous Drain Current, V_{GS} @ 10V [1] (T_A=25℃)	18	
	Continuous Drain Current, V_{GS} @ 10V [1] (T_A=70℃)	14.3	
I_{DM}	Pulsed Drain Current [2]	280	A
P_D	Total Power Dissipation [4] (Tc=25℃)	96	W
	Total Power Dissipation [4] (Tc=100℃)	38	
	Total Power Dissipation [4] (T_A=25℃)	6.25	
	Total Power Dissipation [4] (T_A=70℃)	4	
E_{AS}	Single Pulse Avalanche Energy [3]	196	mJ
I_{AS}	Avalanche Current	28	A
T_J,T_{STG}	Operating Junction and Storage Temperature Range	-55 To 150	℃

Electrical Characteristics (T_J=25℃ unless otherwise noted)

Static Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS} = 0 V , I_D = 250 μA	100			V
$R_{DS(ON)}$	Drain-Source On-State Resistance [2]	V_{GS} = 10 V , I_D = 20 A		7.8	10	mΩ
		V_{GS} = 4.5 V , I_D = 15 A		10	13	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS} = V_{DS} , I_D = 250 μA	1.2	1.6	2.2	V
I_{DSS}	Drain-Source Leakage Current (T_J=25℃)	V_{DS} = 100 V , V_{GS} = 0V			1	μA
	Drain-Source Leakage Current (T_J=55℃)	V_{DS} = 100 V , V_{GS} = 0V			5	
I_{GSS}	Gate-Body Leakage Current	V_{GS} = ±20 V , V_{DS} = 0V			±100	nA
gfs	Forward Transconductance	V_{DS} = 5 V , I_D = 15 A		27		S
R_g	Gate Resistance	V_{DS} =0V, V_{GS} = 0V, f=1MHz		1.4		Ω

Dynamic Characteristics						
Symbol	**Parameter**	**Conditions**	**Min**	**Typ**	**Max**	**Unit**
C_{iss}	Input Capacitance	V_{DS} = 40 V V_{GS} = 0 V f=1.0MHz		2433		pF
C_{oss}	Output Capacitance			631		pF
C_{rss}	Reverse Transfer Capacitance			27		pF
Switching Times						
Symbol	**Parameter**	**Conditions**	**Min**	**Typ**	**Max**	**Unit**
$t_{d(on)}$	Turn-On Delay Time	V_{DD} = 50 V V_{GS} = 10 V R_G = 6 Ω I_D = 10 A		10.9		nS
t_r	Turn-On Rise Time			16		nS
$t_{d(off)}$	Turn-Off Delay Time			40		nS
t_f	Turn-Off Fall Time			26		nS
Q_g	Total Gate Charge (10 V)	V_{DS} = 50 V V_{GS} = 10 V I_D = 12 A		26		nC
Q_{gs}	Gate-Source Charge			10		nC
Q_{gd}	Gate-Drain Charge			5.3		nC

Source-Drain Diode Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
I_S	Continuous Source Current [1,5]	V_G=V_D=0V, Force Current			70	A
V_{SD}	Diode Forward Voltage [2]	I_S= 20 A , V_{GS}=0V, T_J=25℃			1.2	V
t_{rr}	Reverse Recovery Time	I_F = 20 A , dI/dt = 100A/μs, T_J=25℃		50		nS
Q_{rr}	Reverse Recovery Charge			70		nC

Notes:

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 ≤ 300μs , Duty Cycle ≤ 2%.

3.The E_{AS} data shows Max. rating . The test condition is V_{DD} = 25V , V_{GS} = 10V , L = 0.5 mH , I_{AS} = 28 A.

4.The power dissipation is limited by 150℃ junction temperature.

5.The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

Typical Characteristics

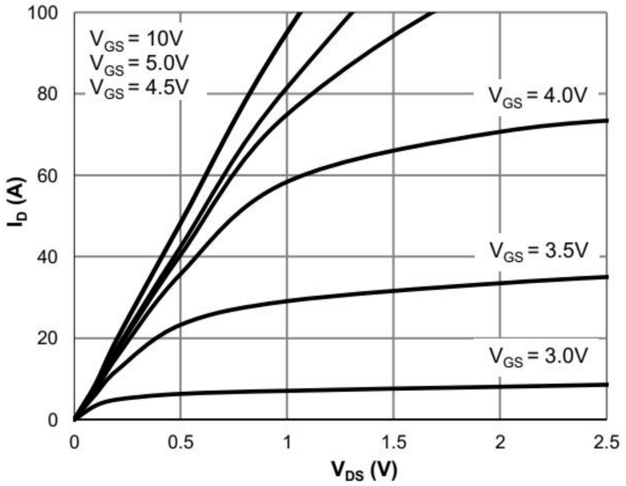


Fig.1 Typical Output Characteristics

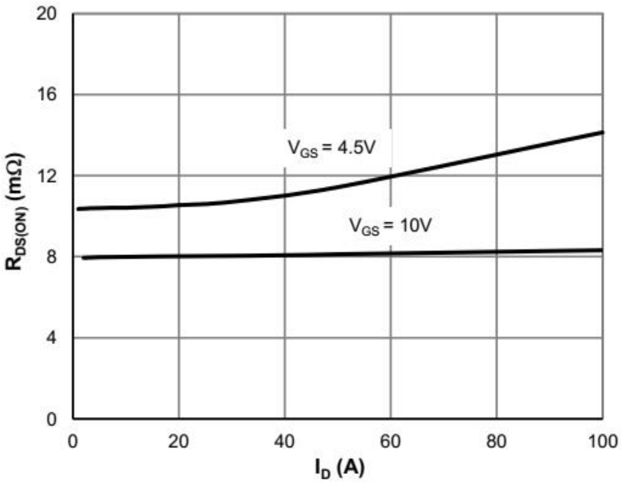


Fig.2 On-Resistance vs. Drain Current

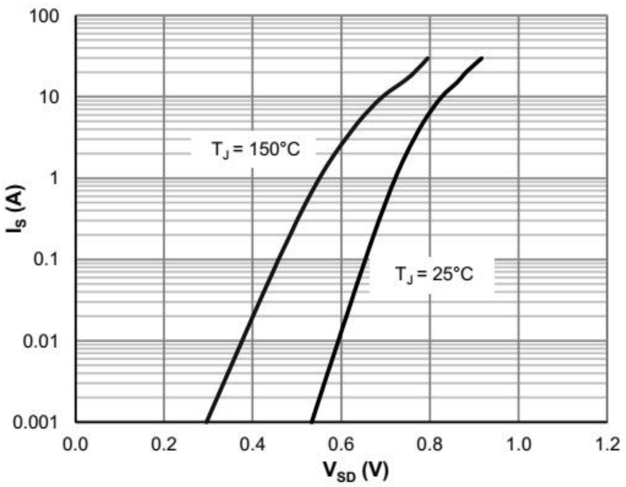


Fig.3 Forward Characteristics Of Reverse

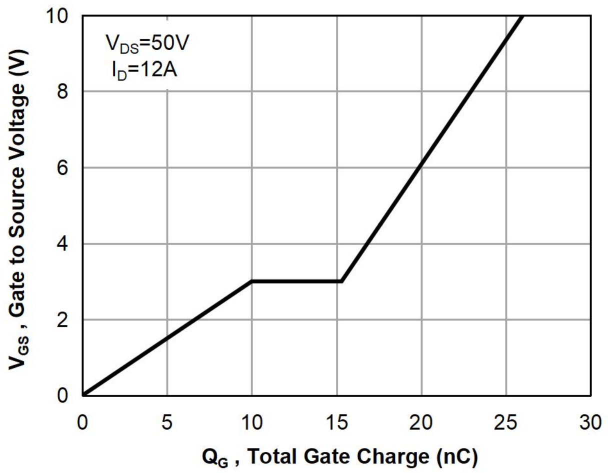


Fig.4 Gate-Charge Characteristics

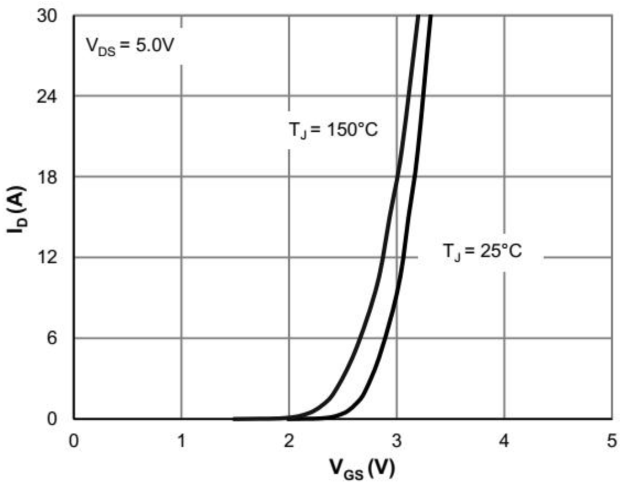


Fig.5 Transfer Characteristics

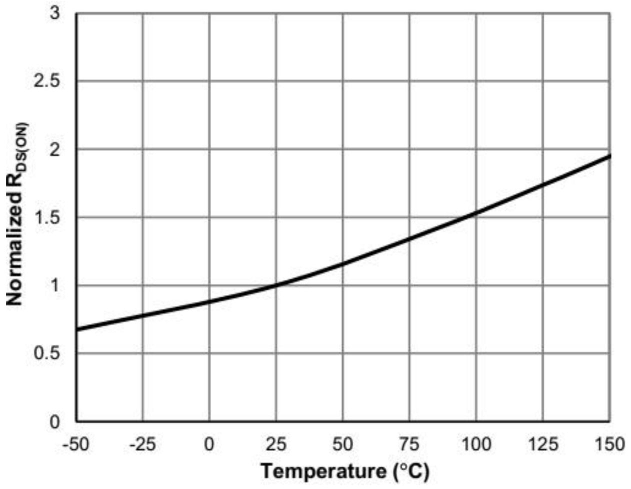


Fig.6 Normalized R_{DSON} vs. T_J

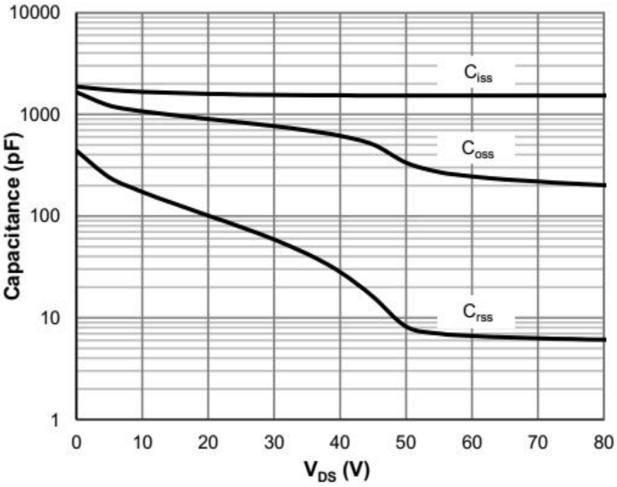


Fig.7 Capacitance

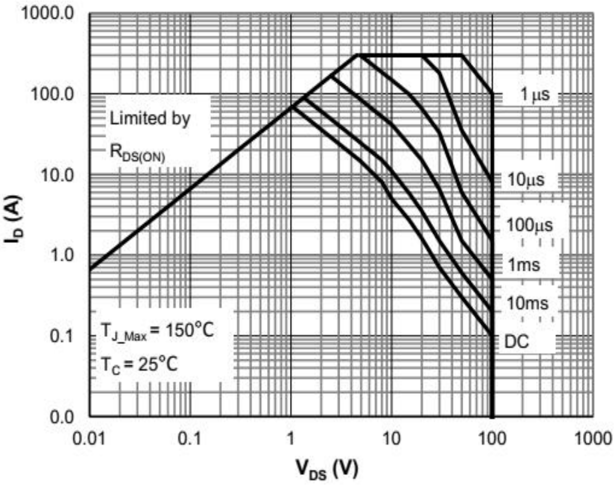


Fig.8 Safe Operating Area

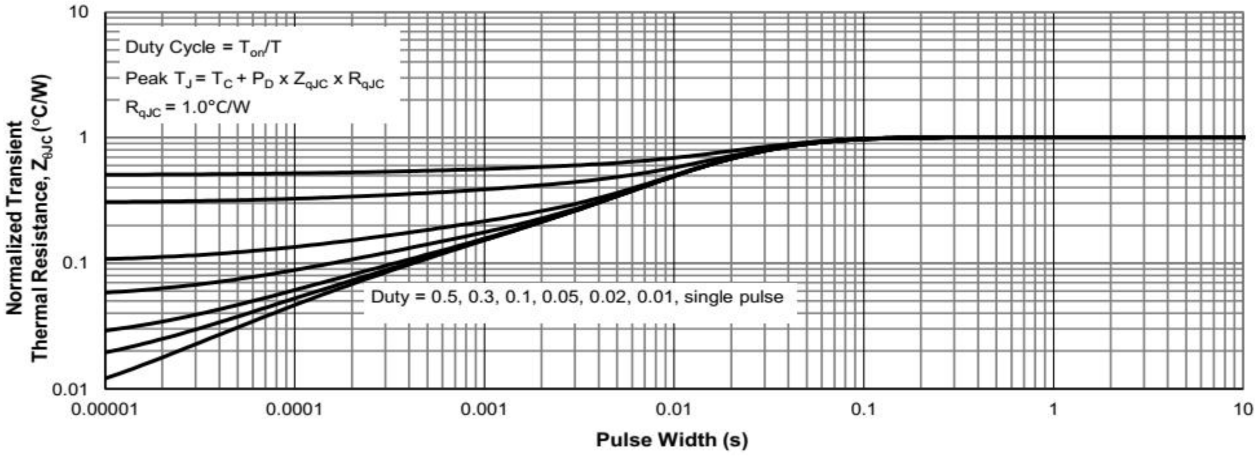


Fig.9 Normalized Maximum Transient Thermal Impedance

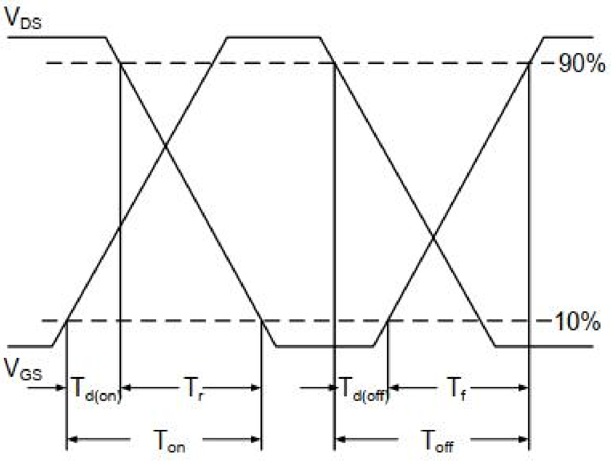


Fig.10 Switching Time Waveform

$$EAS=\frac{1}{2}L \times I_{AS}^{2} \times \frac{BV_{DSS}}{BV_{DSS}-V_{DD}}$$

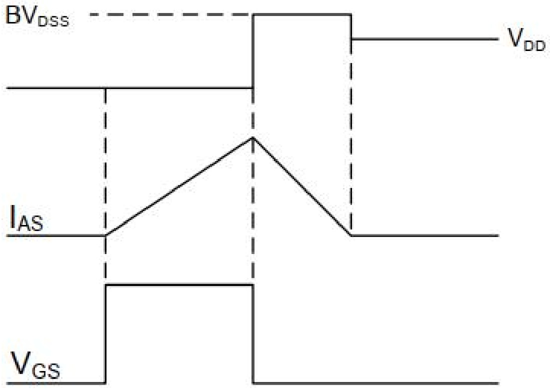
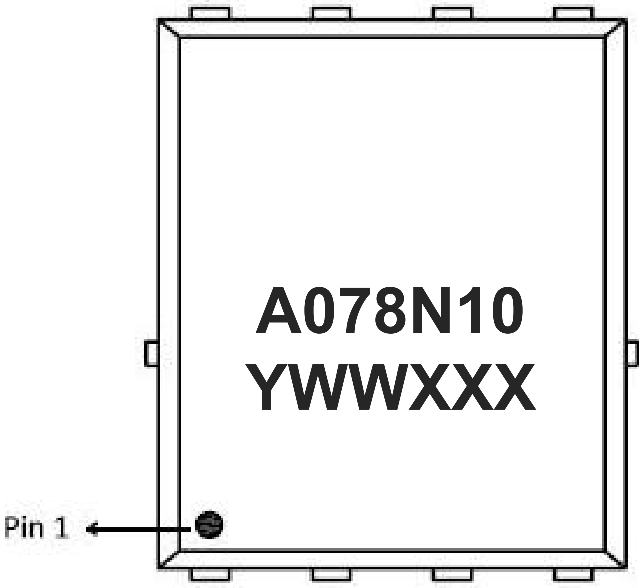


Fig.11 Unclamped Inductive Switching Waveform

Marking Information



1 nd line： **Device Package, Part Number, Channel and Version**

2 rd line： **Date Code [Y WW XX X]**

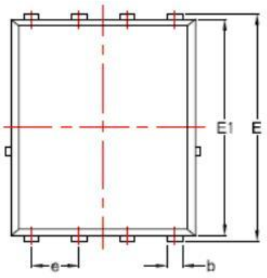
① **Y** : Year (2021=M, 2022=N……)

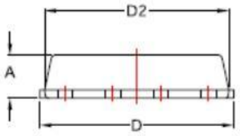
② **W W** : Week (01-53)

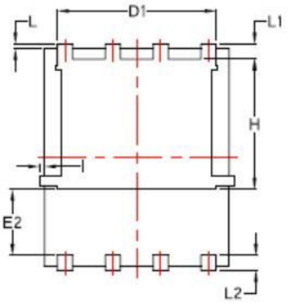
③ **X X** : Serial Number (01-99, AA-ZZ)

④ **X** : Factory Code (A-Z)

PRPAK5×6 Package Outline







SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	0.90	1.20	0.0354	0.0474
b	0.30	0.51	0.0118	0.0200
c	0.60	1.046	0.0236	0.0412
D1	4.11	4.31	0.1618	0.1697
D2	4.80	5.20	0.1890	0.2047
E	5.90	6.35	0.2323	0.2500
E1	5.65	6.06	0.2224	0.2386
E2	1.10	-	0.0433	-
e	1.27 BSC		0.05 BSC	
L	0.05	0.25	0.0020	0.0098
L1	0.38	0.61	0.0150	0.0240
L2	0.30	0.71	0.0118	0.0280
H	3.30	3.92	0.1300	0.1543
I	-	0.18	-	0.0070