

40V 170A N-Channel Enhancement Mode Power MOSFET

Features

- $R_{DS(on)} \leq 1.8m\Omega$ @ $V_{gs}=10V$
- Advanced SGT process
- Excellent $R_{DS(on)}$ and Low Gate Charge
- Lead free product is acquired

Application

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

SYMBOL



ASSEMBLY MESSAGE

Product Name	Package	Packaging
BXS018N04C	PDFN5*6	Reel

ABSOLUTE MAXIMUM RATINGS ($T_C=25^\circ C$ unless otherwise noted)

Parameter	Symbol	Rating	Unit	
		PDFN5*6		
Drain-Source Voltage	V_{DSS}	40	V	
Drain Current	I_D	Continuous ($T_C = 25^\circ C$)	170	A
		Continuous ($T_C = 100^\circ C$)	141	A
Drain Current	I_{DM}	Pulsed (Note1)	340	A
Single Pulsed Avalanche Energy	EAS	180	mJ	
Gate-Source Voltage	V_{GSS}	± 20	V	
Power Dissipation	$T_C = 25^\circ C$	P_D	96	W
Maximum Junction Temperature	T_J	150	$^\circ C$	
Storage Temperature Range	T_{STG}	-55 to 150	$^\circ C$	

Note: 1. Repetitive Rating: Pulse width limited by maximum junction temperature

THERMAL CHARACTERISTICS

Parameter	Symbol	Max.	Unit
		PDFN5*6	
Thermal Resistance, Junction to Case	$R_{\theta JC}$	1.3	$^\circ C / W$

ELECTRICAL CHARACTERISTICS ($T_J=25^{\circ}\text{C}$, unless otherwise Noted)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	40			V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=40V, V_{GS}=0V$			1	μA
Gate-Body Leakage Current, Forward	I_{GSS}	$V_{GS}=20V$			100	nA
Gate-Body Leakage Current, Reverse		$V_{GS}=-20V$			-100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1.0	1.6	2.5	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=20A$		1.31	1.8	$m\Omega$
		$V_{GS}=4.5V, I_D=10A$		1.45	2.5	$m\Omega$
DYNAMIC PARAMETERS						
Input Capacitance	C_{ISS}	$V_{DS}=20V, V_{GS}=0V,$ $f=1.0MHz$		6350		pF
Output Capacitance	C_{OSS}			1126		pF
Reverse Transfer Capacitance	C_{RSS}			39.8		pF
SWITCHING PARAMETERS						
Turn-ON Delay Time	$t_{D(ON)}$	$V_{DD}=20V, I_D=20A, V_{GS}$ $= 10V, R_G=3\Omega$		16		ns
Turn-ON Rise Time	t_R			8		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			40		ns
Turn-OFF Fall-Time	t_F			60		ns
Total Gate Charge(Note2)	Q_G	$V_{DS}=20V, V_{GS}=10V,$ $I_D=20A$		89		nC
Gate Source Charge	Q_{GS}			14		nC
Gate Drain Charge	Q_{GD}			8		nC
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Drain-Source Diode Forward Voltage	V_{SD}	$I_S=20A, V_{GS}=0V$			1.4	V
Diode Continuous Forward Current	I_S				85	A
Maximum Pulsed Drain to Source Diode Forward Current	I_{SM}				340	A

Note: 2. Essentially independent of operating temperature

TYPICAL CHARACTERISTICS

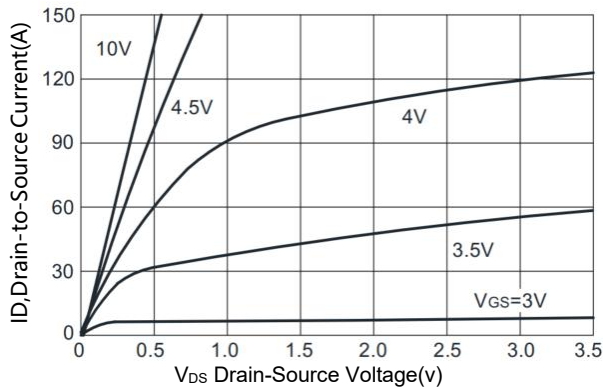


Figure1. Typical Output Characteristics

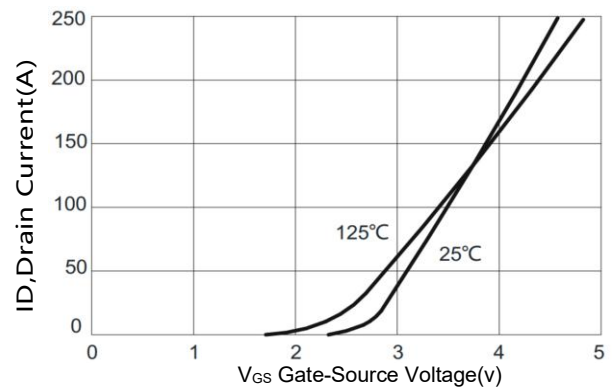


Figure2. Typical Transfer Characteristics

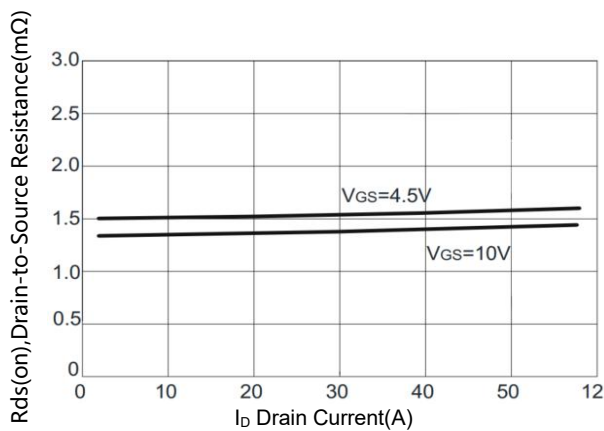


Figure3. On-Resistance versus Drain Current

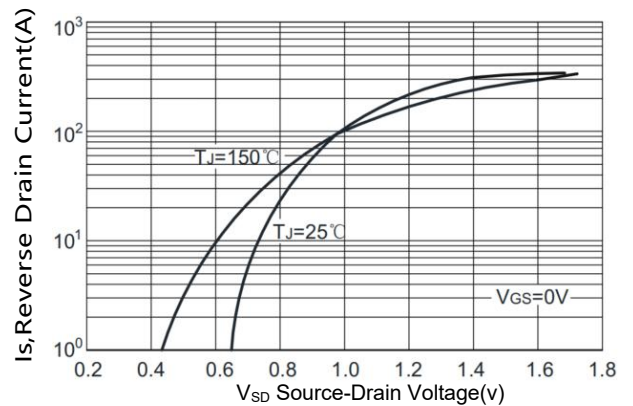


Figure4. Diode forward voltage versus Current

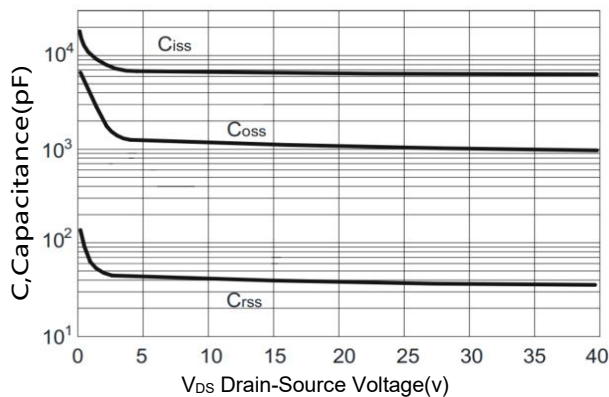


Figure5. Typical Capacitance versus VDS

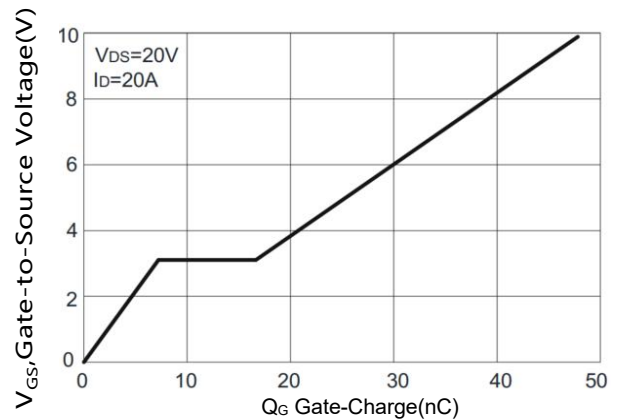


Figure6. Typical Gate Charge versus VGS

TYPICAL CHARACTERISTICS(Cont.)

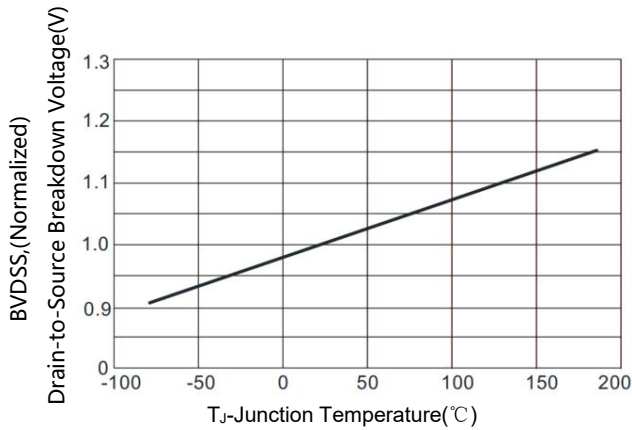


Figure7. BV_{DSS} Variation with Temperature

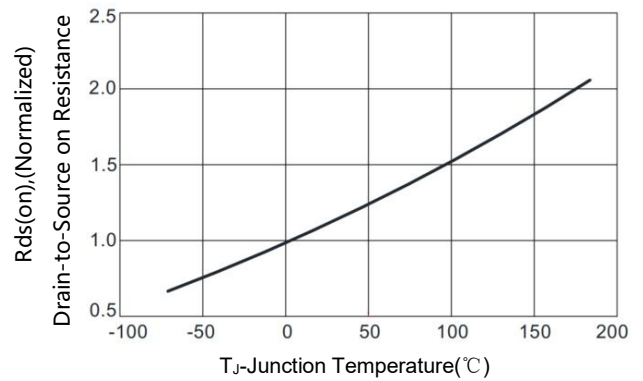


Figure8. On-Resistance Variation with Temperature

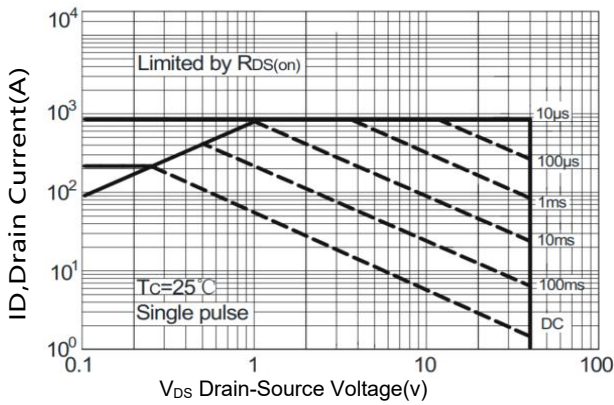


Figure9. Maximum Safe Operating Area

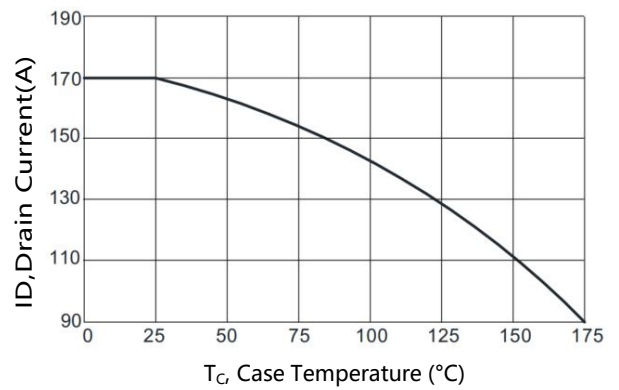
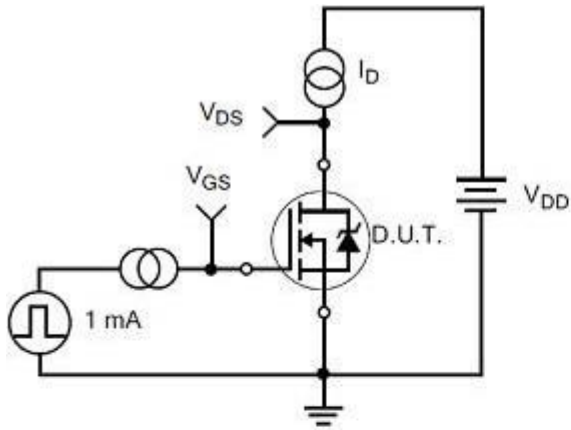
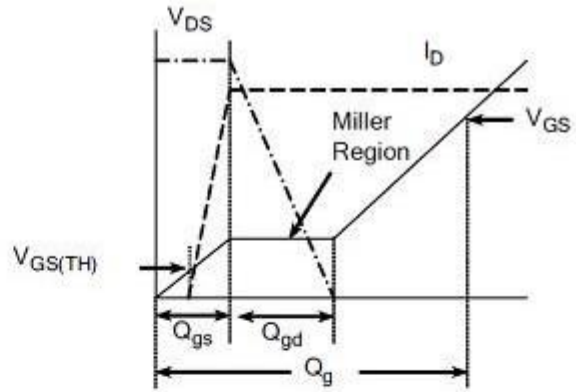


Figure10. Maximum Continuous Drain Current versus Case Temperature

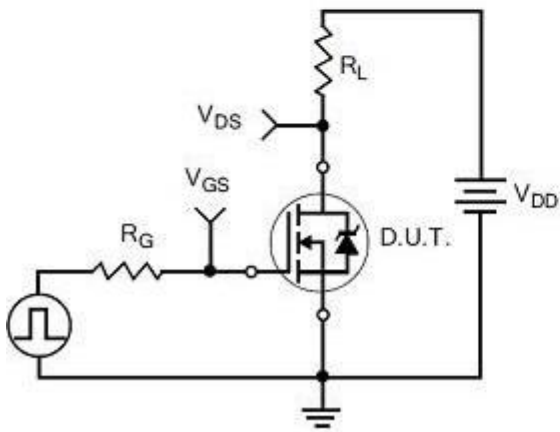
TEST CIRCUITS AND WAVEFORMS



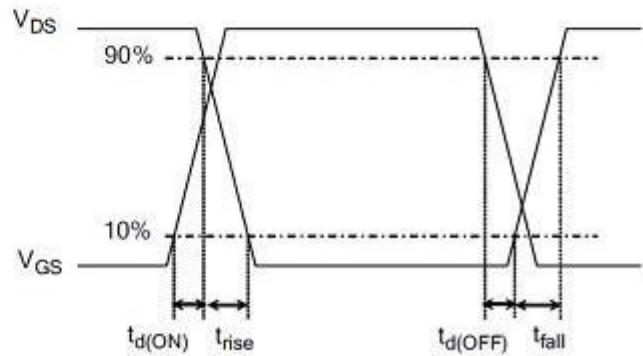
Gate Charge Test Circuit



Gate Charge Waveform

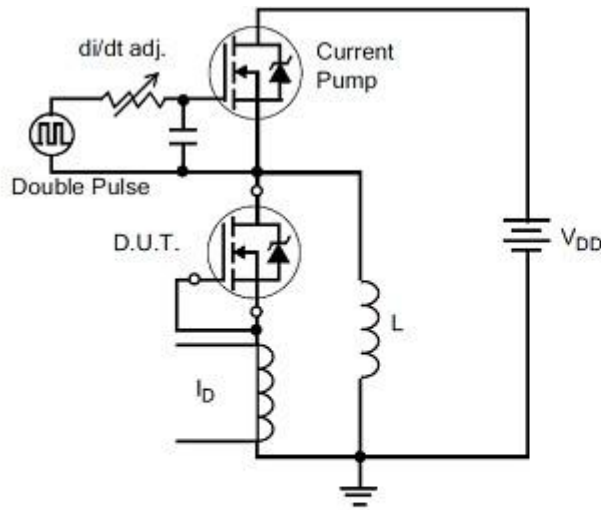


Resistive Switching Test Circuit

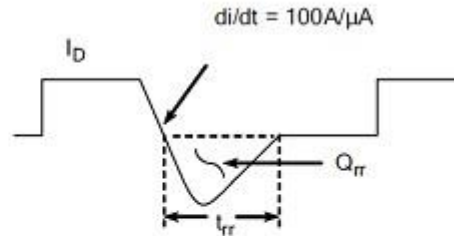


Resistive Switching Waveforms

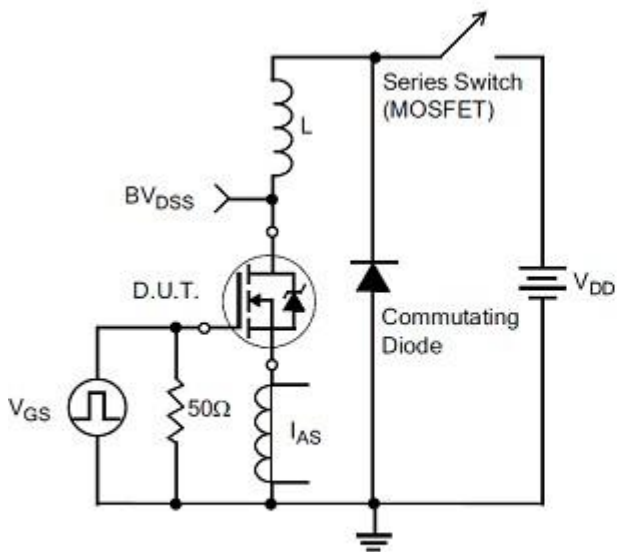
TEST CIRCUITS AND WAVEFORMS(Cont.)



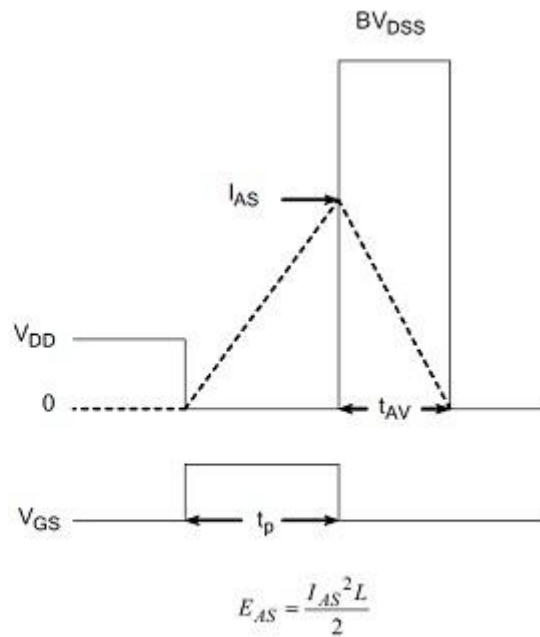
Diode Reverse Recovery Test Circuit



Diode Reverse Recovery Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

Revision history**Document revision history**

Date	Revision	Changes
26-Nov-2021	1.0	First release

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