



BRT30N70P1

N-channel Enhancement Mode Power MOSFET

芯天下技术股份有限公司

XTX Technology Inc.

Tel: (+86 755) 28229862

Fax: (+86 755) 28229847

Web Site: <http://www.xtxtech.com/>

Technical Contact: fae@xtxtech.com

* Information furnished is believed to be accurate and reliable. However, XTX Technology Inc. assumes no responsibility for the consequences of use of such information or for any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent rights of XTX Technology Inc. Specifications mentioned in this publication are subjected to change without notice. This publication supersedes and replaces all information previously supplied. XTX Technology Inc. products are not authorized for use as critical components in life support devices or systems without express written approval of XTX Technology Inc. The XTX logo is a registered trademark of XTX Technology Inc. All other names are the property of their respective own.

FEATURES

- ◆ 30V, 70A
- ◆ $R_{DS(ON)} < 6.0m\Omega @ V_{GS} = 10V$
- ◆ $R_{DS(ON)} < 9.5m\Omega @ V_{GS} = 4.5V$
- ◆ Advanced Trench Technology
- ◆ Excellent $R_{DS(ON)}$ and Low Gate Charge
- ◆ Lead Free

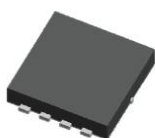
APPLICATIONS

- ◆ Load Switch
- ◆ PWM Application
- ◆ Power Management

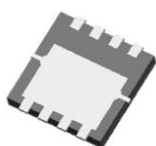


PDFN3.3*3.3-8L

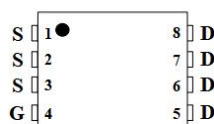
Top View



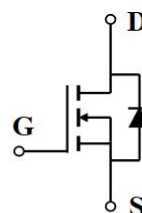
Bottom View



Pin Configuration
Top View



Schematic Diagram



PACKAGE MARKING AND ORDERING INFORMATION

OPN	Marking	Package	Quantity
BRT30N70P1	T30N70	PDFN3.3*3.3-8L	5000pcs/Reel

ABSOLUTE MAXIMUM RATINGS

Symbol	Definition		Ratings	Unit
V_{DS}	Drain-to-Source Voltage		30	V
V_{GS}	Gate-to-Source Voltage		± 20	V
I_D	Continuous Drain Current	$T_C = 25^\circ C$	70	A
		$T_C = 100^\circ C$	45	A
I_{DM}	Pulsed Drain Current ⁽¹⁾		280	A
E_{AS}	Single Pulsed Avalanche Energy ⁽²⁾		81	mJ
P_D	Power Dissipation, $T_C = 25^\circ C$		50	W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient ⁽³⁾		31	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance, Junction to Case		2.5	$^\circ C/W$
T_J, T_{STG}	Junction & Storage Temperature Range		$-55 \sim +150$	$^\circ C$

ELECTRICAL CHARACTERISTICS (All test condition is $T_J=25^{\circ}\text{C}$, unless otherwise noted)

Symbol	Parameter	Condition	Min	Typ	Max	Unit
Off Characteristics						
V _{(BR)DSS}	Drain-Source Breakdown Voltage	I _D = 250μA, V _{GS} = 0V	30	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 30V, V _{GS} = 0V	-	-	1	uA
I _{GSS}	Gate-Body Leakage Current	V _{DS} = 0V, V _{GS} = ±20V	-	-	±100	nA
On Characteristics						
V _{GS(TH)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = 250uA	1.0	1.5	2.5	V
R _{DS(ON)}	Static Drain-Source ON-Resistance ⁽⁴⁾	V _{GS} = 10V, I _D = 30A		4.0	6.0	mΩ
		V _{GS} = 4.5V, I _D = 20A		5.6	9.5	mΩ
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{GS} = 0V, V _{DS} = 15V, f = 1MHz	-	1899	-	pF
C _{oss}	Output Capacitance		-	221	-	pF
C _{rss}	Reverse Transfer Capacitance		-	191	-	pF
Q _g	Total Gate Charge	V _{GS} = 0 to 10V V _{DS} = 15V, I _D = 30A	-	34	-	nC
Q _{gs}	Gate Source Charge		-	6.5	-	nC
Q _{gd}	Gate Drain("Miller") Charge		-	7.5	-	nC
Switching Characteristics						
t _{d(on)}	Turn-On Delay Time	V _{GS} = 10V, V _{DD} = 15V I _D = 30A, R _{GEN} = 3Ω	-	7	-	ns
t _r	Turn-On Rise Time		-	14	-	ns
t _{d(off)}	Turn-Off Delay Time		-	34	-	ns
t _f	Turn-Off Fall Time		-	11	-	ns
Drain-Source Diode Characteristics						
I _S	Continuous Source Current		-	-	70	A
V _{SD}	Forward on voltage	V _{GS} = 0V, I _S = 30A	-	-	1.2	V
T _{rr}	Reverse Recovery Time	I _F = 20A, di/dt = 100A/us	-	10	-	ns
Q _{rr}	Reverse Recovery Charge		-	1.7	-	nC

Notes:

1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.
2. E_{AS} condition: Starting $T_J=25^{\circ}\text{C}$, $V_{DD}=15\text{V}$, $V_G=10\text{V}$, $R_G=25\Omega$, $L=0.5\text{mH}$, $I_{AS}=18\text{A}$
3. $R_{\theta JA}$ is measured with the device mounted on a 1 inch² pad of 2oz copper FR4 PCB
4. Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 0.5\%$.

TYPICAL PERFORMANCE CHARACTERISTICS

Figure 1: Output Characteristics

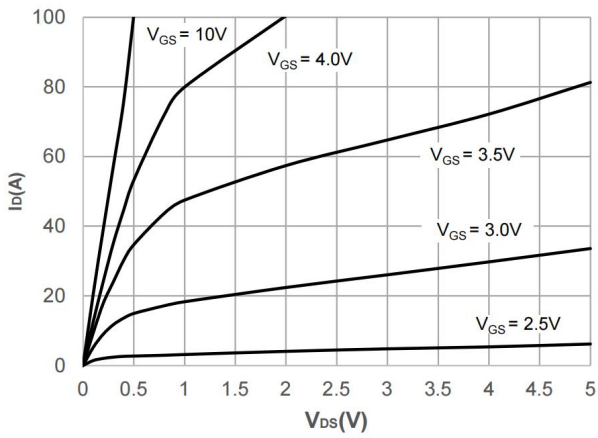


Figure 2: Typical Transfer Characteristics

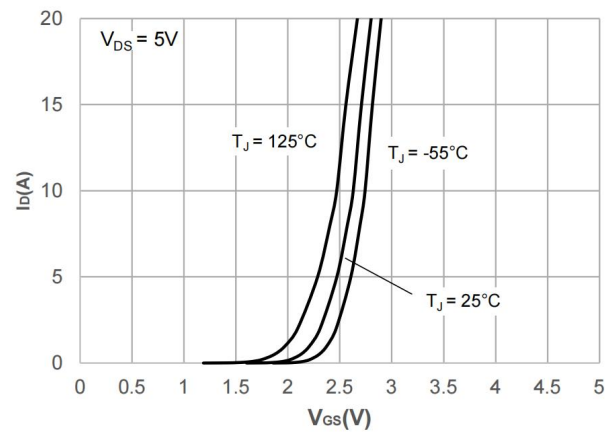


Figure 3: On-resistance vs. Drain Current

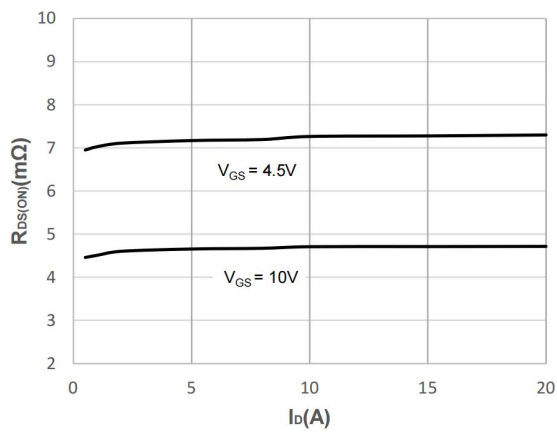


Figure 4: Body Diode Characteristics

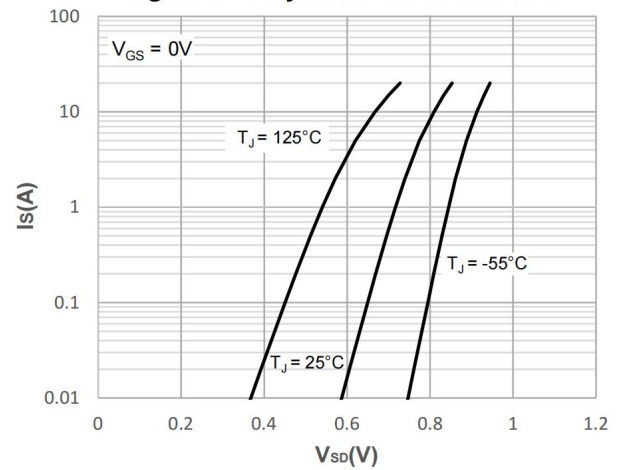


Figure 5: Gate Charge Characteristics

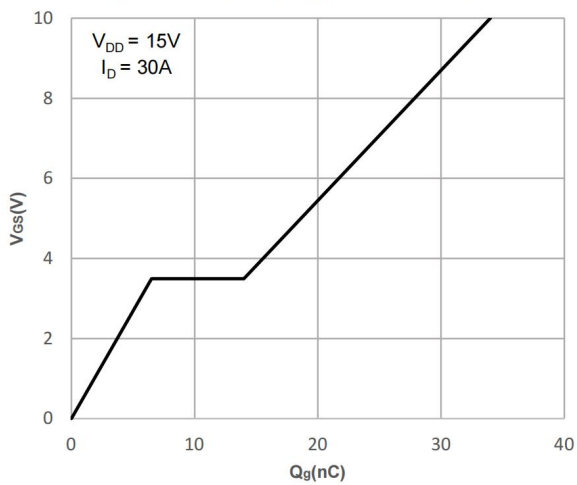
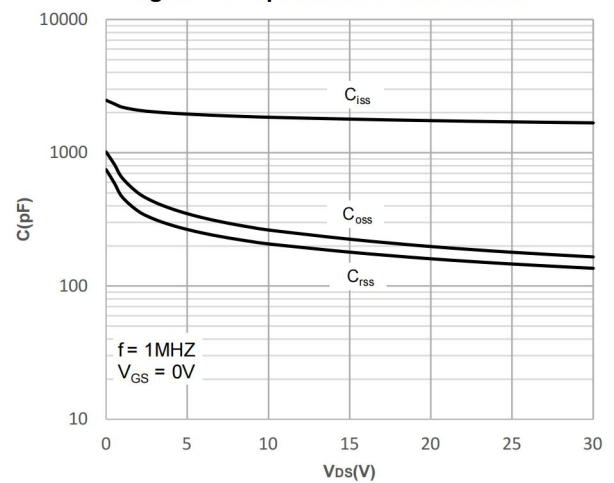


Figure 6: Capacitance Characteristics



TYPICAL PERFORMANCE CHARACTERISTICS

Figure 7: Normalized Breakdown voltage vs. Junction Temperature

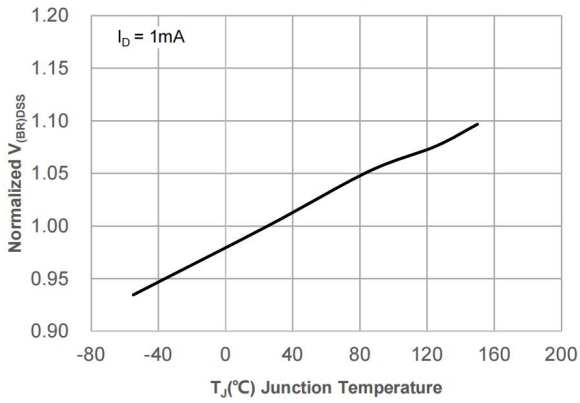


Figure 8: Normalized on Resistance vs. Junction Temperature

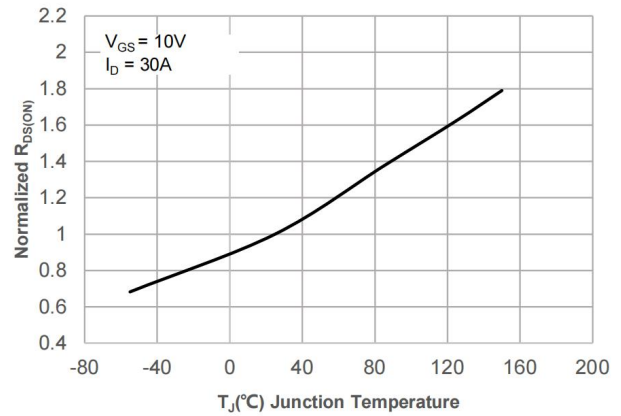


Figure 9: Maximum Safe Operating Area

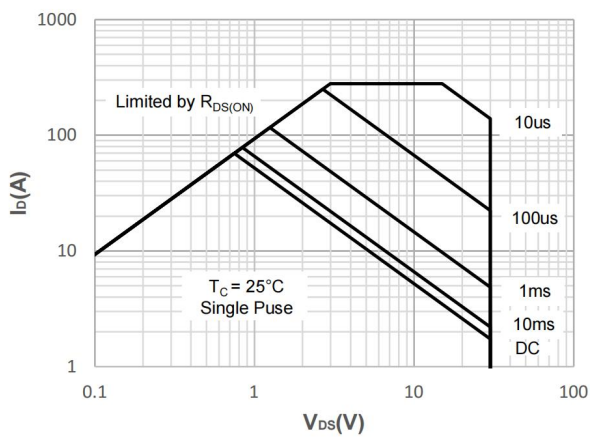


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

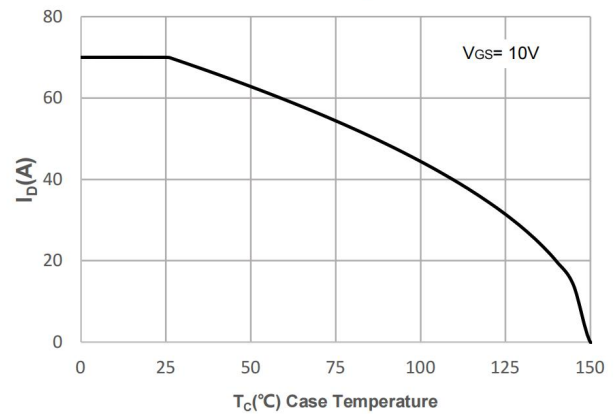


Figure 11: Normalized Maximum Transient Thermal Impedance

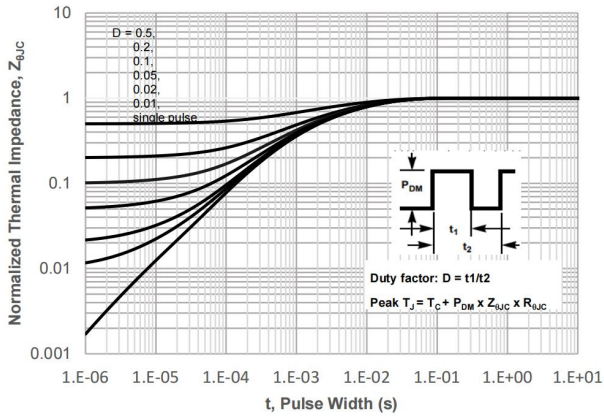
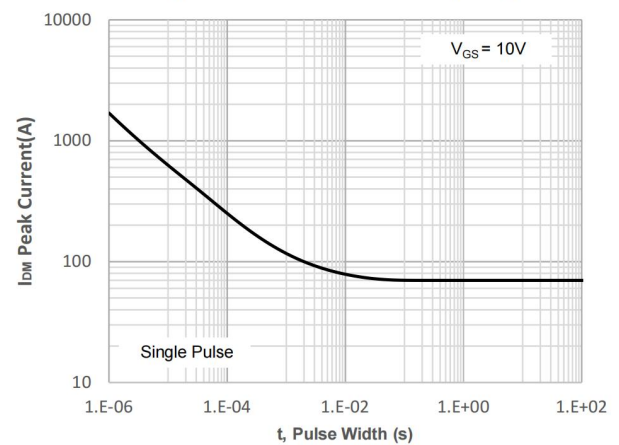


Figure 12: Peak Current Capacity



TEST CIRCUIT

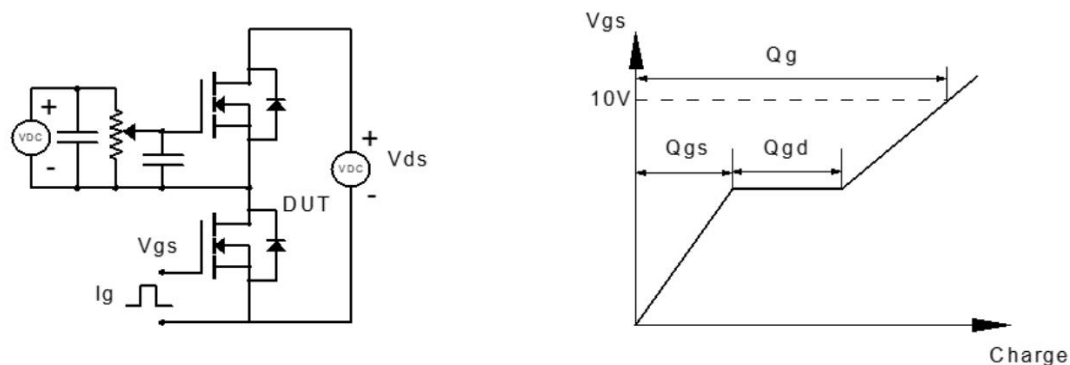


Figure 13: Gate Charge Test Circuit & Waveform

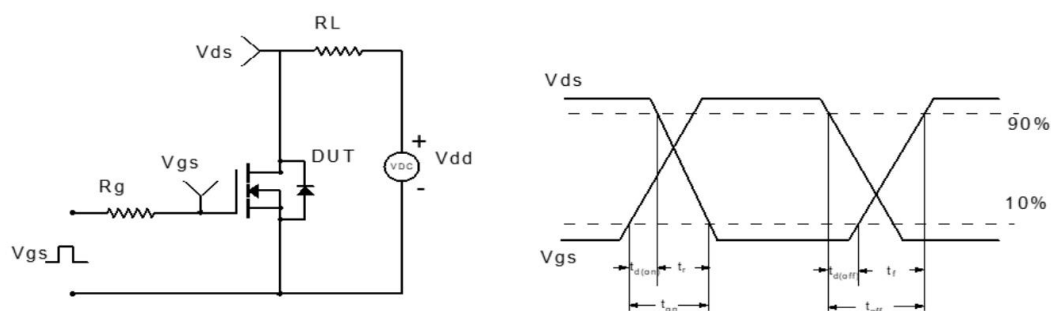


Figure 14: Resistive Switching Test Circuit & Waveform

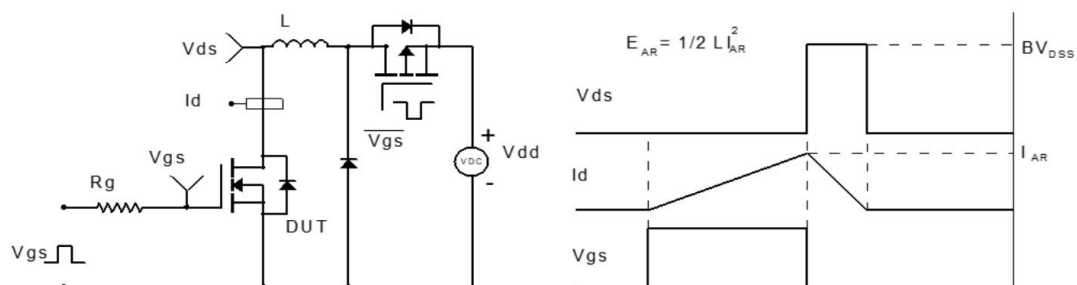


Figure 15: Unclamped Inductive Switching Test Circuit & Waveform

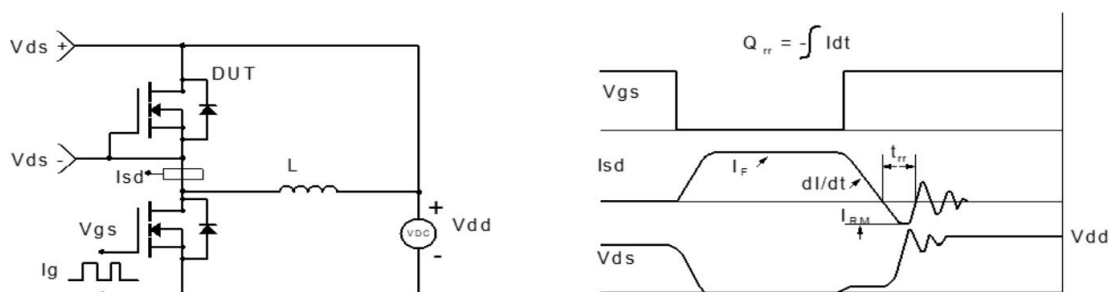


Figure 16: Diode Recovery Test Circuit & Waveform

MARKING INFORMATION



1st Line: XTX Logo

2nd Line: Part Number (T30N70)

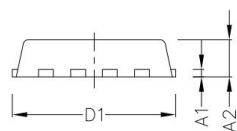
3rd Line: Date Code (XXXX)

XX: Year

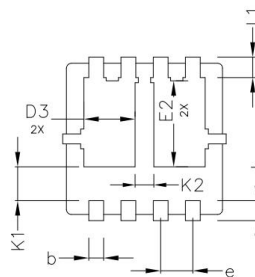
XX: Week (01 to 53)

Year	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Code	21	22	23	24	25	26	27	28	29	30	31	32	33

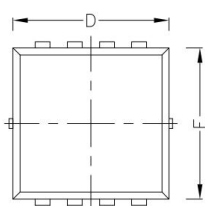
DETAIL PACKAGE OUTLINE DRAWING (PDFN3.3*3.3-8L)



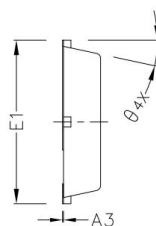
SIDE VIEW



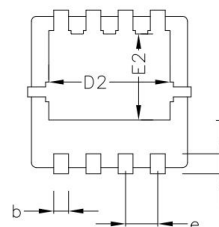
BOTTOM VIEW
OPTION 2



TOP VIEW



SIDE VIEW



BOTTOM VIEW
OPTION 1

SYMBOL	MILLIMETERS		
	MIN	NOM	MAX
A1	0.152 BSC		
A2	0.650	0.750	0.850
A3	0.005	-	0.020
b	0.250	0.300	0.350
D	3.050	3.150	3.250
D1	3.200	3.300	3.400
D2	2.350	2.450	2.550
D3	0.935	1.035	1.135
E1	3.150	3.300	3.450
E	2.950	3.050	3.150
E2	1.635	1.735	1.835
e	0.650 TYPE		
L	0.300	0.400	0.500
θ	12° TYPE		
K1	0.680 REF		
K2	0.380 REF		
L1	0.410 REF		

REVISION HISTORY

Number	Description
Rev 1.0	BRT30N70P1 datasheet release