

# MJ N-Channel Enhancement Mode Power MOSFET

## Description

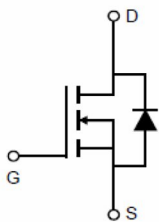
The MJ30H11BG uses advanced trench technology and design to provide excellent  $R_{DS(ON)}$  with low gate charge. It can be used in a wide variety of applications.

## General Features

- ◆  $V_{DS}=30V, I_D=110A$   
 $R_{DS(ON)}<2.3m\Omega$  (typical) @  $V_{GS}=10V$   
 $R_{DS(ON)}<3.3m\Omega$  (typical) @  $V_{GS}=4.5V$
- ◆ Excellent gate charge x  $R_{DS(on)}$  product(FOM)
- ◆ Very low on-resistance  $R_{DS(on)}$
- ◆ 150 °C operating temperature
- ◆ Pb-free lead plating
- ◆ 100% UIS tested

## Application

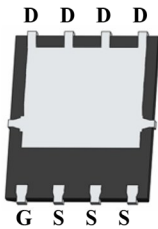
- ◆ DC/DC Converter
- ◆ Ideal for high-frequency switching and synchronous rectification



Schematic diagram



Top View



Bottom View

100% UIS TESTED! 100%  $\Delta V_{ds}$  TESTED!

## Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
MJ30H11BG	MJ30H11BG	DFN 5X6 -8L	-	-	-

## Absolute Maximum Ratings (Tc =25 °Cunless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	$V_{DS}$	30	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Drain Current-Continuous	$I_D$	110	A
Drain Current-Continuous( $T_c =100^{\circ}C$ )	$I_{D(100^{\circ}C)}$	77.8	A
Pulsed Drain Current	$I_{DM}$	440	A
Maximum Power Dissipation	$P_D$	68	W
Single pulse avalanche energy <sup>(Note 5)</sup>	$E_{AS}$	350	mJ
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 To 150	$^{\circ}C$

## Thermal Characteristic

Thermal Resistance,Junction-to-Case <sup>(Note 2)</sup>	$R_{\theta JC}$	1.83	$^{\circ}C/W$
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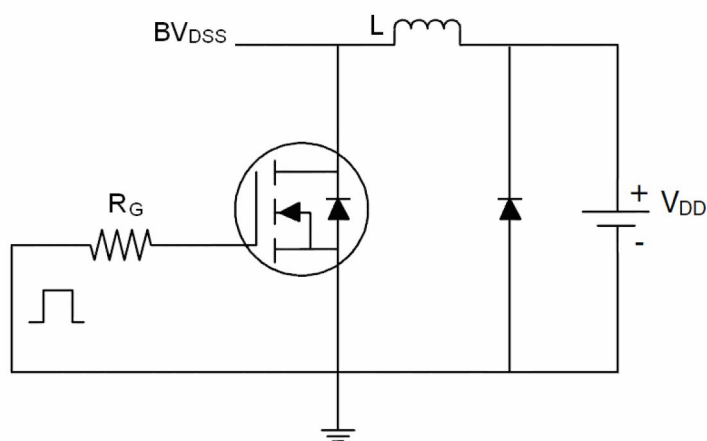
Electrical Characteristics (T<sub>A</sub> =25℃unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V I <sub>D</sub> =250μA	30	-	-	V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =30V,V <sub>GS</sub> =0V	-	-	1	μA
Gate-Body Leakage Current	I <sub>GSS</sub>	V <sub>DS</sub> =±20V,V <sub>DS</sub> =0V	-	-	±100	nA
On Characteristics <sup>(Note 3)</sup>						
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> ,I <sub>D</sub> =250μA	1	1.6	2.5	V
Drain-Source On-State Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =20A	-	2.3	3.0	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =20A	-	3.3	4.1	mΩ
Forward Transconductance	g <sub>FS</sub>	V <sub>DS</sub> =5V,I <sub>D</sub> =20A	50	-	-	S
Dynamic Characteristics <sup>(Note 4)</sup>						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =15V,V <sub>GS</sub> =0V, F=1.0MHz	-	3009	-	PF
Output Capacitance	C <sub>oss</sub>		-	451	-	PF
Reverse Transfer Capacitance	C <sub>rss</sub>		-	403	-	PF
Switching Characteristics <sup>(Note 4)</sup>						
Turn-on Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> =15V,I <sub>D</sub> =20A V <sub>GS</sub> =4.5V,R <sub>GEN</sub> =1.8Ω	-	20	-	nS
Turn-on Rise Time	t <sub>r</sub>		-	15	-	nS
Turn-Off Delay Time	t <sub>d(off)</sub>		-	60	-	nS
Turn-Off Fall Time	t <sub>f</sub>		-	10	-	nS
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =15V,I <sub>D</sub> =20A, V <sub>GS</sub> =10V	-	66.3	-	nC
Gate-Source Charge	Q <sub>gs</sub>		-	7	-	nC
Gate-Drain Charge	Q <sub>gd</sub>		-	17.2	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage <sup>(Note 3)</sup>	V <sub>SD</sub>	V <sub>GS</sub> =0V,I <sub>S</sub> =20A	-	-	1.2	V
Diode Forward Current <sup>(Note 2)</sup>	I <sub>S</sub>		-	-	110	A
Reverse Recovery Time	t <sub>rr</sub>	T <sub>J</sub> =25°C, I <sub>F</sub> =20A di/dt=100A/μs <sup>(Note 3)</sup>	-	56	-	nS
Reverse Recovery Charge	Q <sub>rr</sub>		-	110	-	nC

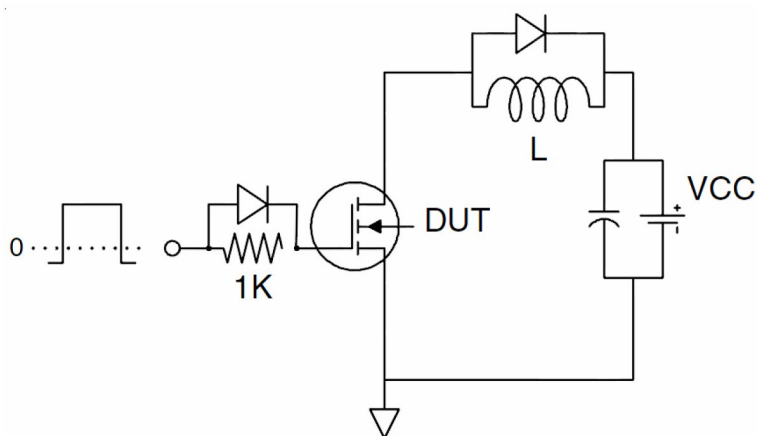
Notes:

- ① Repetitive Rating: Pulse width limited by maximum junction temperature.
- ② Surface Mounted on FR4 Board, t≤10sec.
- ③ Pulse Test: Pulse Width≤300μs, Duty Cycle≤2%.
- ④ Guaranteed by design, not subject to production
- ⑤ EAS condition：T<sub>J</sub>=25°C,V<sub>DD</sub>=15V,V<sub>G</sub>=10V,L=0.5mH,R<sub>g</sub>=25Ω

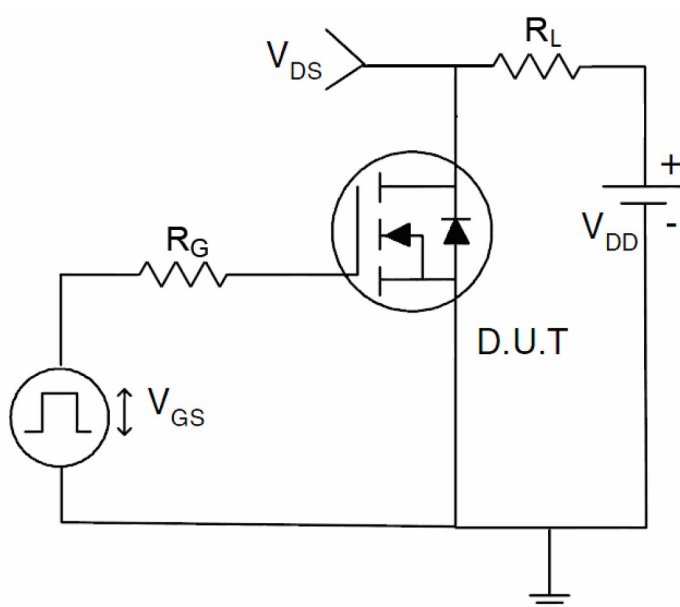
# Test circuit



EAS test Circuit

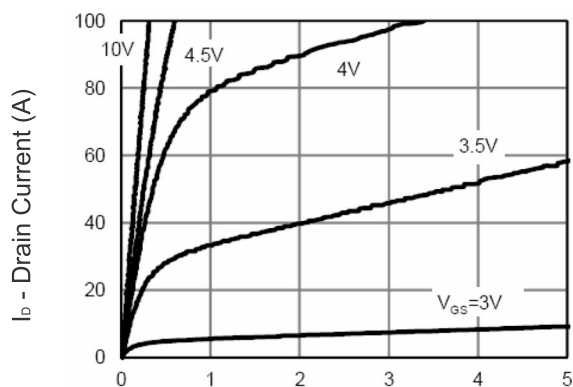


Gate charge test Circuit



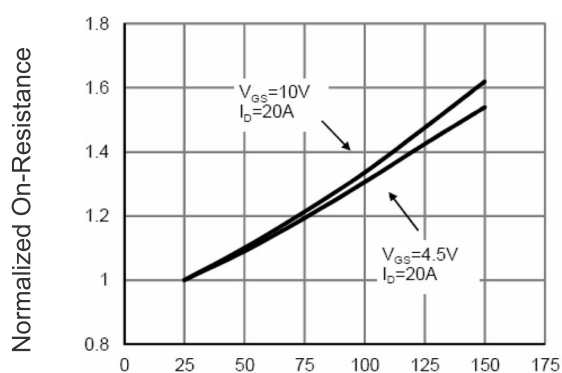
Switch Time Test Circuit

# Typical Electrical and Thermal Characteristics (Curves)



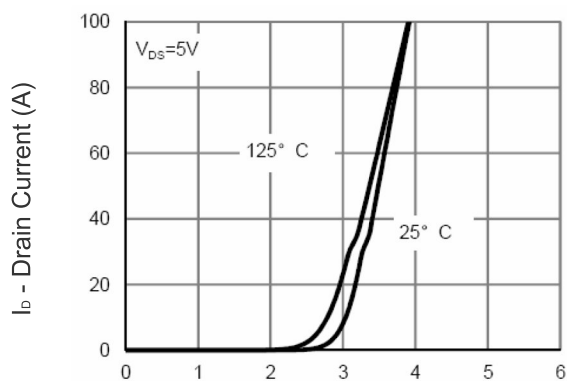
V<sub>DS</sub> Drain-Source Voltage (V)

Figure 1 Output Characteristics



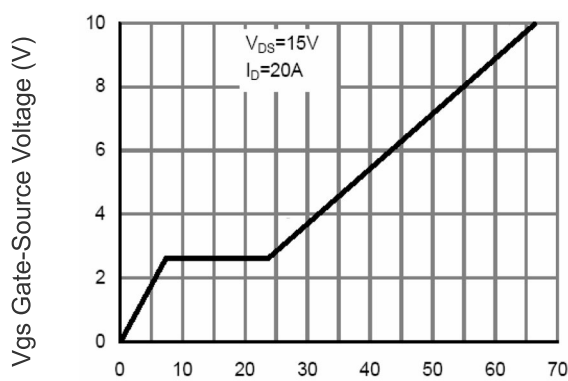
T<sub>J</sub> -Junction Temperature(°C)

Figure 4 Rdson-Junction Temperature



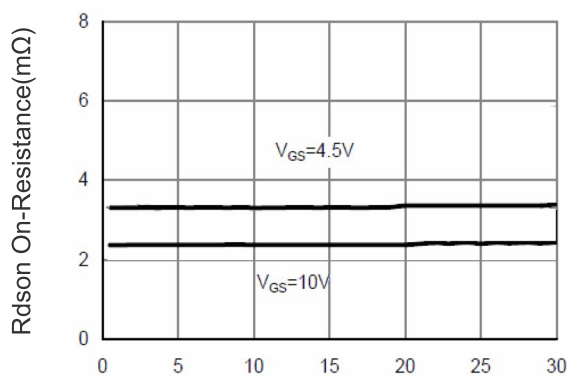
V<sub>GS</sub> Gate-Source Voltage (V)

Figure 2 Transfer Characteristics



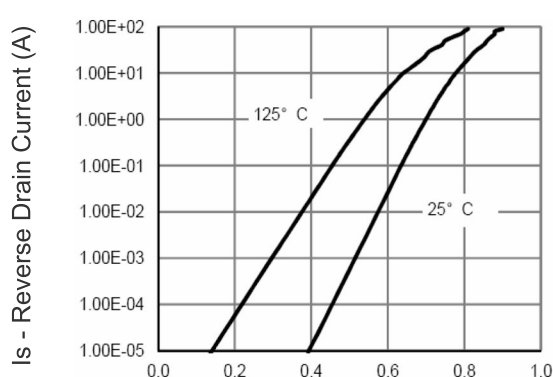
Q<sub>g</sub> Gate Charge (nC)

Figure 5 Gate Charge



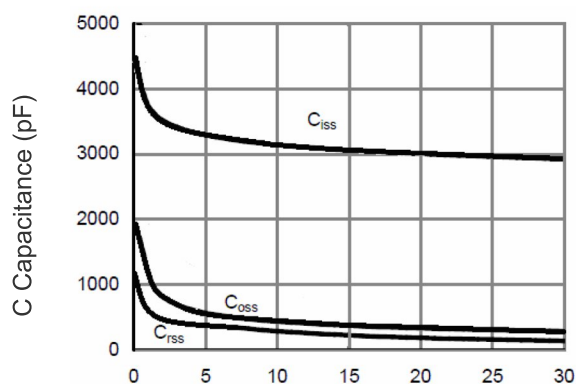
I<sub>D</sub> - Drain Current (A)

Figure 3 Rdson- Drain Current

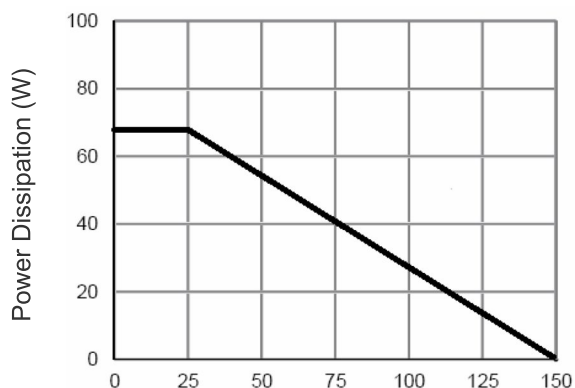


V<sub>SD</sub> Source-Drain Voltage (V)

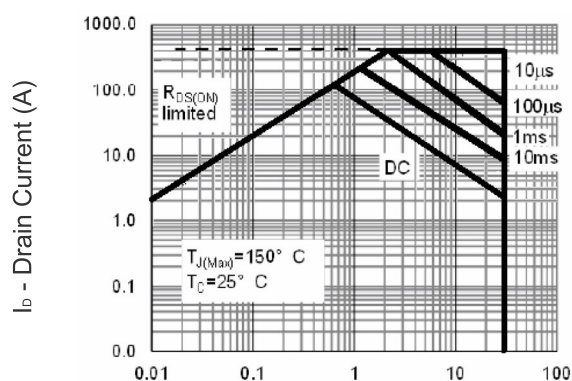
Figure 6 Source- Drain Diode Forward



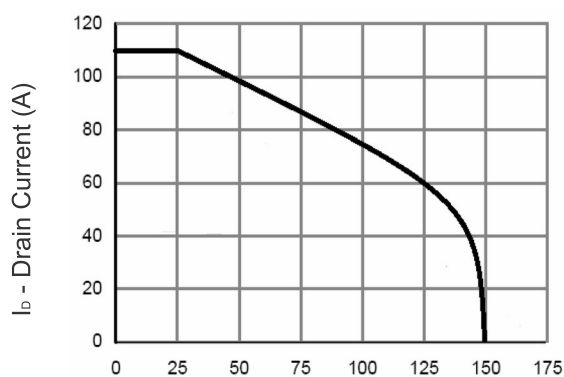
Vds Drain-Source Voltage (V)  
Figure 7 Capacitance vs Vds



TJ -Junction Temperature(°C)  
Figure 9 Power De-rating



Vds Drain-Source Voltage (V)  
Figure 8 Safe Operation Area



TJ -Junction Temperature(°C)  
Figure 10 Current De-rating

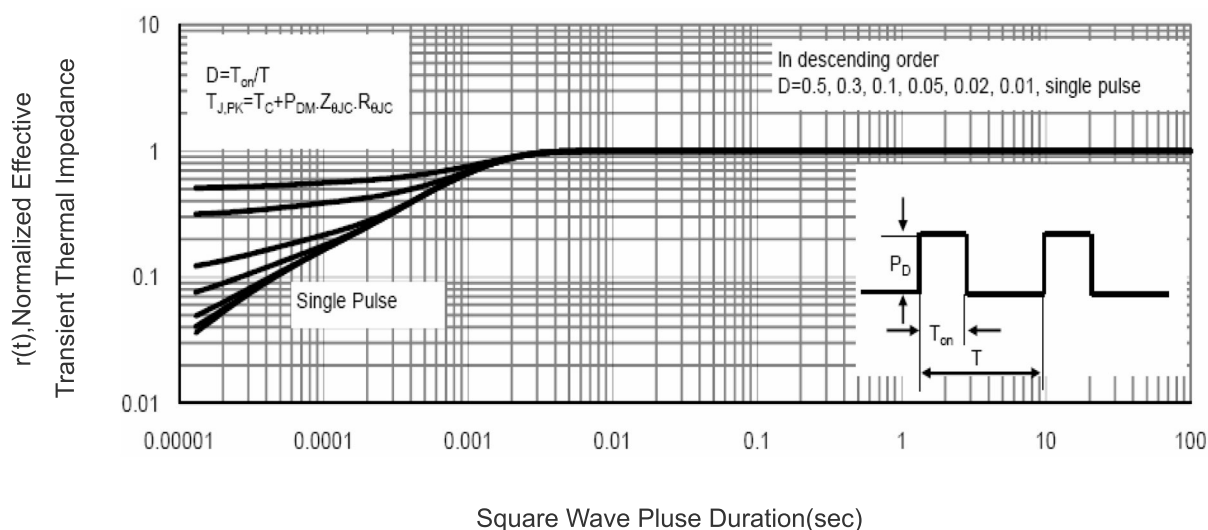
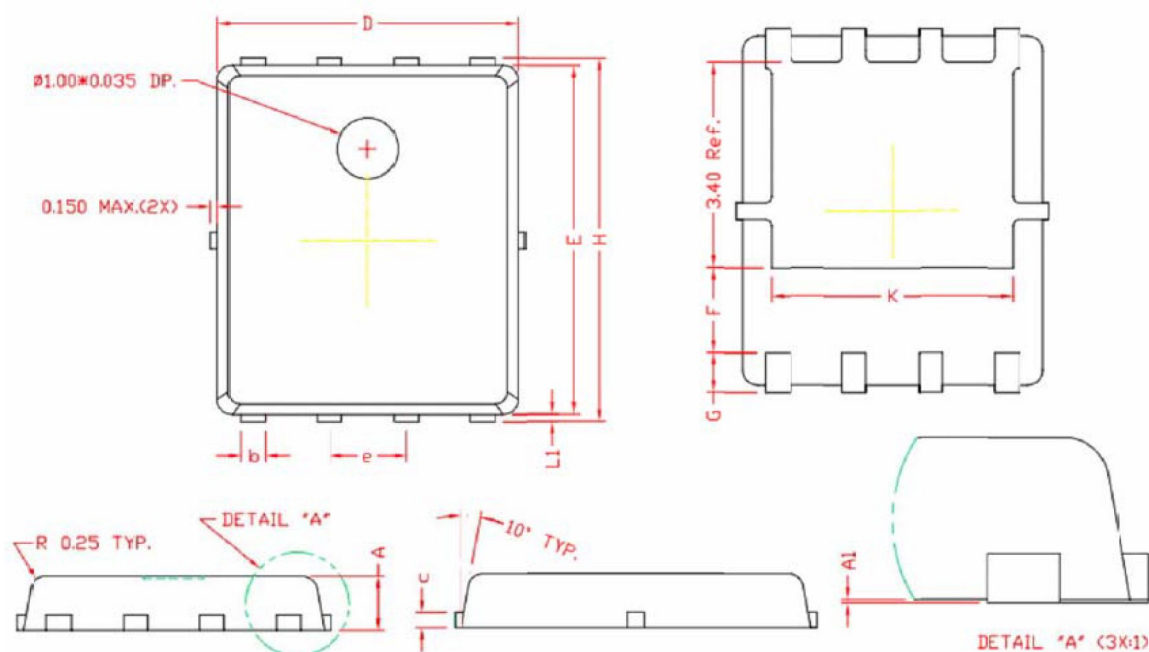


Figure 11 Normalized Maximum Transient Thermal Impedance

# DFN5X6-8L Package Information



COMMON DIMENSIONS  
(UNITS OF MEASURE=MILLIMETER)

SYMBOL	MIN	NOM	MAX
A	0.80	0.90	1.00
A1	0.00	0.03	0.05
b	0.35	0.42	0.49
c	0.254 REF.		
D	4.90	5.00	5.10
F	1.40 REF.		
E	5.70	5.80	5.90
e	1.27 BSC.		
H	5.95	6.08	6.20
L1	0.10	0.14	0.18
G	0.60 REF.		
K	4.00 REF.		

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