

MJ N-Channel Enhancement Mode Power MOSFET

Description

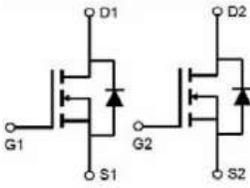
The MJ30ND07S uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications.

General Features

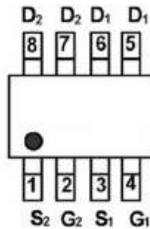
- ◆ $V_{DS} = 30V, I_D = 7A$
 $R_{DS(ON)} < 23m\Omega @ V_{GS} = 10V$
 $R_{DS(ON)} < 40m\Omega @ V_{GS} = 4.5V$
- ◆ High density cell design for ultra low R_{dson}
- ◆ Fully characterized avalanche voltage and current

Application

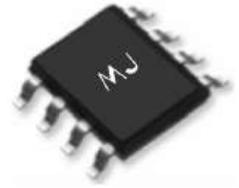
- ◆ Power switching application
- ◆ Hard switched and high frequency circuits
- ◆ Uninterruptible power supply



Schematic diagram



Marking and pin Assignment



SOP-8 top view

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
30ND07S	MJ30ND07S	SOP-8	Ø330mm	12mm	2500 units

Absolute Maximum Ratings ($T_A = 25^\circ C$ unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current-Continuous	I_D	7	A
Drain Current-Continuous($T_C = 100^\circ C$)	$I_{D(100^\circ C)}$	4.95	A
Pulsed Drain Current	I_{DM}	40	A
Maximum Power Dissipation	P_D	2	W
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 150	$^\circ C$

Thermal Characteristic

Parameter	Symbol	Typ	Max	Unit
Thermal Resistance, Junction-to-Ambient ^(Note 2)	$R_{\theta JA}$	62.5	85	$^\circ C/W$

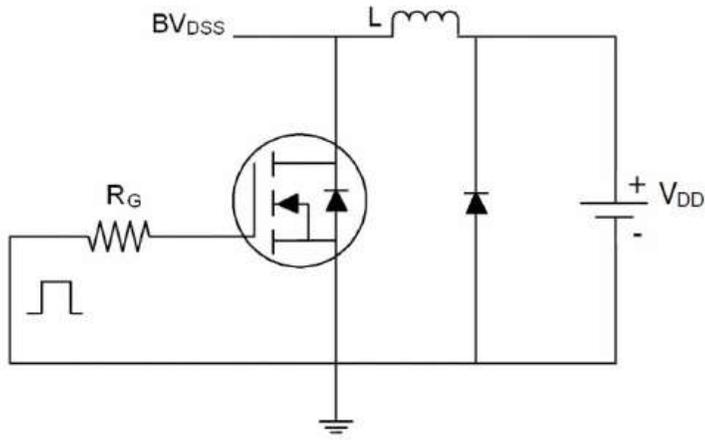
Electrical Characteristics (T_A=25°C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	B _V DSS	V _{GS} =0V, I _b =250μA	30	-	-	V
Zero Gate Voltage Drain Current	I _{bss}	V _{DS} =30V, V _{GS} =0V	-	-	1	μA
Gate-Body Leakage Current	I _{gss}	V _{DS} =±20V, V _{GS} =0V	-	-	±100	nA
On Characteristics ^(Note 3)						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _b =250μA	1.1	-	2.1	V
Drain-Source On-State Resistance	R _{DS(on)}	V _{GS} =10V, I _b =7A	-	18	23	mΩ
		V _{GS} =4.5V, I _b =6A	-	25	40	mΩ
Forward Transconductance	g _{FS}	V _{DS} =5V, I _b =7A	-	15	-	S
Dynamic Characteristics ^(Note 4)						
Input Capacitance	C _{iss}	V _{DS} =15V, V _{GS} =0V F=1.0MHz	-	380	-	PF
Output Capacitance	C _{oss}		-	67	-	PF
Reverse Transfer Capacitance	C _{rss}		-	41	-	PF
Switching Characteristics ^(Note 4)						
Turn-on Delay Time	t _{d(on)}	V _{DD} =15V, R _L =2Ω V _{GS} =10V, R _G =3Ω	-	5	-	nS
Turn-on Rise Time	t _r		-	3	-	nS
Turn-Off Delay Time	t _{d(off)}		-	15	-	nS
Turn-Off Fall Time	t _f		-	3	-	nS
Total Gate Charge	Q _g	V _{DS} =15V, I _b =7A V _{GS} =4.5V	-	7.2	-	nC
Gate-Source Charge	Q _{gs}		-	1.3	-	nC
Gate-Drain Charge	Q _{gd}		-	1.7	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage ^(Note 3)	V _{SD}	V _{GS} =0V, I _s =7A	-	-	1.2	V
Diode Forward Current ^(Note 2)	I _s		-	-	7	A

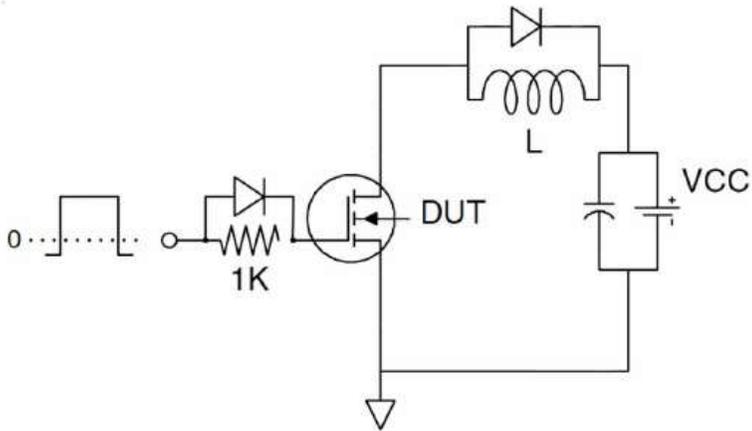
Notes:

- ① Repetitive Rating: Pulse width limited by maximum junction temperature.
- ② The value of R_{θJA} is measured with the device mounted on 1in 2 FR-4 board with 2oz. Copper, in a still air environment with T_A=25°C. The value in any given application depends on the user's specific board design. Surface Mounted on FR4 Board, t ≤ 10 sec. The current rating is based on the t ≤ 10s thermal resistance rating.
- ③ Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
- ④ Guaranteed by design, not subject to production

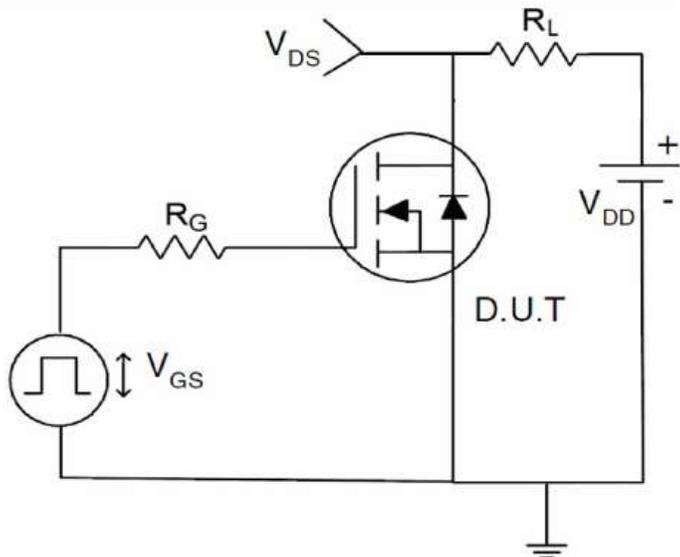
Test circuit



EAS test Circuit

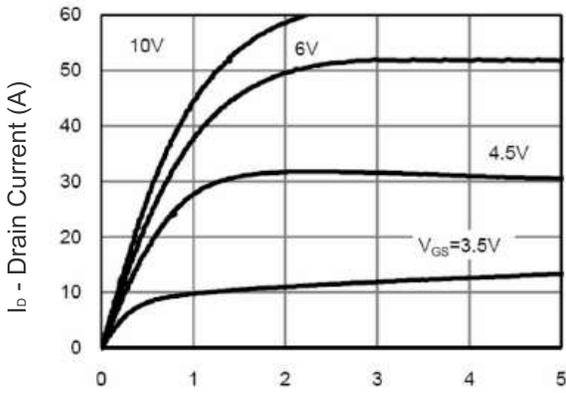


Gate charge test Circuit

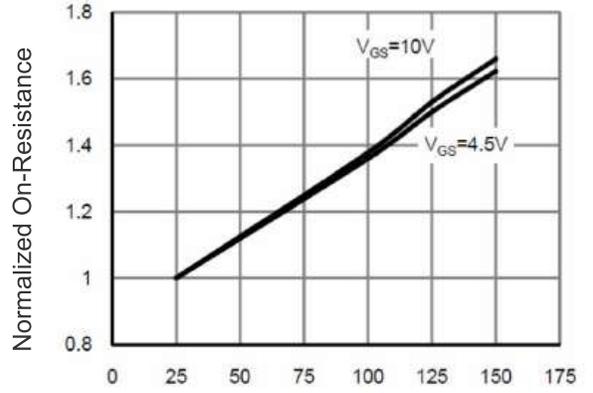


Switch Time Test Circuit

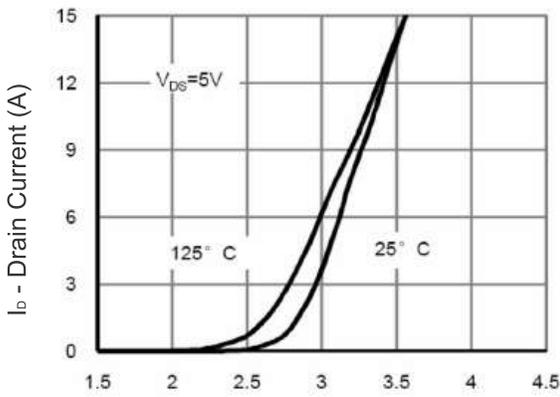
Typical Electrical and Thermal Characteristics (Curves)



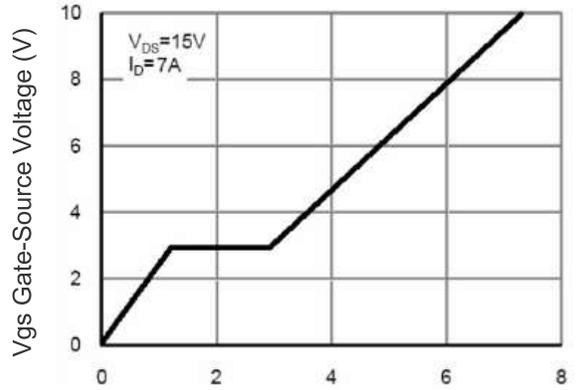
V_{DS} Drain-Source Voltage (V)
Figure 1 Output Characteristics



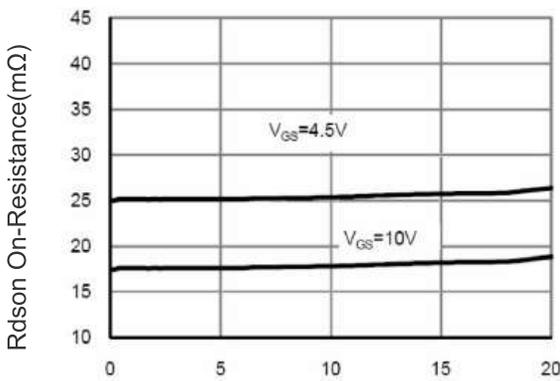
T_J -Junction Temperature(°C)
Figure 4 R_{dson}-Junction Temperature



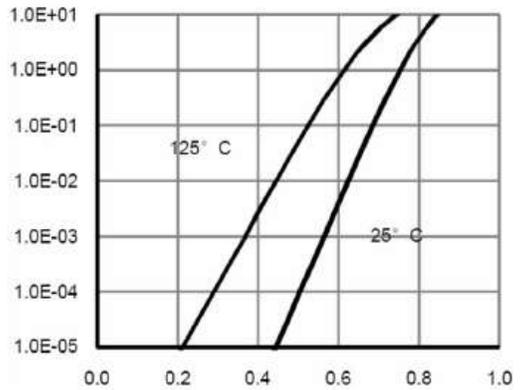
V_{GS} Gate-Source Voltage (V)
Figure 2 Transfer Characteristics



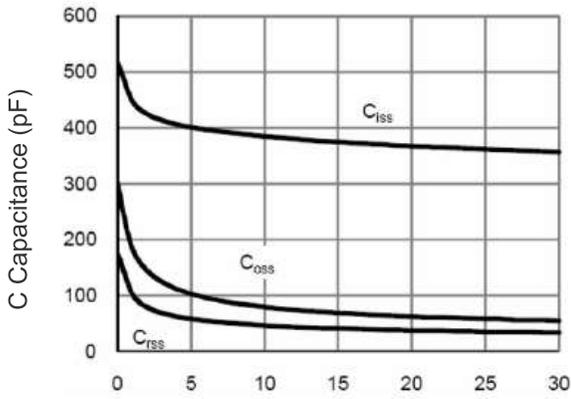
Q_g Gate Charge (nC)
Figure 5 Gate Charge



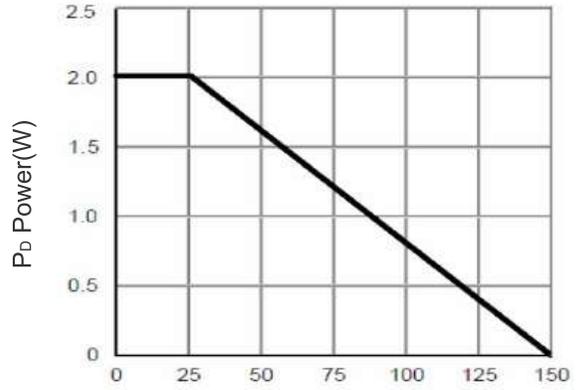
I_D - Drain Current (A)
Figure 3 R_{dson}- Drain Current



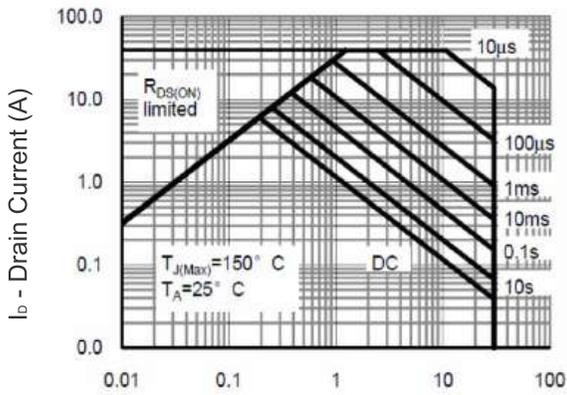
V_{SD} Source-Drain Voltage (V)
Figure 6 Source- Drain Diode Forward



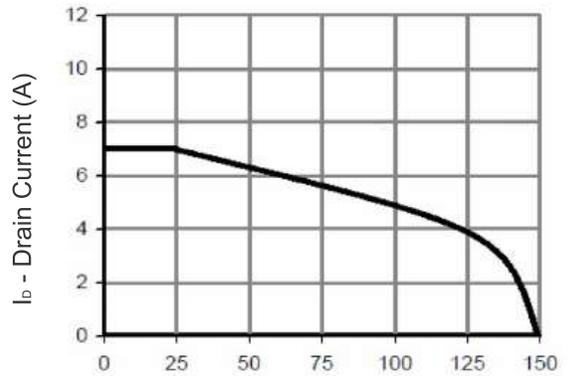
Vds Drain-Source Voltage (V)
Figure 7 Capacitance vs Vds



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

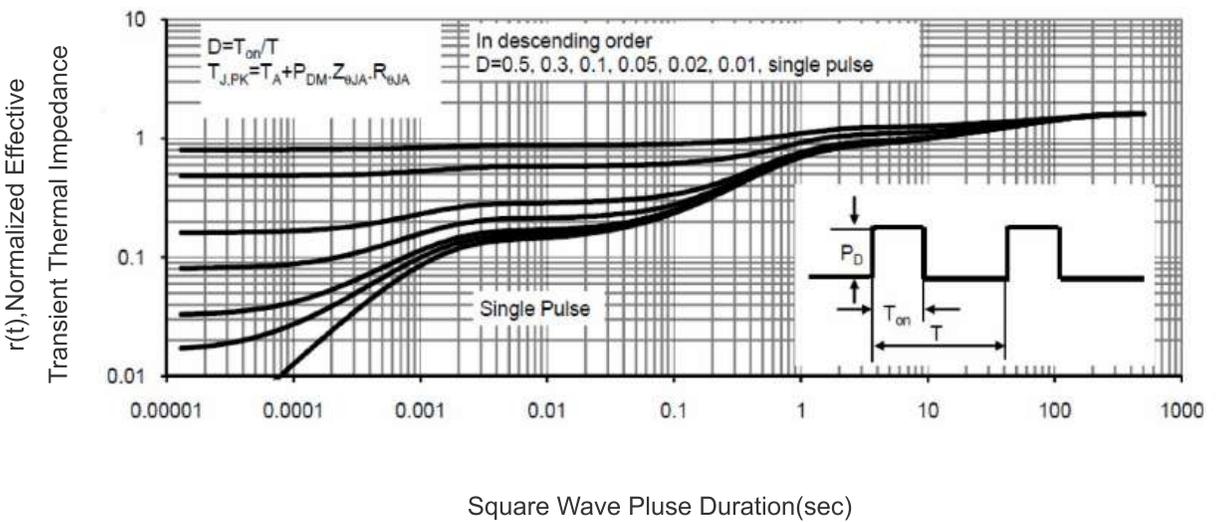
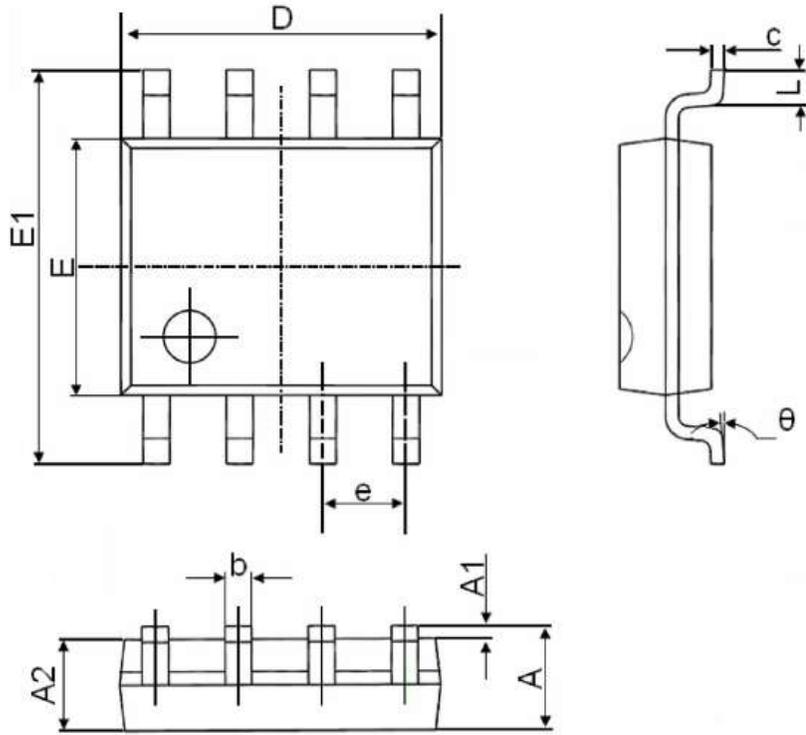


Figure 11 Normalized Maximum Transient Thermal Impedance

SOP-8 Package Information


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270(BSC)		0.050(BSC)	
L	0.400	1.270	0.016	0.050
theta	0°	8°	0°	8°

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