

# MJ N-Channel Enhancement Mode Power MOSFET

## Description

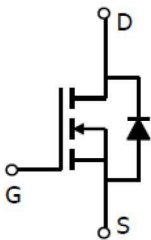
The MJ6008AS uses advanced trench technology and design to provide excellent  $R_{DS(ON)}$  with low gate charge. It can be used in a wide variety of applications.

### General Features

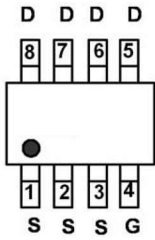
- ◆  $V_{DS} = 60V, I_D = 8A$   
 $R_{DS(ON)} < 20m\Omega @ V_{GS} = 10V$  (Typ:15.6m $\Omega$ )  
 $R_{DS(ON)} < 28m\Omega @ V_{GS} = 4.5V$  (Typ:20m $\Omega$ )
- ◆ High density cell design for ultra low  $R_{dson}$
- ◆ Fully characterized avalanche voltage and current
- ◆ Low gate to drain charge to reduce switching losses

### Application

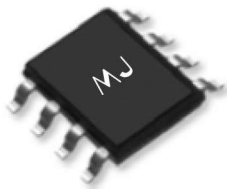
- ◆ Power switching application
- ◆ Load switch



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
MJ6008AS	MJ6008AS	SOP-8	-	-	-

## Absolute Maximum Ratings (Tc=25℃ unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	$V_{DS}$	60	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Drain Current-Continuous	$I_D$	8	A
Drain Current-Continuous( $T_c = 100^{\circ}C$ )	$I_{D(100^{\circ}C)}$	5.6	A
Pulsed Drain Current	$I_{DM}$	32	A
Maximum Power Dissipation	$P_D$	2.1	W
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 To 150	$^{\circ}C$

## Thermal Characteristic

Thermal Resistance,Junction-to-Ambient <sup>(Note 2)</sup>	$R_{\theta JA}$	60	$^{\circ}C/W$
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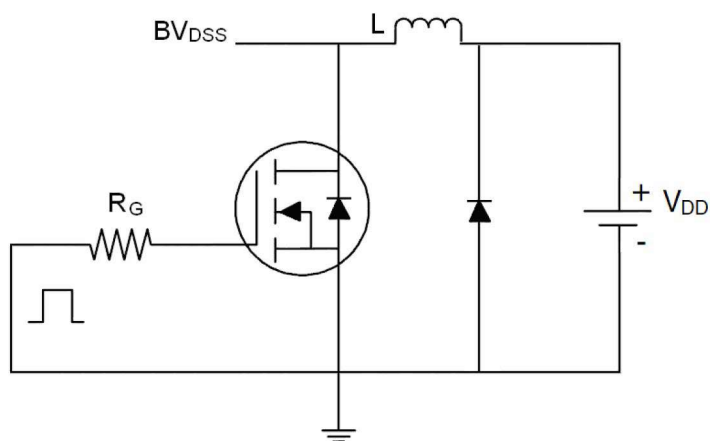
Electrical Characteristics (Tc=25°C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V,I <sub>b</sub> =250μA	60	-	-	V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =60V,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>b</sub> =250μA	1.0	1.6	2.2	V
Drain-Source On-State Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =8A	-	15.6	20	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =8A	-	20	28	mΩ
Forward Transconductance	g <sub>FS</sub>	V <sub>DS</sub> =5V,I <sub>b</sub> =8A	18	-	-	S
Dynamic Characteristics <sup>(Note 4)</sup>						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =30V,V <sub>GS</sub> =0V F=1.0MHz	-	1600	-	PF
Output Capacitance	C <sub>oss</sub>		-	112	-	PF
Reverse Transfer Capacitance	C <sub>rss</sub>		-	98	-	PF
Switching Characteristics <sup>(Note 4)</sup>						
Turn-on Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> =30V,R <sub>L</sub> =1Ω V <sub>GS</sub> =10V,R <sub>G</sub> =3Ω	-	7	-	nS
Turn-on Rise Time	t <sub>r</sub>		-	5.5	-	nS
Turn-Off Delay Time	t <sub>d(off)</sub>		-	29	-	nS
Turn-Off Fall Time	t <sub>f</sub>		-	4.5	-	nS
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =30V,I <sub>D</sub> =8A V <sub>GS</sub> =10V	-	38.5	-	nC
Gate-Source Charge	Q <sub>gs</sub>		-	4.7	-	nC
Gate-Drain Charge	Q <sub>gd</sub>		-	10.3	-	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> =8A	-	-	1.2	V
Diode Forward Current <sup>(Note 2)</sup>	I <sub>s</sub>		-	-	8	A
Reverse Recovery Time	t <sub>rr</sub>	T <sub>J</sub> =25°C, I <sub>F</sub> =8A di/dt= 100A/μs <sup>(Note 3)</sup>	-	28	-	nS
Reverse Recovery Charge	Q <sub>rr</sub>		-	40	-	nC

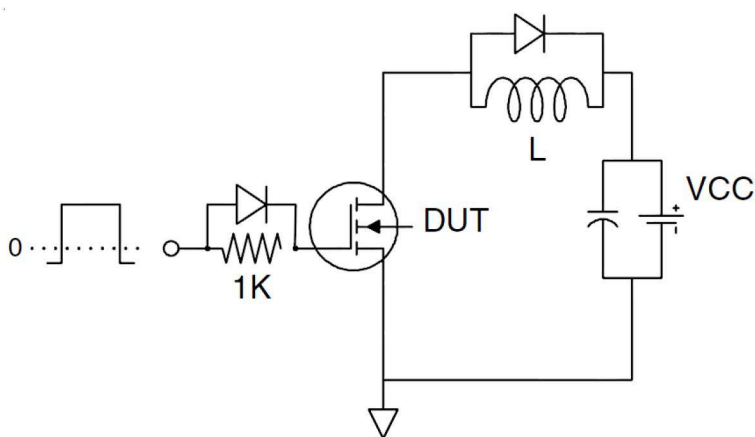
Notes:

- ① Repetitive Rating: Pulse width limited by maximum junction temperature.
- ② Surface Mounted on FR4 Board, t ≤ 10 sec.
- ③ Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
- ④ Guaranteed by design, not subject to production

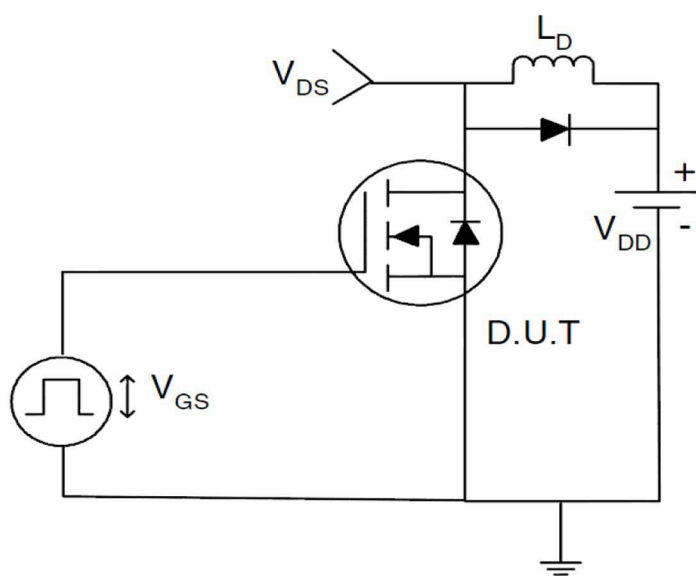
## Test circuit



EAS test Circuit

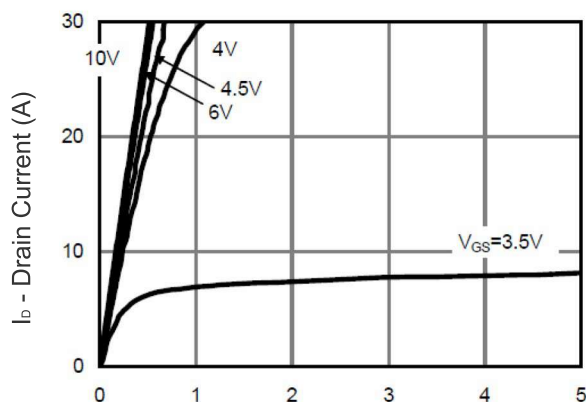


Gate charge test Circuit



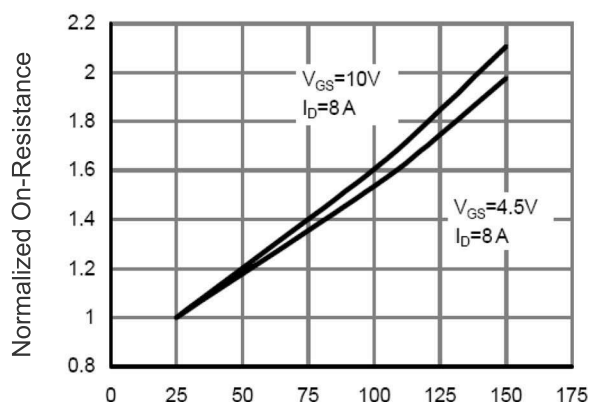
Switch Time Test Circuit

# Typical Electrical and Thermal Characteristics (Curves)



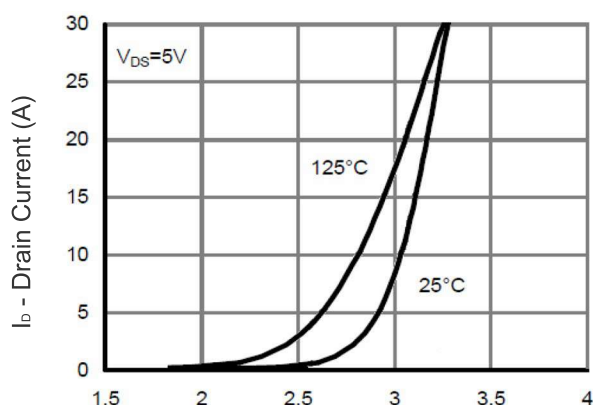
V<sub>ds</sub> Drain-Source Voltage (V)

Figure 1 Output Characteristics



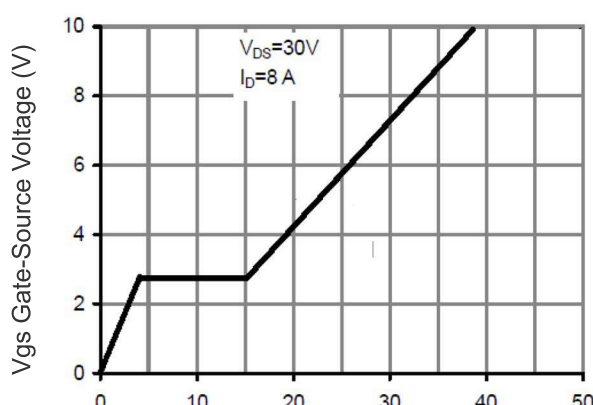
T<sub>j</sub> -Junction Temperature(°C)

Figure 4 Rdson-Junction Temperature



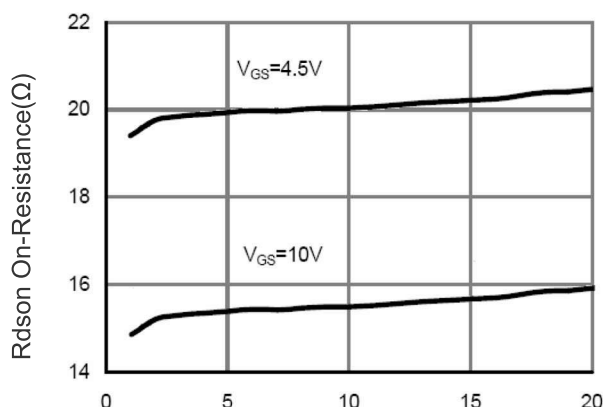
V<sub>gs</sub> Gate-Source Voltage (V)

Figure 2 Transfer Characteristics



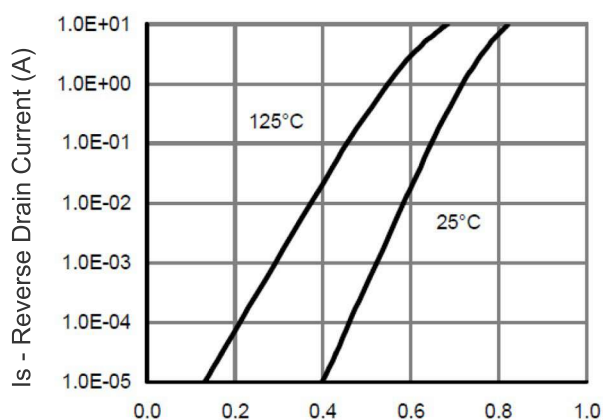
Q<sub>g</sub> Gate Charge (nC)

Figure 5 Gate Charge



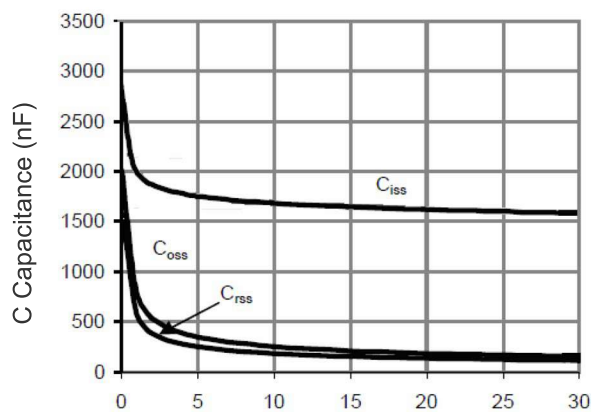
I<sub>D</sub> - Drain Current (A)

Figure 3 Rdson- Drain Current

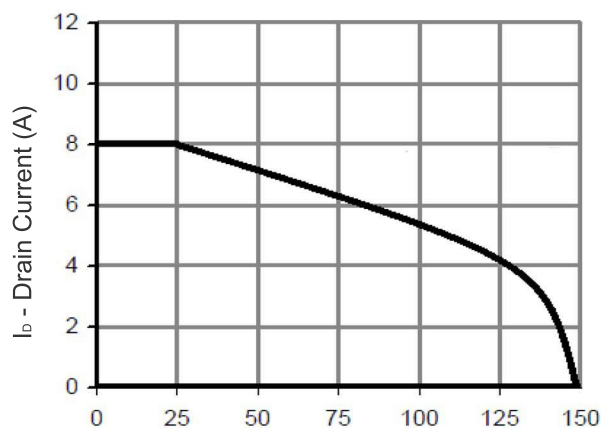


V<sub>sd</sub> Source-Drain Voltage (V)

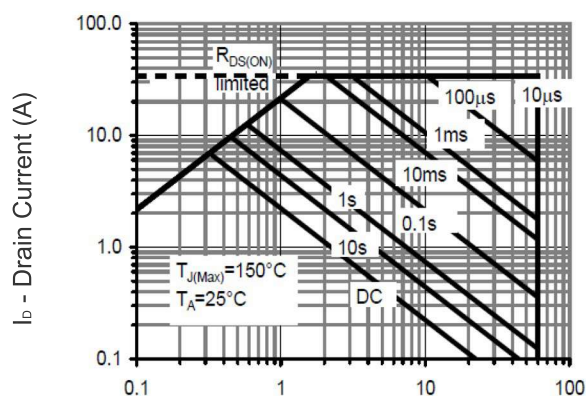
Figure 6 Source- Drain Diode Forward



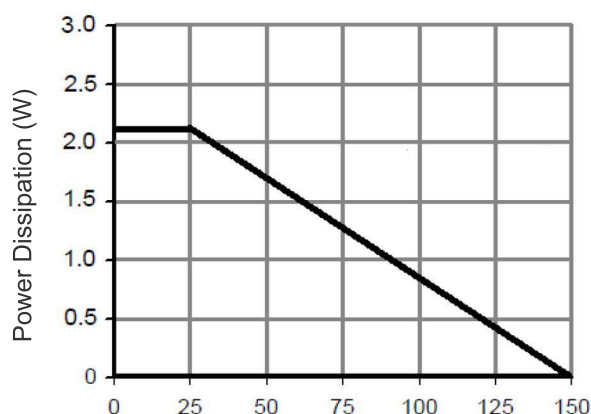
Vds Drain-Source Voltage (V)  
Figure 7 Capacitance vs Vds



Tj -Junction Temperature(°C)  
Figure 9 Current De-rating



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



Tj -Junction Temperature(°C)  
Figure 10 Power De-rating

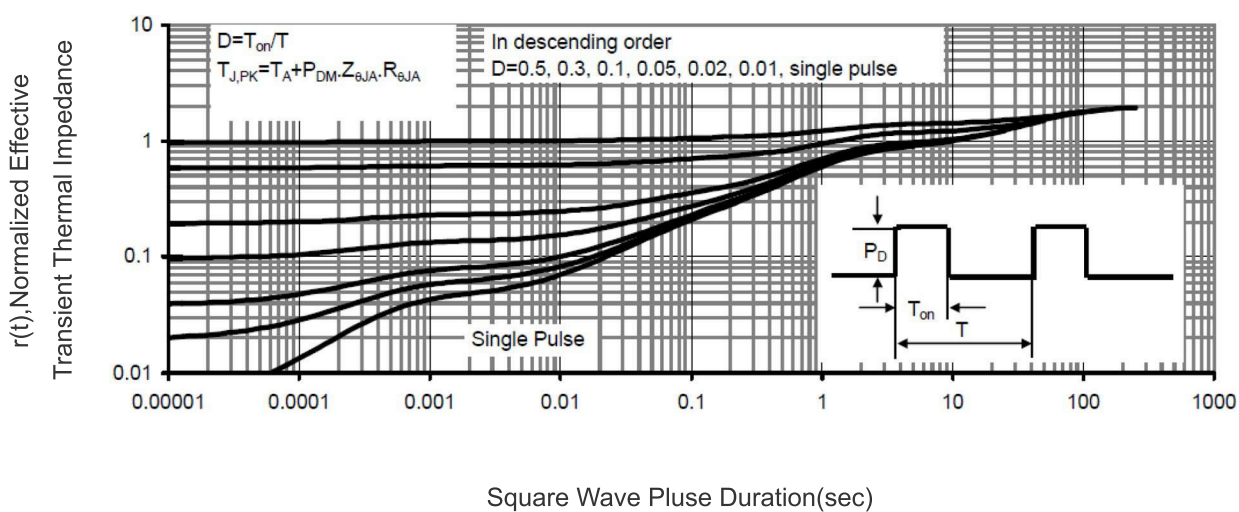
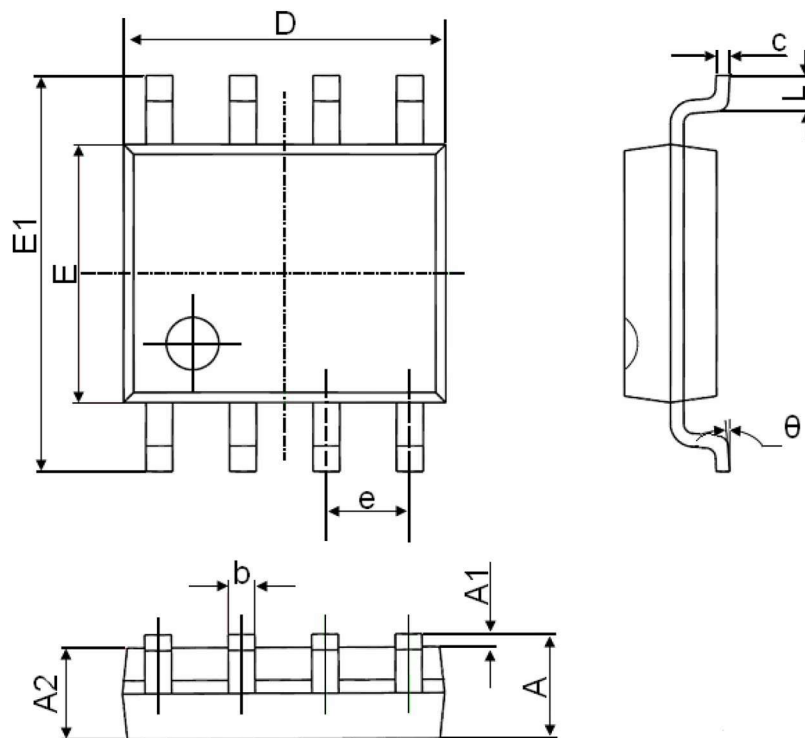


Figure 11 Normalized Maximum Transient Thermal Impedance

# 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
θ	0°	8°	0°	8°

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