

MJ P-Channel Enhancement Mode Power MOSFET

Description

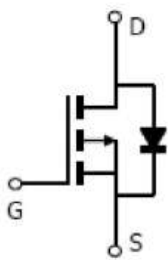
The MJ40P06S uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications. It is ESD protected.

General Features

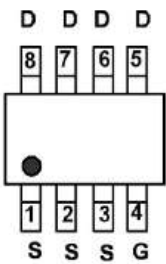
- ◆ $V_{DS} = -40V, I_D = -6A$
 $R_{DS(ON)} < 45m\Omega @ V_{GS} = -10V$
- ◆ High density cell design for ultra low R_{dson}
- ◆ Fully characterized avalanche voltage and current
- ◆ Excellent package for good heat dissipation

Application

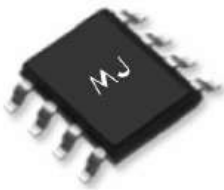
- ◆ Power switching application
- ◆ Hard switched and high frequency circuits
- ◆ DC-DC converter



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
40P06	MJ40P06S	SOP-8	Ø330mm	12mm	2500 units

Absolute Maximum Ratings (TA=25°C unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	-40	V
Gate-Source Voltage	V_{GS}	±20	V
Drain Current-Continuous	I_D	-6	A
Drain Current-Continuous($T_C = 100^{\circ}C$)	$I_{D(100^{\circ}C)}$	-4.2	A
Pulsed Drain Current	I_{DM}	30	A
Maximum Power Dissipation	P_D	2.2	W
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 150	°C

Thermal Characteristic

Thermal Resistance, Junction-to-Ambient ^(Note 2)	$R_{\theta JA}$	57	°C/W
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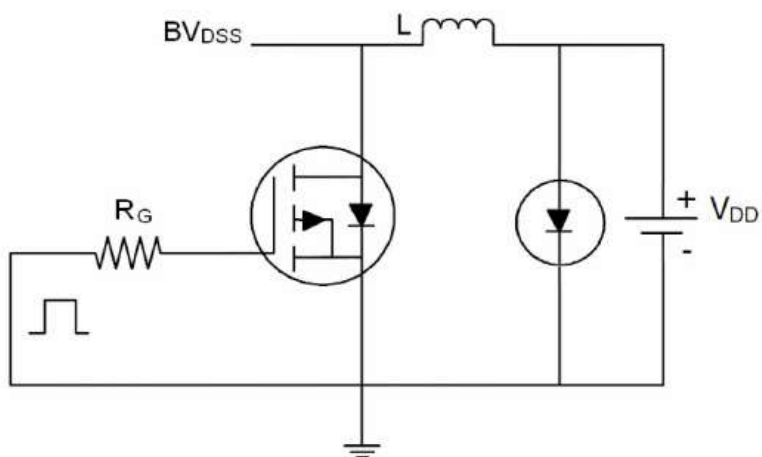
Electrical Characteristics (T_A=25℃ unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =-250μA	-40	-	-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =-40V, V _{GS} =0V	-	-	1	μA
Gate-Body Leakage Current	I _{GSS}	V _{DS} =±20V, V _{GS} =0V	-	-	±100	nA
On Characteristics <small>(Note 3)</small>						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} ,I _D =-250μA	-1.1	-1.9	-2.5	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =-10V, I _D =-5A	-	40	45	mΩ
Forward Transconductance	g _{FS}	V _{DS} =-5V, I _D =-5A	13	-	-	S
Dynamic Characteristics <small>(Note 4)</small>						
Input Capacitance	C _{iss}	V _{DS} =-20V, V _{GS} =0V F=1.0MHz	-	1150	-	PF
Output Capacitance	C _{oss}		-	97	-	PF
Reverse Transfer Capacitance	C _{rss}		-	72	-	PF
Switching Characteristics <small>(Note 4)</small>						
Turn-on Delay Time	t _{d(on)}	V _{DD} =-20V, R _L =2Ω V _{GS} =-10V, R _{GEN} =3Ω	-	6.2	-	nS
Turn-on Rise Time	t _r		-	8.4	-	nS
Turn-Off Delay Time	t _{d(off)}		-	28	-	nS
Turn-Off Fall Time	t _f		-	10	-	nS
Total Gate Charge	Q _g	V _{DS} =-20V, I _D =-5A V _{GS} =-10V	-	19	-	nC
Gate-Source Charge	Q _{gs}		-	4.4	-	nC
Gate-Drain Charge	Q _{gd}		-	4.2	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage <small>(Note 3)</small>	V _{SD}	V _{GS} =0V, I _S =-6A	-	-	1.2	V
Diode Forward Current <small>(Note 2)</small>	I _S		-	-	-6	A

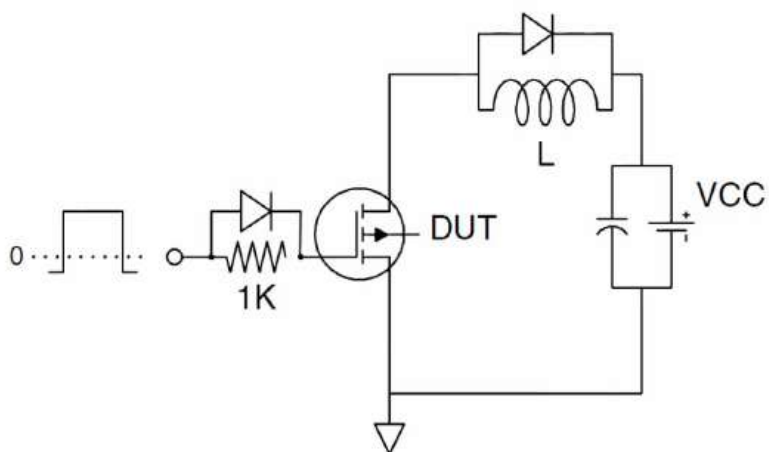
Notes:

- 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

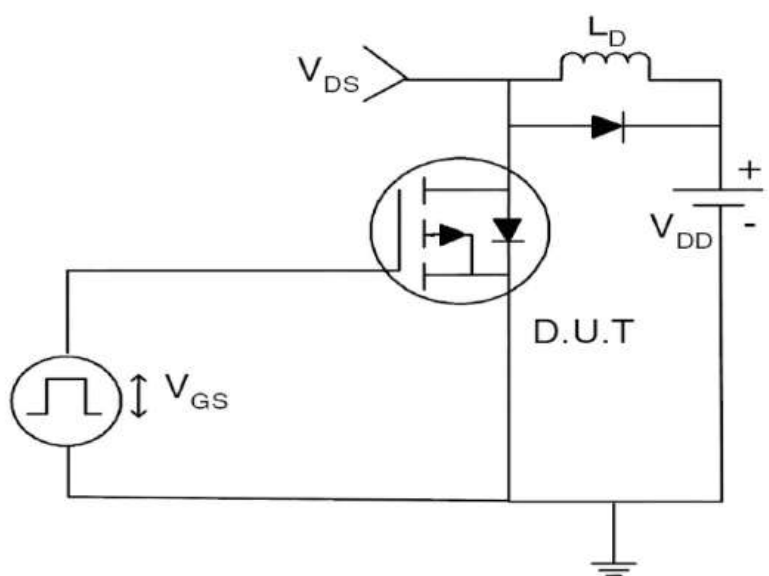
Test circuit



EAS test Circuit

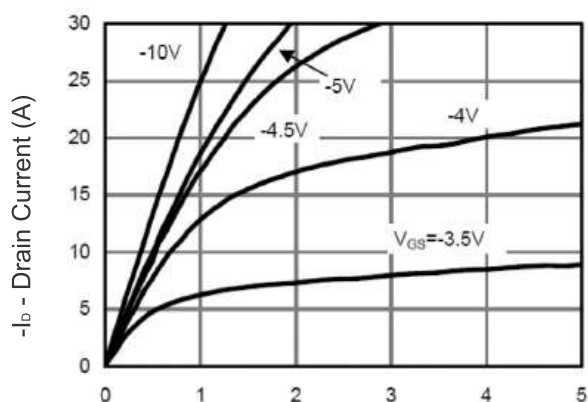


Gate charge test Circuit



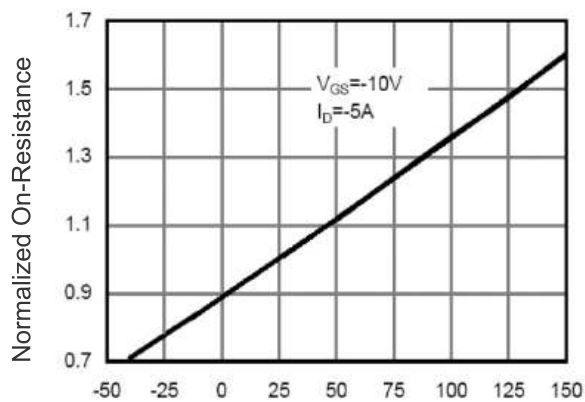
Switch Time Test Circuit

Typical Electrical and Thermal Characteristics (Curves)



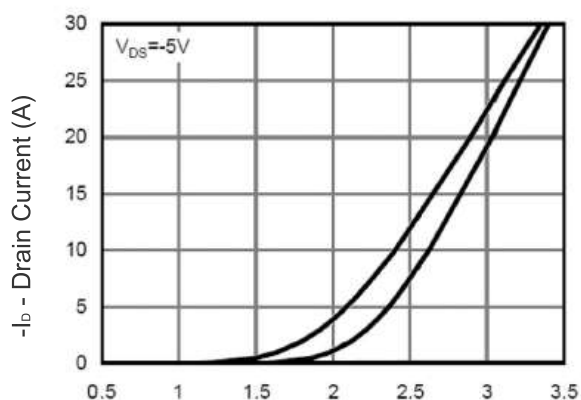
-V_{DS} Drain-Source Voltage (V)

Figure 1 Output Characteristics



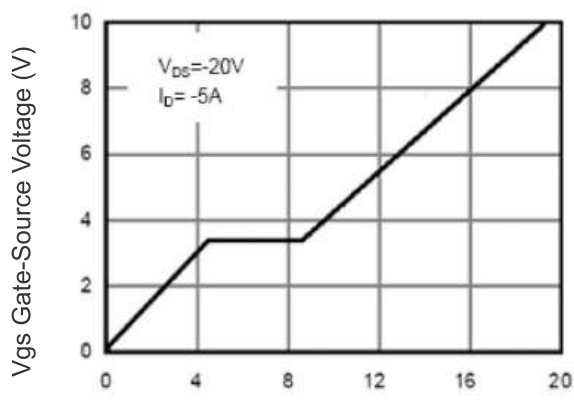
T_J -Junction Temperature(°C)

Figure 4 R_{DS(on)}-Junction Temperature



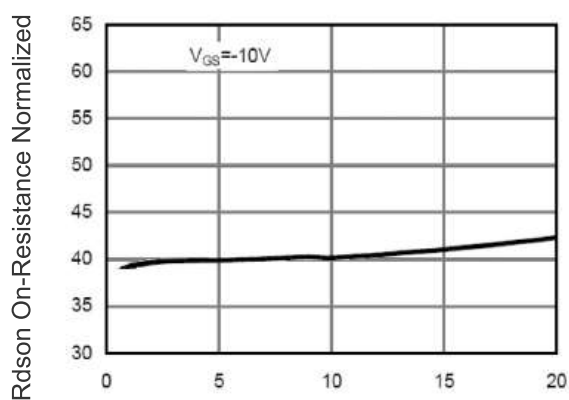
-V_{GS} Gate-Source Voltage (V)

Figure 2 Transfer Characteristics



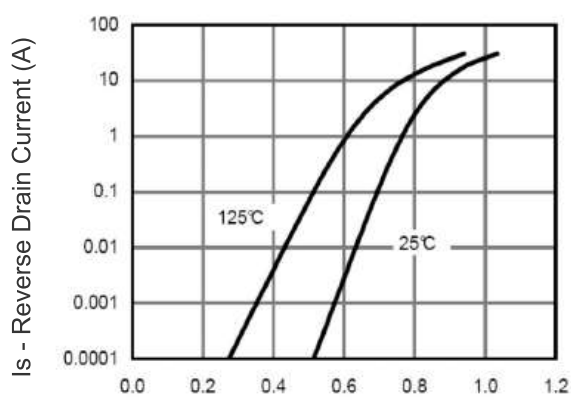
Q_g Gate Charge (nC)

Figure 5 Gate Charge



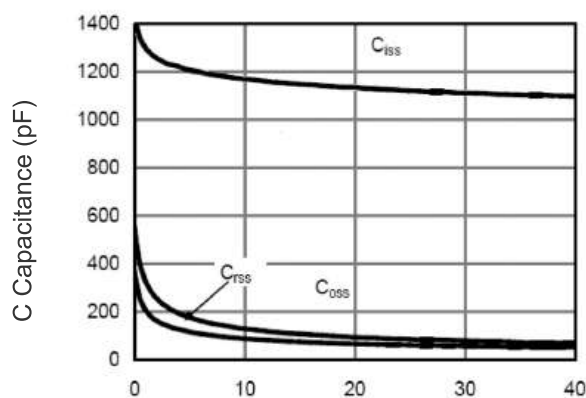
-I_D - Drain Current (A)

Figure 3 R_{DS(on)}- Drain Current



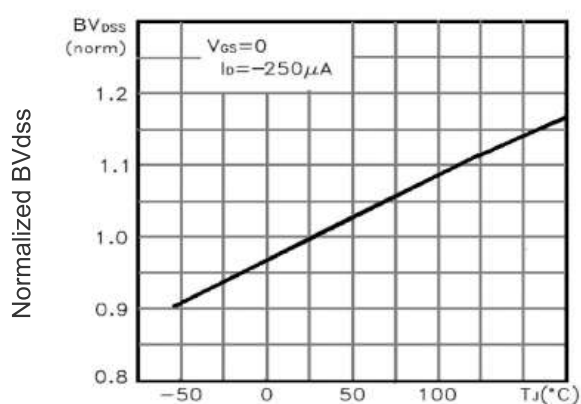
V_{SD} Source-Drain Voltage (V)

Figure 6 Source- Drain Diode Forward



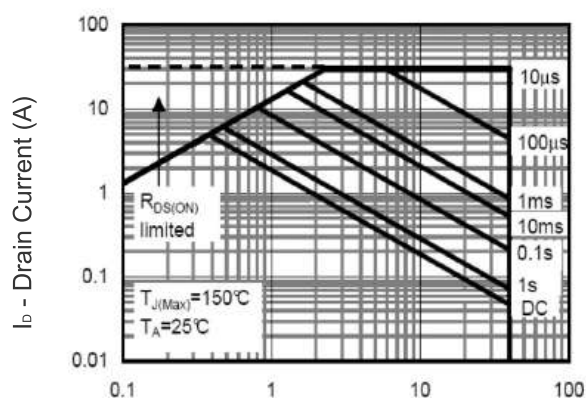
Vds Drain-Source Voltage (V)

Figure 7 Capacitance vs Vds



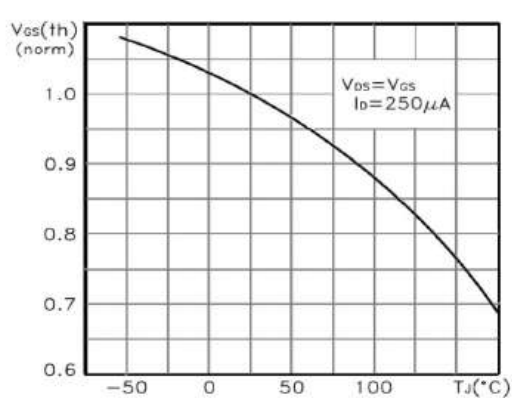
Tj -Junction Temperature(°C)

Figure 9 BVdss vs Junction Temperature



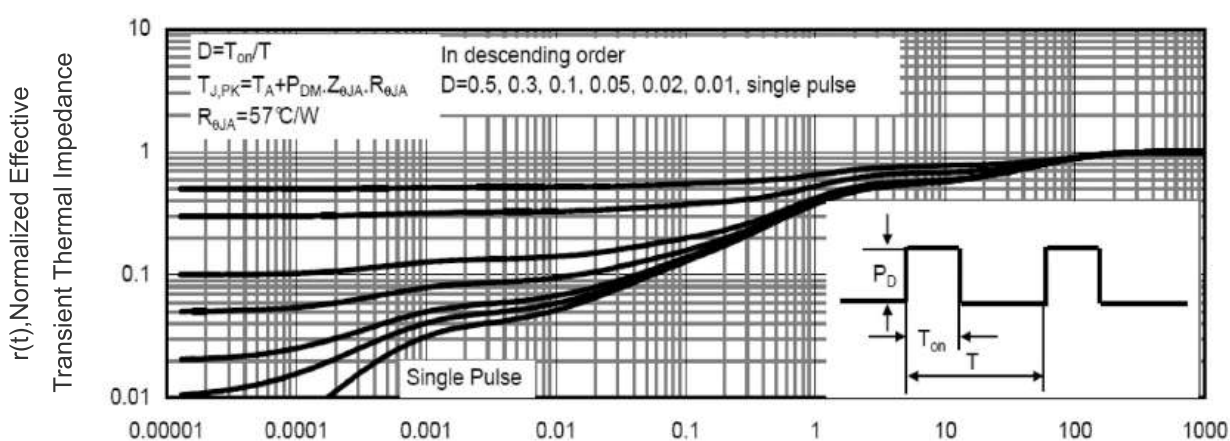
Vds Drain-Source Voltage (V)

Figure 8 Safe Operation Area



Tj -Junction Temperature(°C)

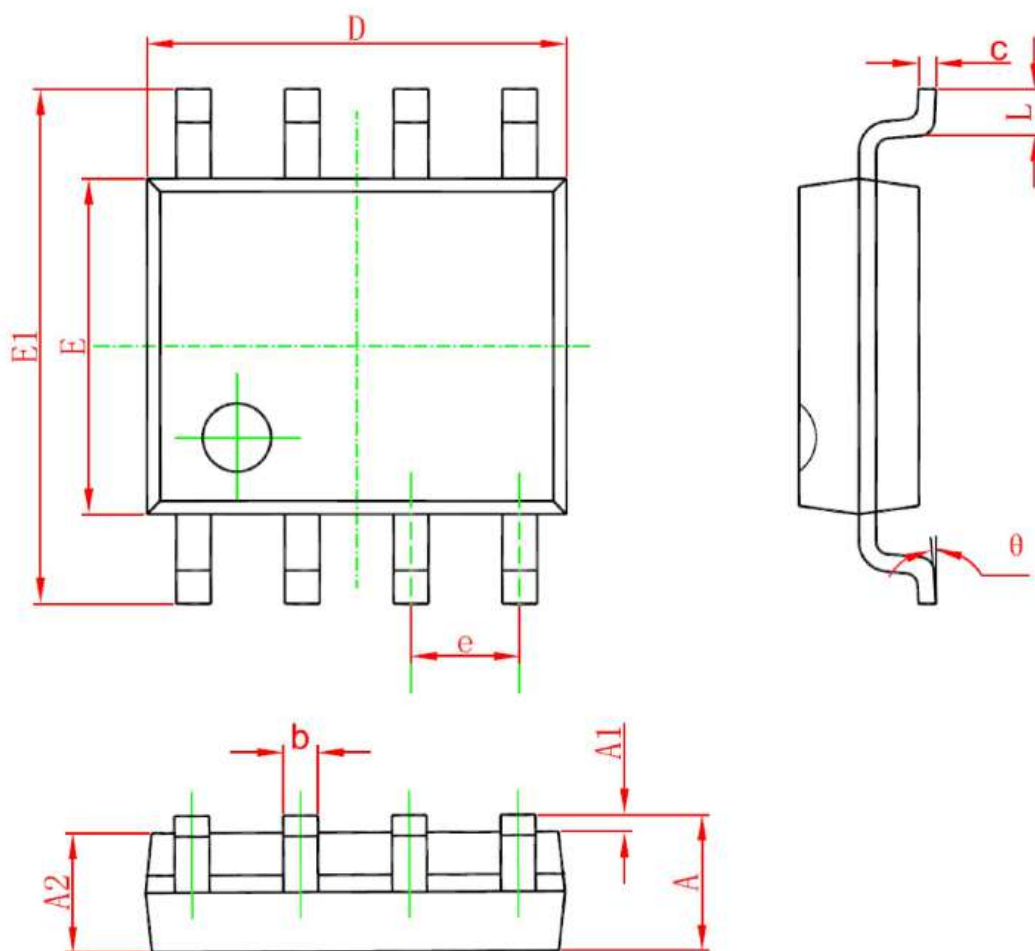
Figure 10 VGS(th) vs Junction Temperature



Square Wave Pluse Duration(sec)

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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