MJ P-Channel Enhancement Mode Power MOSFET

Description

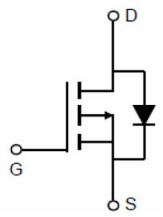
The MJ20P70G uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications.

General Features

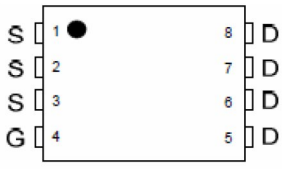
- V_{DS}=-20V,I_D=-70A
  $R_{DS(ON)}$<3mΩ @ V_{GS}=-4.5V
  $R_{DS(ON)}$<4mΩ @ V_{GS}=-2.5V
  $R_{DS(ON)}$<8mΩ @ V_{GS}=-1.8V
- High density cell design for ultra low Rdson
- Fully characterized avalanche voltage and current
- Good stability and uniformity with high E_{AS}
- Excellent package for good heat dissipation

Application

- Load switch
- Battery protection



Schematic diagram



Pin Assignment

DFN5x6 -8L top view

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
MJ20P70G	MJ20P70G	DFN 5X6 -8L	-	-	-

Absolute Maximum Ratings (T_C =25 ℃unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	-20	V
Gate-Source Voltage	V_{GS}	±10	V
Drain Current-Continuous	I_D	-70	A
Drain Current-Continuous(T_C =100℃)	$I_{D(100℃)}$	-49.5	A
Pulsed Drain Current (Note 1)	I_{DM}	-280	A
Maximum Power Dissipation	P_D	130	W
Derating factor		1.04	W/℃
Operating Junction and Storage Temperature Range	T_J ,T_{STG}	-55 To 150	℃

Thermal Characteristic

Thermal Resistance,Junction-to-Case (Note 2)	$R_{θJC}$	0.96	℃/W

Electrical Characteristics (T_C =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	-20	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=-20V,V_{GS}=0V	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	V_{DS}=±10V,V_{DS}=0V	-	-	±100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS} ,I_D=-250μA	-0.4	-0.6	-1.0	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=-4.5V, I_D=-20A	-	2.3	3	mΩ
		V_{GS}=-2.5V, I_D=-20A	-	2.8	4	mΩ
		V_{GS}=-1.8V, I_D=-20A	-	3.8	8	mΩ
Forward Transconductance	g_{FS}	V_{DS}=-5V,I_D=-20A	100	-	-	S
Dynamic Characteristics (Note 4)						
Input Capacitance	C_{lss}	V_{DS}=-10V,V_{GS}=0V, F=1.0MHz	-	4950	-	PF
Output Capacitance	C_{oss}		-	380	-	PF
Reverse Transfer Capacitance	C_{rss}		-	290	-	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=-10V,R_{GEN}=3Ω V_{GS}=-4.5V,R_L=0.5Ω	-	20	-	nS
Turn-on Rise Time	t_r		-	50	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	100	-	nS
Turn-Off Fall Time	t_f		-	40	-	nS
Total Gate Charge	Q_g	V_{DS}=-10V,I_D=-20A, V_{GS}=-4.5V	-	100	-	nC
Gate-Source Charge	Q_{gs}		-	21	-	nC
Gate-Drain Charge	Q_{gd}		-	32	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V_{SD}	V_{GS}=0V,I_S=-20A	-	-	-1.2	V
Diode Forward Current (Note 2)	I_S		-	-	-70	A
Reverse Recovery Time	t_{rr}	T_J=25°C, I_F=-10A di/dt=100A/μs (Note 3)	-	48	-	nS
Reverse Recovery Charge	Q_{rr}		-	55	-	nC
Forward Turn-On Time	t_{on}	Intrinsic turn-on time is negligible(turn-on is dominated by LS+LD)				

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

Typical Electrical and Thermal Characteristics

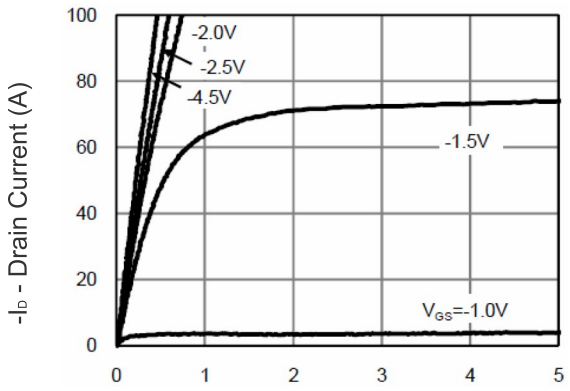


Figure 1 Output Characteristics

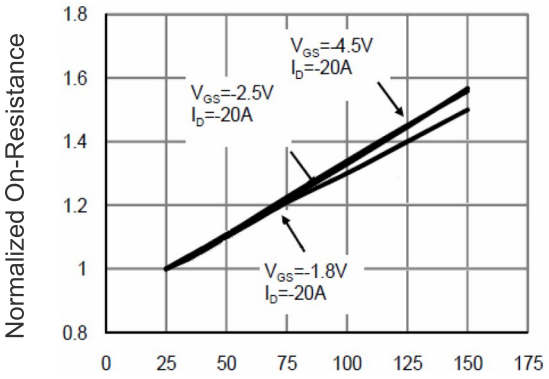


Figure 4 Rdson-Junction Temperature

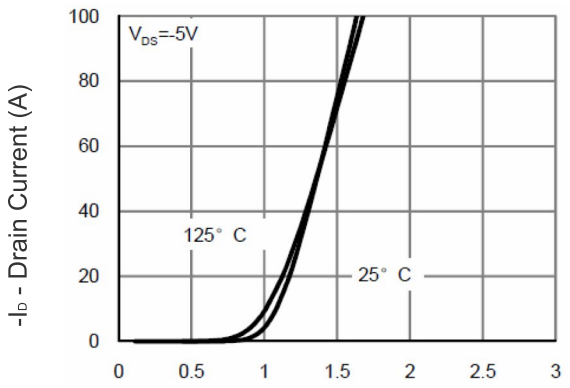


Figure 2 Transfer Characteristics

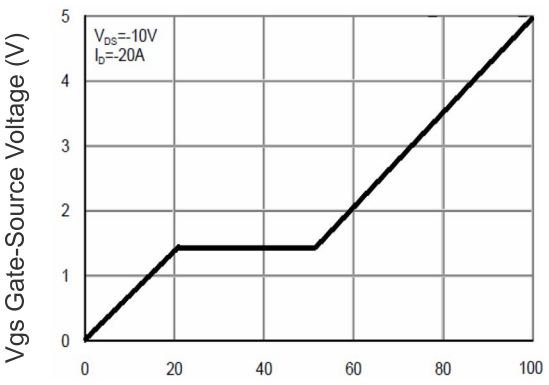


Figure 5 Gate Charge

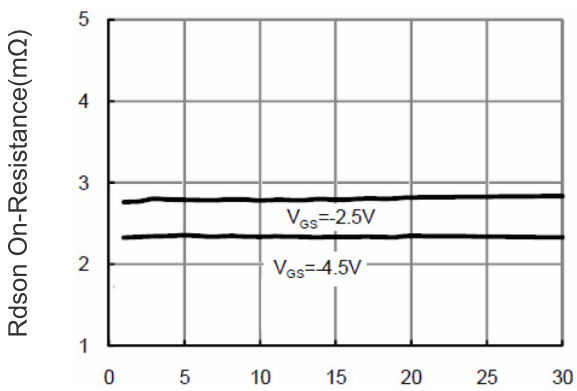


Figure 3 Rdson- Drain Current

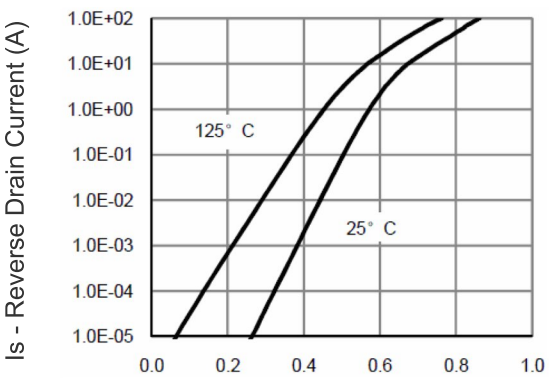


Figure 6 Drain-Source On-Resistance

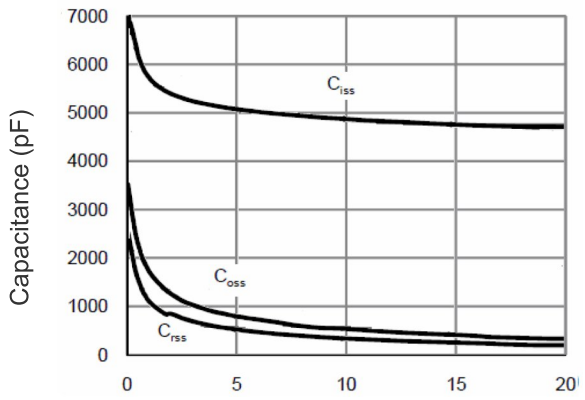


Figure 7 Capacitance vs Vds

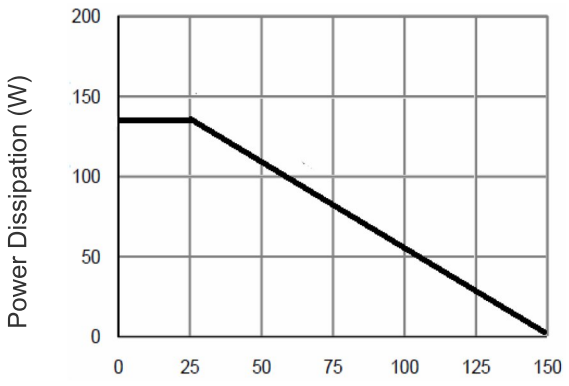


Figure 9 Power De-rating

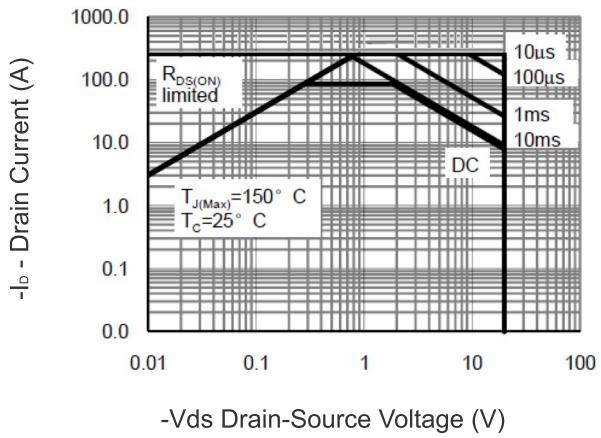


Figure 8 Safe Operation Area

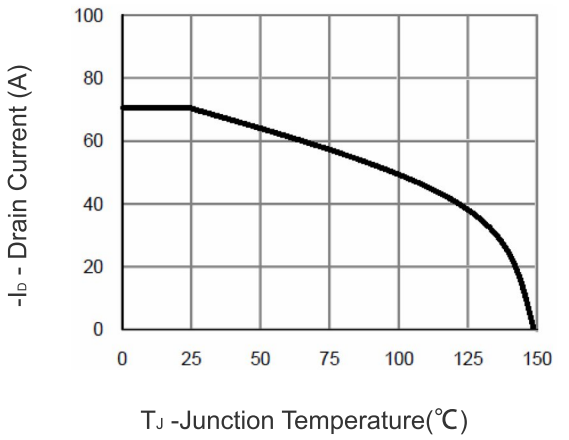


Figure 10 -Current De-rating

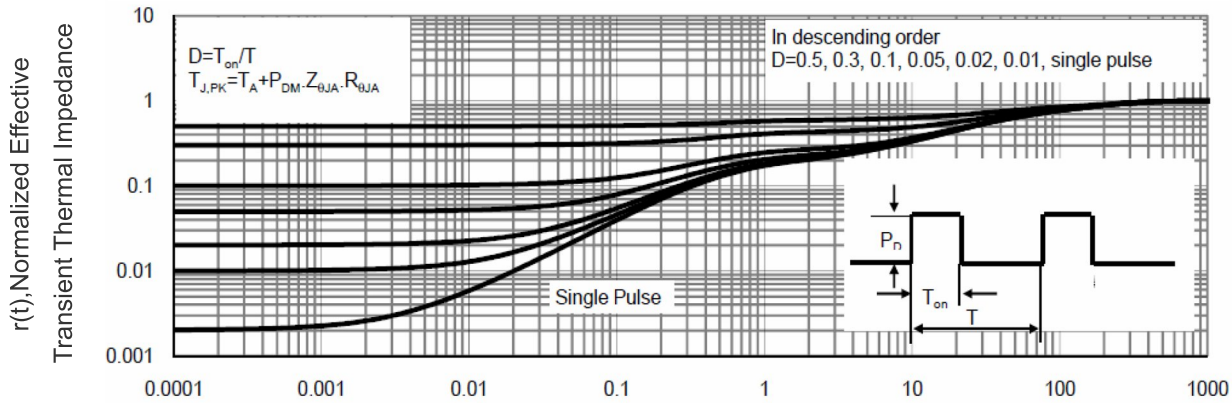
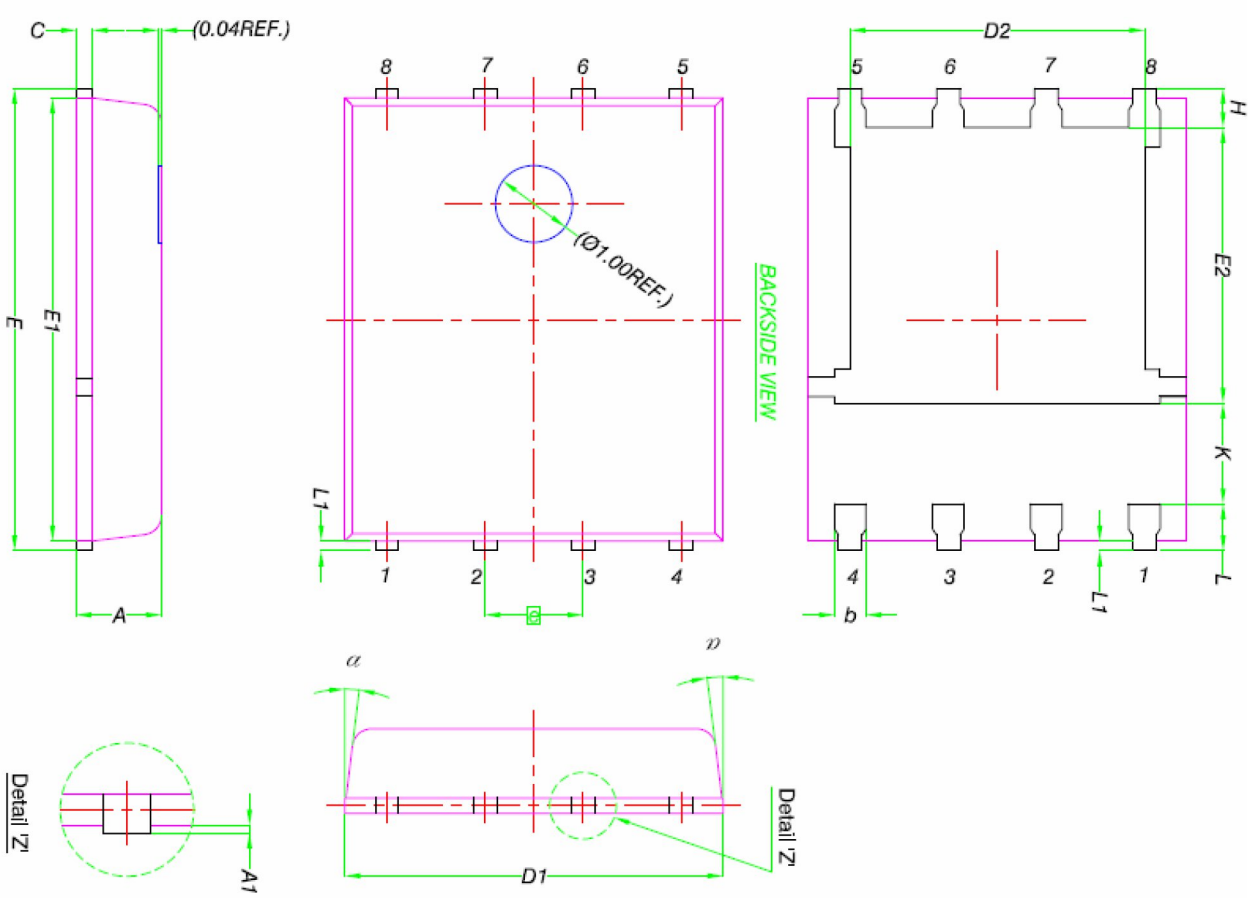
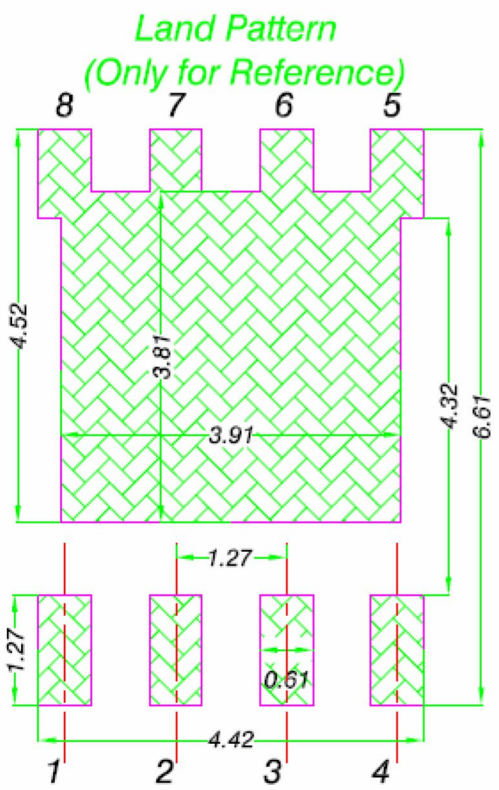


Figure 11 Normalized Maximum Transient Thermal Impedance

DFN5X6-8L Package Information



DIM.	MILLIMETERS		
	MIN.	NOM.	MAX.
A	0.90	1.00	1.10
A1	0	-	0.05
b	0.33	0.41	0.51
C	0.20	0.25	0.30
D1	4.80	4.90	5.00
D2	3.61	3.81	3.96
E	5.90	6.00	6.10
E1	5.70	5.75	5.80
E2	3.38	3.58	3.78
e	1.27 BSC		
H	0.41	0.51	0.61
K	1.10	-	-
L	0.51	0.61	0.71
L1	0.06	0.13	0.20
α	0°	-	12°



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