

MJ N-Channel Super Trench II Power MOSFET

Description

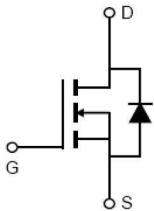
The series of devices uses Super Trench II technology that is uniquely optimized to provide the most efficient high frequency switching performance. Both conduction and switching power losses are minimized due to an extremely low combination of $R_{DS(ON)}$ and Q_g . This device is ideal for high-frequency switching and synchronous rectification.

General Features

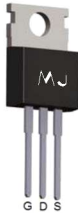
- ◆ $V_{DS}=120V, I_D=90A$
 $R_{DS(ON)} < 7.7m\Omega @ V_{GS}=10V$
- ◆ Excellent gate charge x $R_{DS(on)}$ product(FOM)
- ◆ Very low on-resistance $R_{DS(on)}$
- ◆ 175°C operating temperature
- ◆ Pb-free lead plating

Application

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



Schematic Diagram



TO-220

100% UIS TESTED! 100% ΔV_d s TESTED!

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
MJXP080N12	MJXP080N12	TO-220	-	-	-

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	120	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current-Continuous	I_D	90	A
Drain Current-Continuous(Tc =100°C)	$I_{D(100^\circ C)}$	64	A
Pulsed Drain Current (Note 1)	I_{DM}	360	A
Maximum Power Dissipation	P_D	140	W
Derating factor		0.93	W/°C
Single pulse avalanche energy (Note 4)	E_{AS}	352	mJ
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 175	°C

Thermal Characteristic

Thermal Resistance,Junction-to-Case	$R_{\theta JC}$	1.07	°C/W
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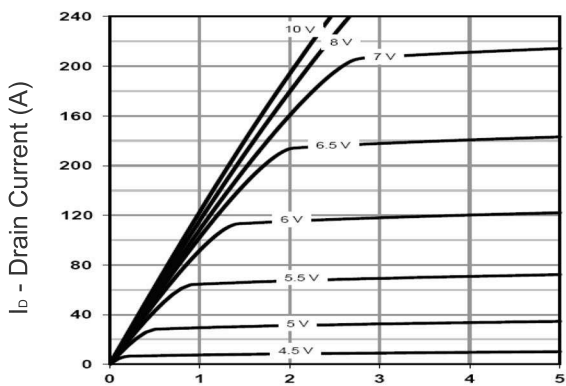
Electrical Characteristics (Tc=25℃ unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V I _D =250μA	120	-	-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =120V,V _{GS} =0V	-	-	1	μA
Gate-Body Leakage Current	I _{GSS}	V _{DS} =±20V,V _{DS} =0V	-	-	±100	nA
On Characteristics ^(Note 3)						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} ,I _D =250μA	2.0	3.0	4.0	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =45A	-	7.7	8.0	mΩ
		V _{GS} =10V, I _D =45A	-	7.5	8.0	mΩ
Forward Transconductance	g _{FS}	V _{DS} =5V,I _D =45A	-	55	-	S
Dynamic Characteristics ^(Note 3)						
Input Capacitance	C _{iss}	V _{DS} =60V,V _{GS} =0V F=1.0MHz	-	3715	-	PF
Output Capacitance	C _{oss}		-	275	-	PF
Reverse Transfer Capacitance	C _{rss}		-	18	-	PF
Switching Characteristics ^(Note 3)						
Turn-on Delay Time	t _{d(on)}	V _{DD} =60V,I _D =45A V _{GS} =10V,R _G =1.6Ω	-	20	-	nS
Turn-on Rise Time	t _r		-	16	-	nS
Turn-Off Delay Time	t _{d(off)}		-	45	-	nS
Turn-Off Fall Time	t _f		-	12	-	nS
Total Gate Charge	Q _g	V _{DS} =60V,I _D =45A V _{GS} =10V	-	58	-	nC
Gate-Source Charge	Q _{gs}		-	21	-	nC
Gate-Drain Charge	Q _{gd}		-	14.5	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage ^(Note 2)	V _{SD}	V _{GS} =0V,I _S =45A	-	-	1.2	V
Diode Forward Current	I _S		-	-	90	A
Reverse Recovery Time	t _{rr}	T _J =25°C, I _F =90A di/dt=100A/μs ^(Note 3)	-	65	-	nS
Reverse Recovery Charge	Q _{rr}		-	105	-	nC

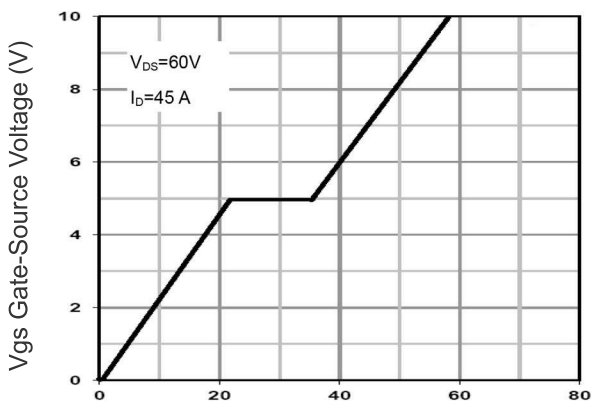
Notes:

- ① Repetitive Rating: Pulse width limited by maximum junction temperature.
- ② Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
- ③ Guaranteed by design, not subject to production
- ④ EAS condition : T_J=25℃,V_{DD}=50V,V_G=10V,L=0.25mH,R_G=25Ω

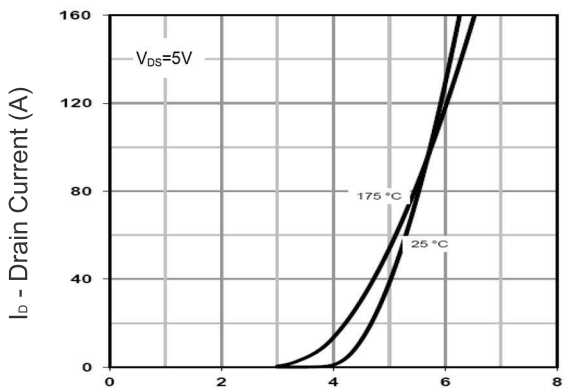
Typical Electrical and Thermal Characteristics



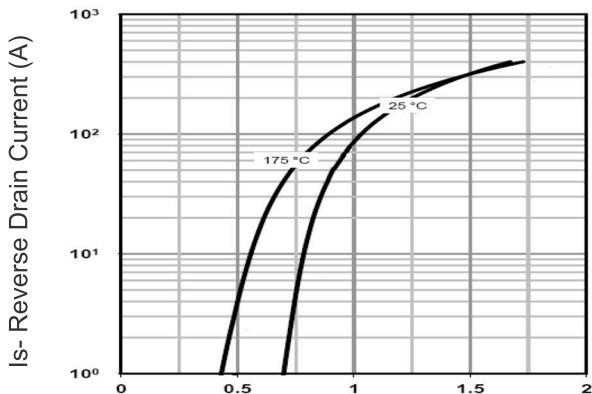
Vds Drain-Source Voltage (V)
Figure 1 Output Characteristics



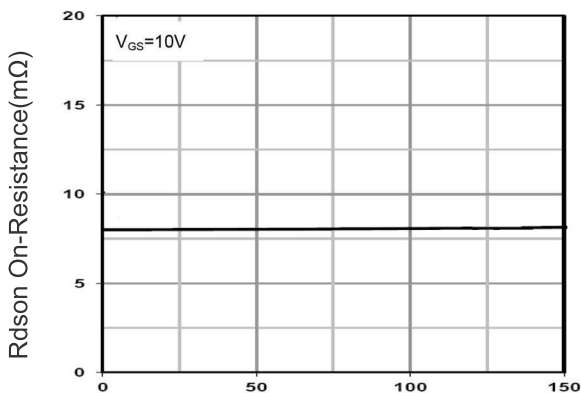
Qg Gate Charge (nC)
Figure 4 Gate Charge



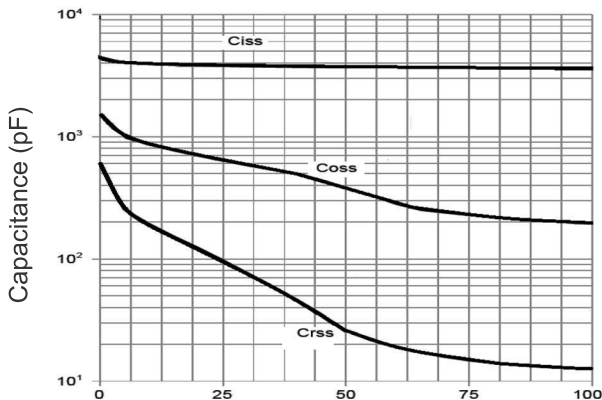
Vgs Gate-Source Voltage (V)
Figure 2 Transfer Characteristics



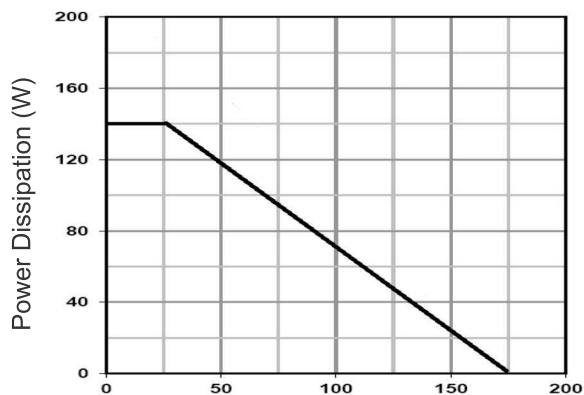
Vsd Source-Drain Voltage (V)
Figure 5 Source- Drain Diode Forward



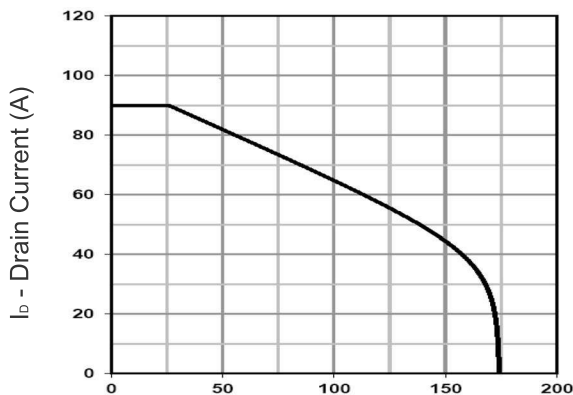
Tj -Junction Temperature(°C)
Figure 3 Rdson-Junction Temperature



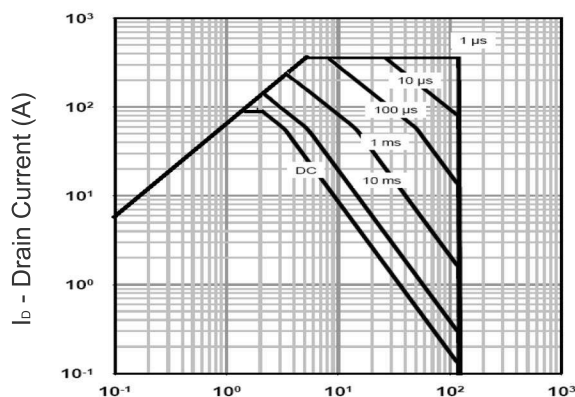
Vds Drain-Source Voltage (V)
Figure 6 Capacitance vs Vds



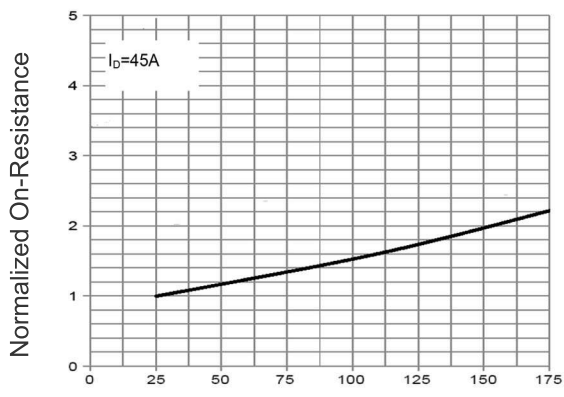
T_J -Junction Temperature(°C)
Figure 7 Power De-rating



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



V_{ds} Drain-Source Voltage (V)
Figure 8 Safe Operation Area



T_J -Junction Temperature(°C)
Figure 10 Rdson-Junction Temperature

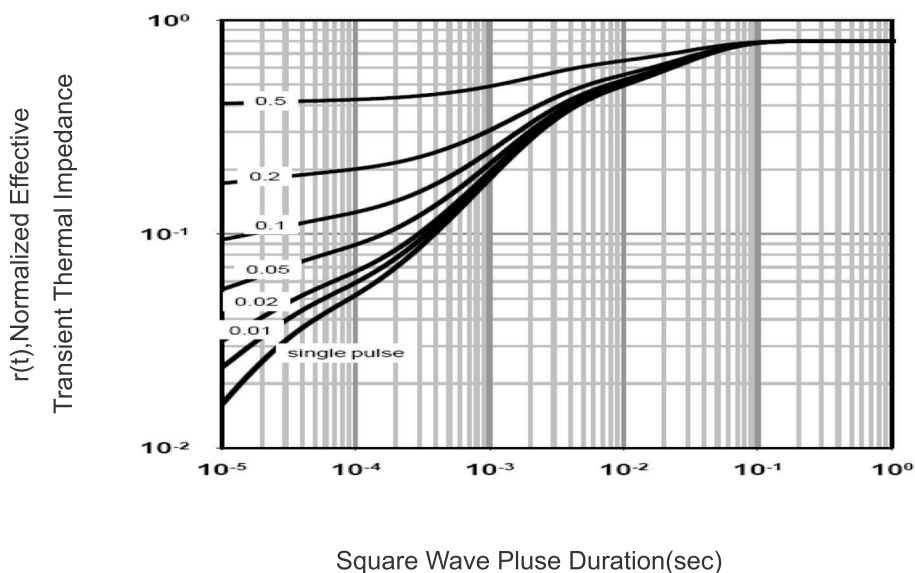
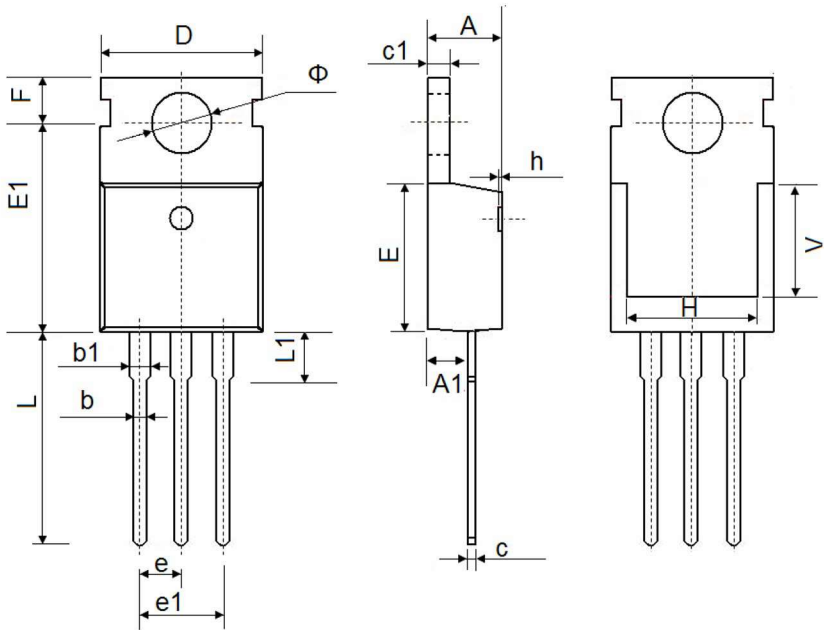


Figure 11 Normalized Maximum Transient Thermal Impedance

TO-220-3L Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.400	4.600	0.173	0.181
A1	2.250	2.550	0.089	0.100
b	0.710	0.910	0.028	0.036
b1	1.170	1.370	0.046	0.054
c	0.330	0.650	0.013	0.026
c1	1.200	1.400	0.047	0.055
D	9.910	10.250	0.390	0.404
E	8.9500	9.750	0.352	0.384
E1	12.650	12.950	0.498	0.510
e	2.540 TYP.		0.100 TYP.	
e1	4.980	5.180	0.196	0.204
F	2.650	2.950	0.104	0.116
H	7.900	8.100	0.311	0.319
h	0.000	0.300	0.000	0.012
L	12.900	13.400	0.508	0.528
L1	2.850	3.250	0.112	0.128
V	6.900 REF.		0.276 REF.	
Φ	3.400	3.800	0.134	0.150

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