MJ N-Channel Enhancement Mode Power MOSFET

Description

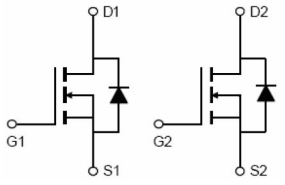
The MJ60ND45G uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications.

General Features

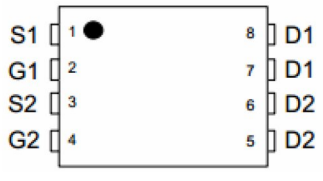
- V_{DS}=60V,I_D=45A
  $R_{DS(ON)}$<15mΩ @ V_{GS}=10V (Typ:11mΩ)
- High density cell design for ultra low Rdson
- Fully characterized avalanche voltage and current
- Low gate to drain charge to reduce switching losses

Application

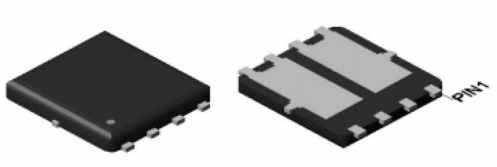
- Power switching application
- Load switch



Schematic Diagram



Pin Assignment



DFN 5X6

100% UIS TESTED! 100% ΔVds TESTED!

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
MJ60ND45G	MJ60ND45G	DFN 5X6 -8L	Ø330mm	12mm	5000

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	60	V
Gate-Source Voltage	V_{GS}	±20	V
Drain Current-Continuous	I_D	45	A
Drain Current-Continuous(T_C =100℃)	$I_{D(100℃)}$	32	A
Pulsed Drain Current	I_{DM}	140	A
Single pulse avalanche energy (Note 5)	E_{AS}	260	mJ
Maximum Power Dissipation	P_D	60	W
Operating Junction and Storage Temperature Range	T_J ,T_{STG}	-55 To 150	℃

Thermal Characteristic

Thermal Resistance,Junction-to-Case (Note 2)	$R_{\theta JC}$	2.08	℃/W

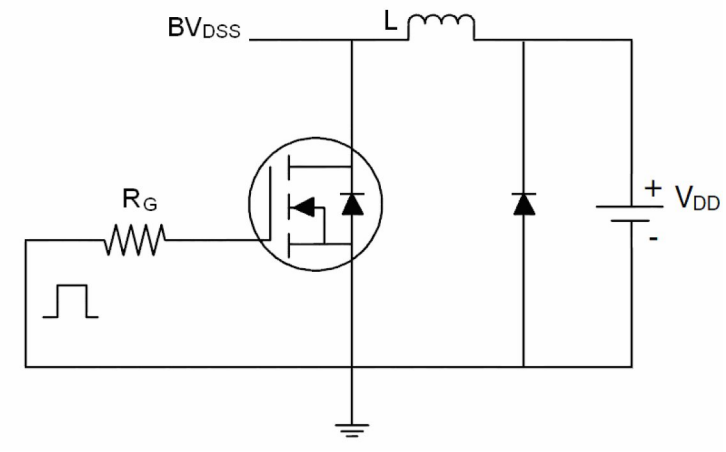
Electrical Characteristics (T_C =25℃unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V I_D=250μA	60	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=60V,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	3	4	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=20A	-	11	15	mΩ
Forward Transconductance	g_{FS}	V_{DS}=5V,I_D=9A	25	-	-	S
Dynamic Characteristics (Note 4)						
Input Capacitance	C_{lss}	V_{DS}=30V,V_{GS}=0V, F=1.0MHz	-	2622.3	-	PF
Output Capacitance	C_{oss}		-	175.3	-	PF
Reverse Transfer Capacitance	C_{rss}		-	126.5	-	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=30V,R_L=1.5Ω V_{GS}=10V,R_{GEN}=3Ω	-	8.5	-	nS
Turn-on Rise Time	t_r		-	6	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	30	-	nS
Turn-Off Fall Time	t_f		-	5	-	nS
Total Gate Charge	Q_g	V_{DS}=30V,I_D=20A, V_{GS}=10V	-	52	-	nC
Gate-Source Charge	Q_{gs}		-	13.9	-	nC
Gate-Drain Charge	Q_{gd}		-	15.2	-	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		-	-	45	A
Reverse Recovery Time	t_{rr}	T_J=25°C, I_F=20A di/dt=100A/μs (Note 3)	-	30	-	nS
Reverse Recovery Charge	Q_{rr}		-	44	-	nC

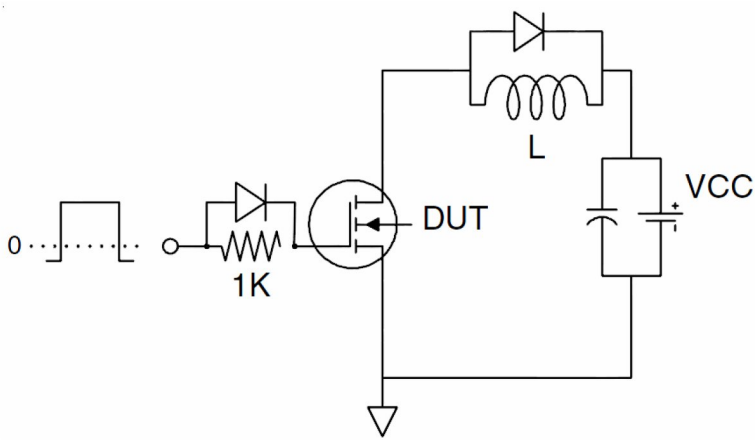
Notes:

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
⑤ EAS condition:Tj=25℃ ,V_{DD}=30V,V_G=10V,L=0.5mH,Rg=25Ω

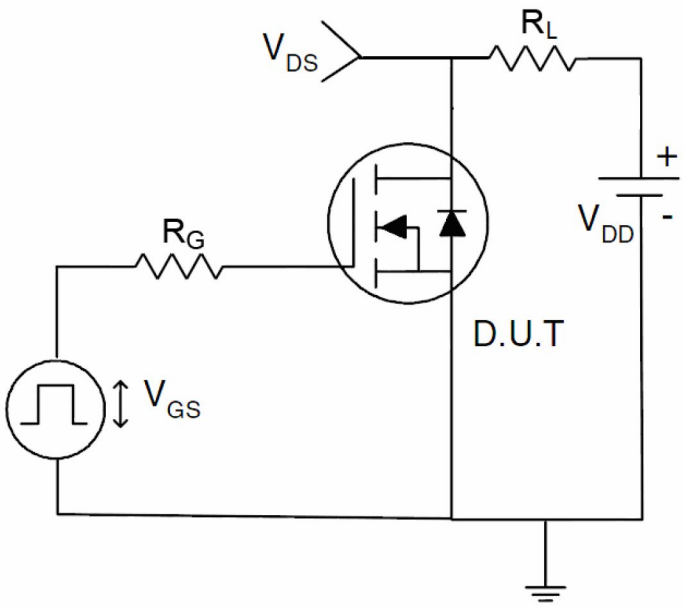
Test circuit



EAS test Circuit



Gate charge test Circuit



Switch Time Test Circuit

Typical Electrical and Thermal Characteristics (Curves)

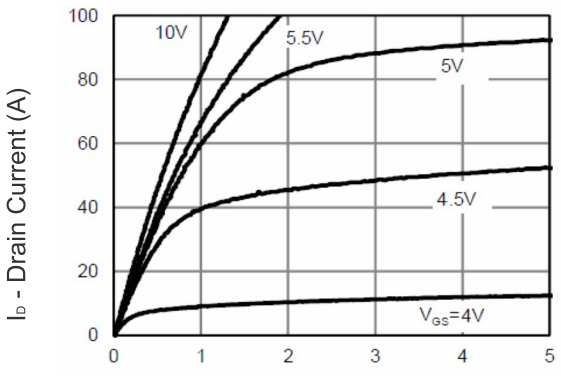


Figure 1 Output Characteristics

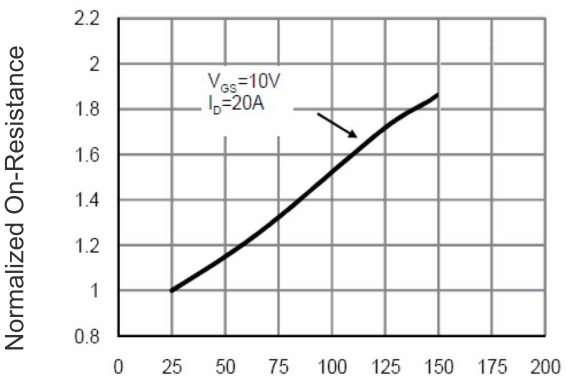


Figure 4 Rdson-JunctionTemperature

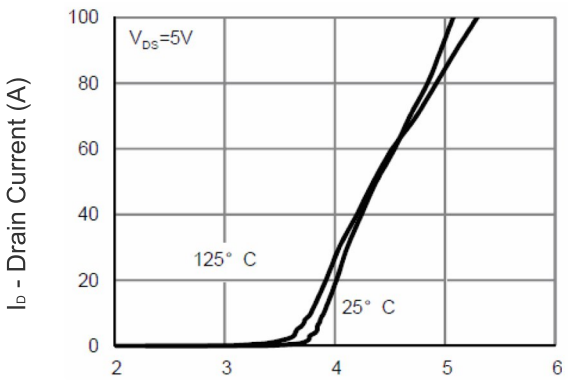


Figure 2 Transfer Characteristics

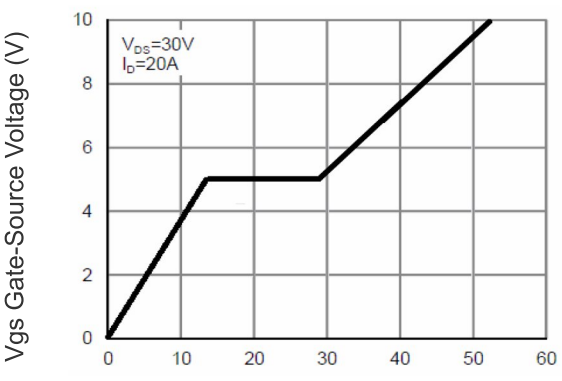


Figure 5 Gate Charge

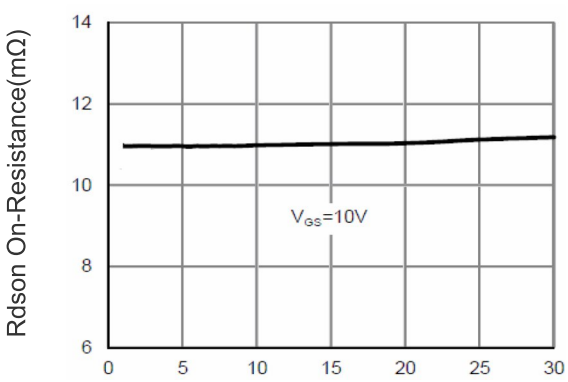


Figure 3 Rdson- Drain Current

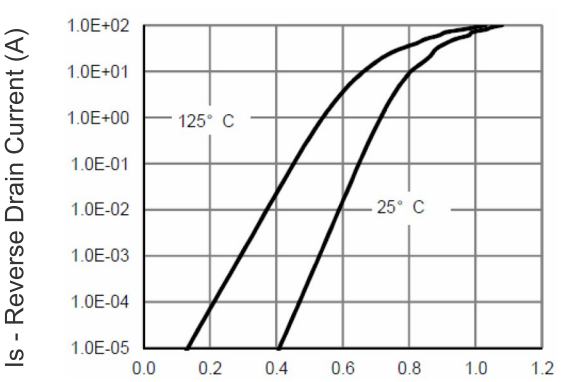
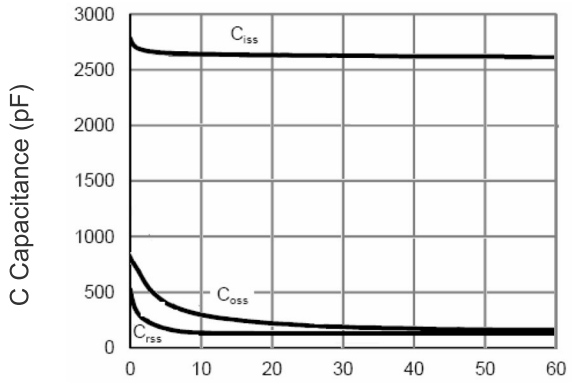
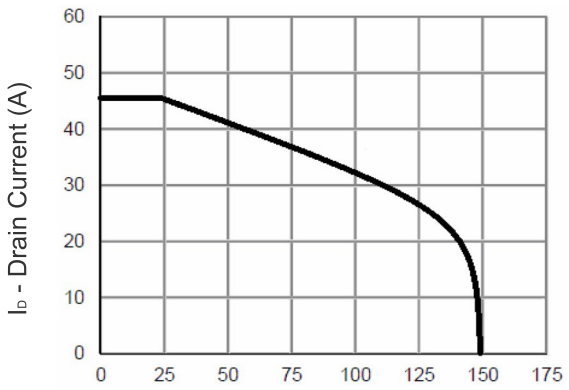


Figure 6 Source- Drain Diode Forward



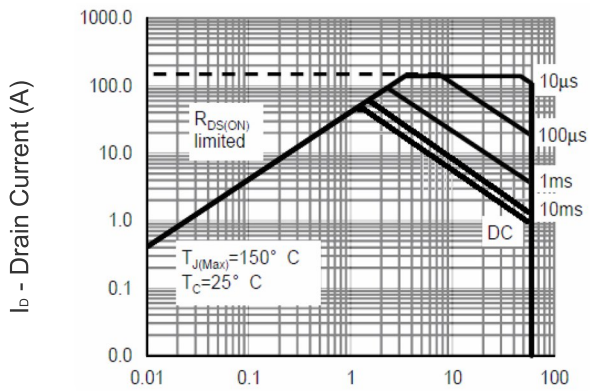
Vds Drain-Source Voltage (V)

Figure 7 Capacitance vs Vds



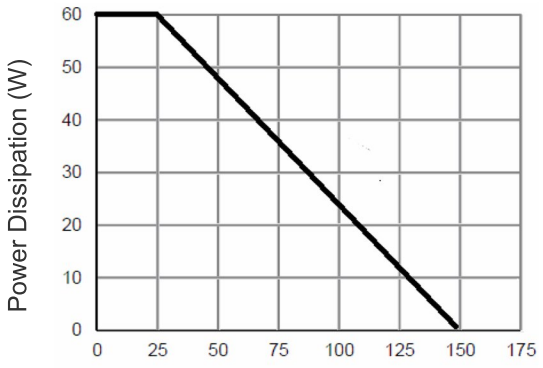
T_J -Junction Temperature(℃)

Figure 9 Current De-rating



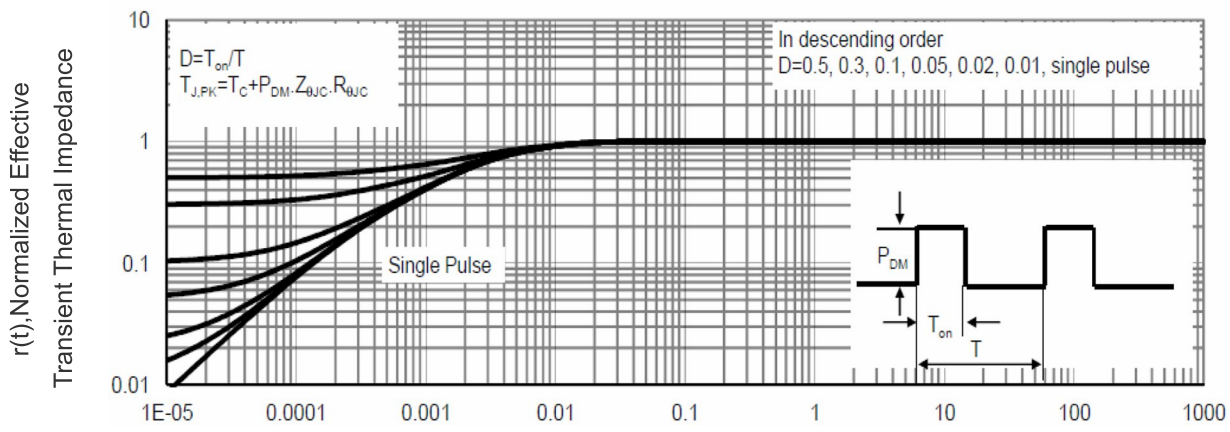
Vds Drain-Source Voltage (V)

Figure 8 Safe Operation Area



T_J -Junction Temperature(℃)

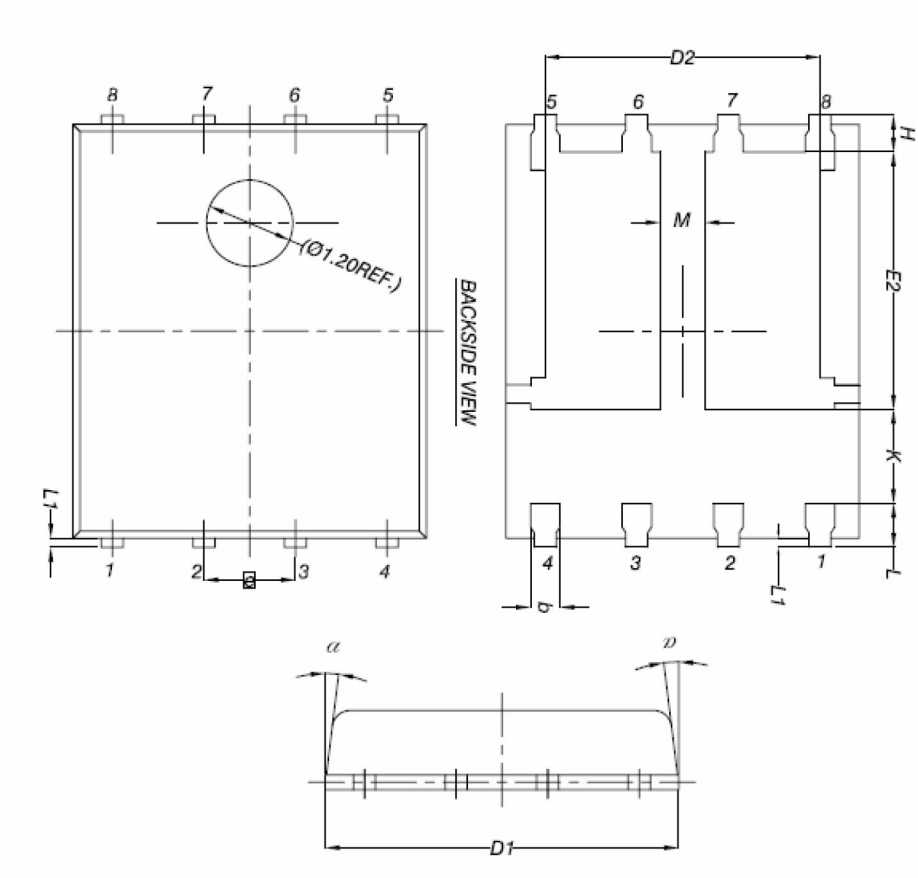
Figure 10 Power De-rating



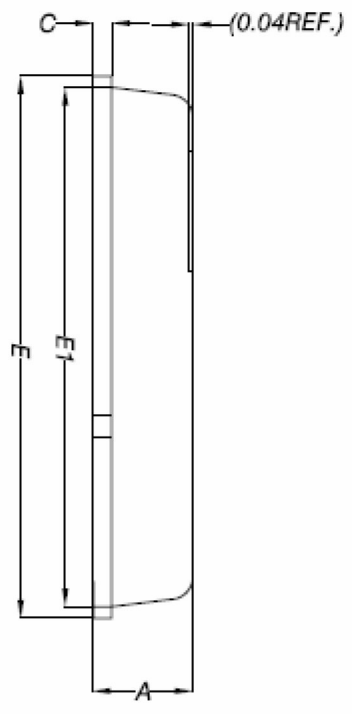
Square Wave Pluse Duration(sec)

Figure 11 Normalized Maximum Transient Thermal Impedance

DFN5X6-8L Package Information



DIM.	MILLIMETERS		
	MIN.	NOM.	MAX.
A	0.90	1.00	1.10
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
M	0.50	-	-
α	0°	-	12°



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