MJ N-Channel Enhancement Mode Power MOSFET

Description

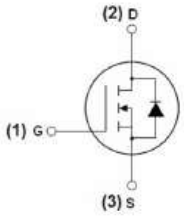
The MJ75H21D uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in Automotive applications and a wide variety of other applications.

General Features

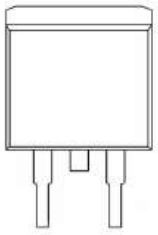
- V_{DS} =75V,I_D =210A
  $R_{DS(ON)}$ <4mΩ @ V_{GS}=10V
- Good stability and uniformity with high E_{AS}
- Special process technology for high ESD capability
- High density cell design for ultra low Rdson
- Fully characterized avalanche voltage and current
- Excellent package for good heat dissipation

Application

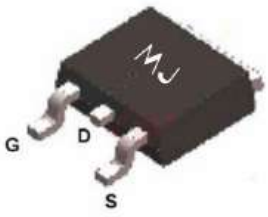
- Automotive applications
- Hard switched and high frequency circuits
- Uninterruptible power supply



Schematic diagram



Marking and pin assignment



TO-263-2L top view

100% UIS TESTED! 100% ΔVds TESTED!

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
MJ75H21D	MJ75H21D	TO-263-2L	-	-	-

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	75	V
Gate-Source Voltage	V_{GS}	±20	V
Drain Current-Continuous	I_D	210	A
Drain Current-Continuous(T_C =100℃)	$I_{D(100℃)}$	150	A
Pulsed Drain Current	I_{DM}	840	A
Maximum Power Dissipation	P_D	330	W
Derating factor		2.2	W/℃
Single pulse avalanche energy (Note 4)	E_{AS}	2200	mJ
Operating Junction and Storage Temperature Range	T_J ,T_{STG}	-55 To 175	℃

Thermal Characteristic

Thermal Resistance,Junction-to-Case (Note 1)	$R_{\theta JC}$	0.455	℃/W

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	75	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=75V,V_{GS}=0V	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	V_{DS}=±20V,V_{DS}=0V	-	-	±200	nA
On Characteristics						
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=40A	-	3	4	mΩ
Forward Transconductance	g_{FS}	V_{DS}=25V,I_D=40A	100	165	-	S
Dynamic Characteristics						
Input Capacitance	C_{lss}	V_{DS}=25V,V_{GS}=0V F=1.0MHz	-	11000	-	PF
Output Capacitance	C_{oss}		-	914	-	PF
Reverse Transfer Capacitance	C_{rss}		-	695	-	PF
Switching Characteristics						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=30V,I_D=2A,R_L=15Ω V_{GS}=10V,R_G=2.5Ω	-	23	-	nS
Turn-on Rise Time	t_r		-	190	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	130	-	nS
Turn-Off Fall Time	t_f		-	120	-	nS
Total Gate Charge	Q_g	I_D=30A,V_{DD}=30V V_{GS}=10V	-	250	-	nC
Gate-Source Charge	Q_{gs}		-	48	-	nC
Gate-Drain Charge	Q_{gd}		-	98	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage	V_{SD}	V_{GS}=0V,I_S=40A	-	-	1.2	V
Reverse Recovery Time	t_{rr}	T_J=25°C, I_F=40A di/dt=100A/μs (Note 2)	-	48	-	nS
Reverse Recovery Charge	Q_{rr}		-	78	-	nC
Forward Turn-On Time	t_{on}	Intrinsic turn-on time is negligible(turn-on is dominated by LS+LD)				

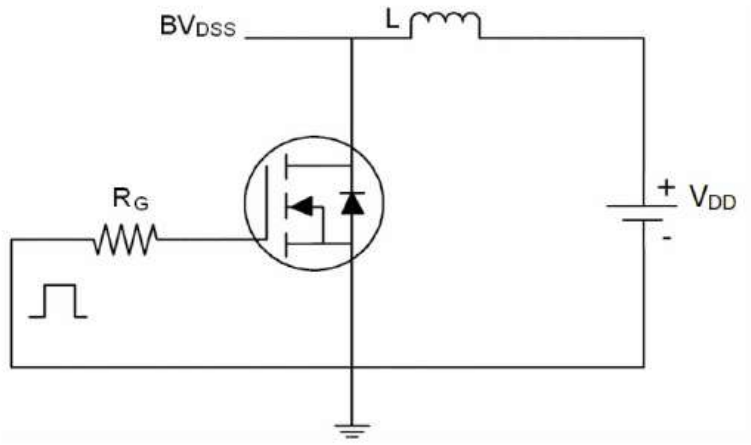
Notes:

① Surface Mounted on FR4 Board, t ≤ 10 sec.

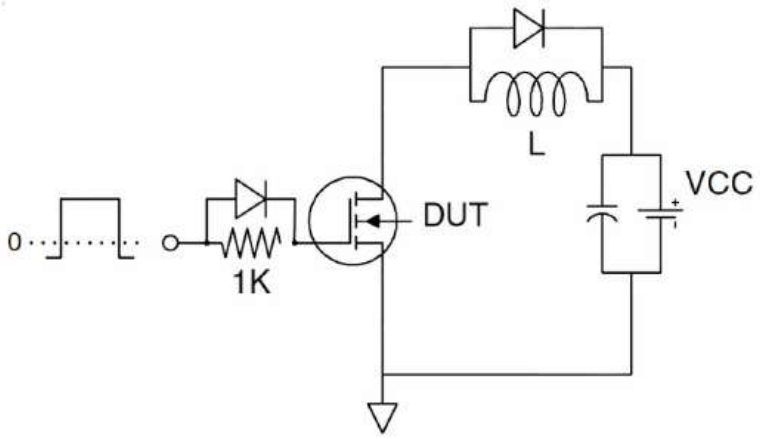
② Pulse Test: Pulse Width ≤ 400μs, Duty Cycle ≤ 2%.

③ EAS condition: Tj=25℃,V_{DD}=37.5V,V_G=10V,L=0.5mH,Rg=25Ω,I_{AS}=37A

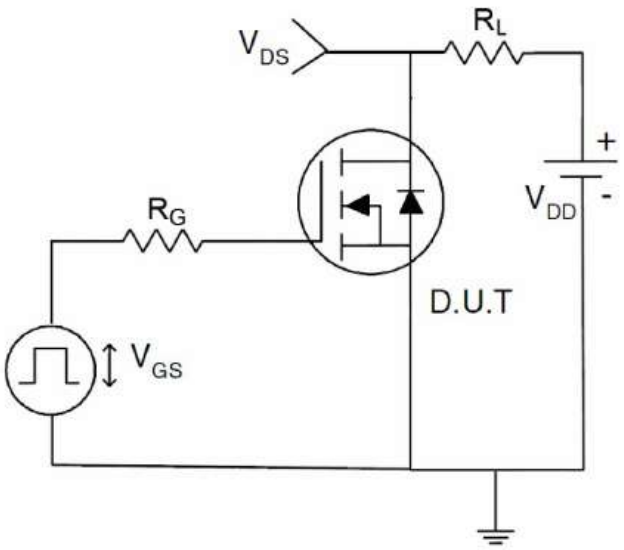
Test circuit



EAS test Circuit



Gate charge test Circuit



Switch Time Test Circuit

Typical Electrical and Thermal Characteristics (Curves)

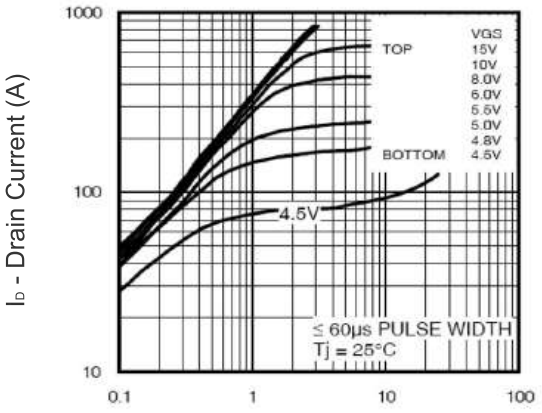


Figure 1 Output Characteristics

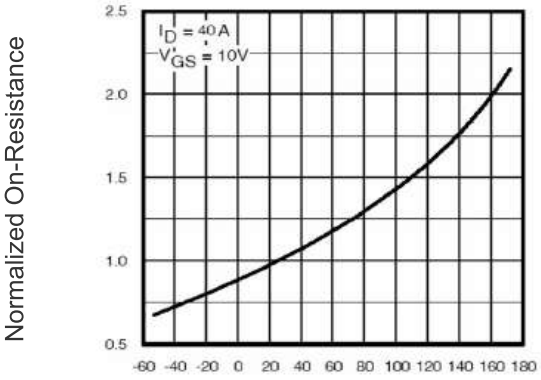


Figure 4 Rdson-Junction Temperature

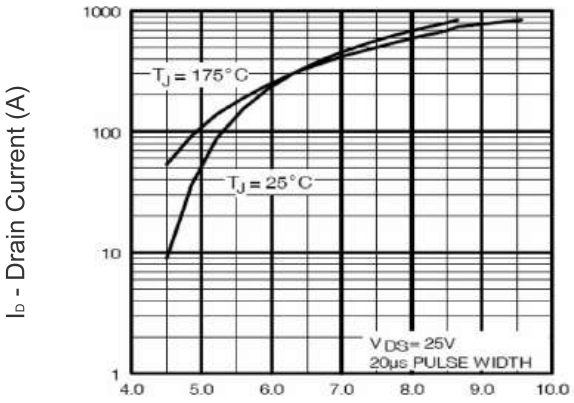


Figure 2 Transfer Characteristics

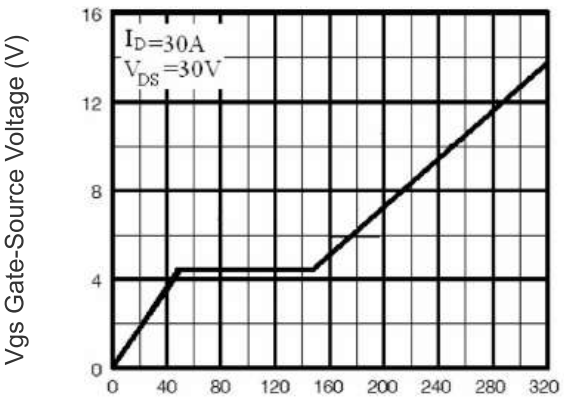


Figure 5 Gate Charge

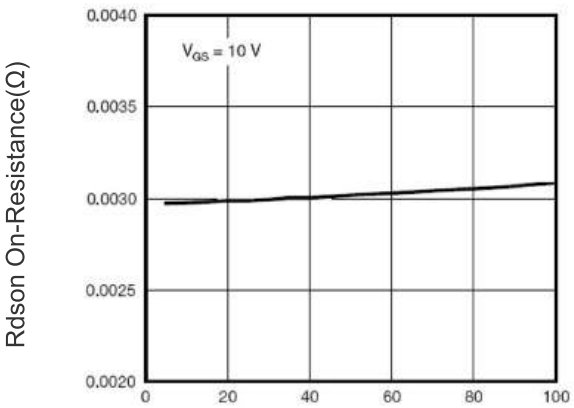


Figure 3 Rdson- Drain Current

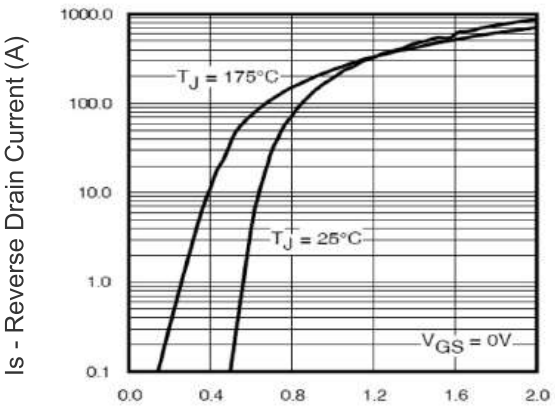
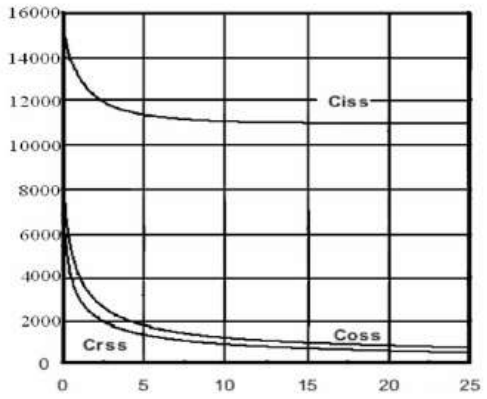
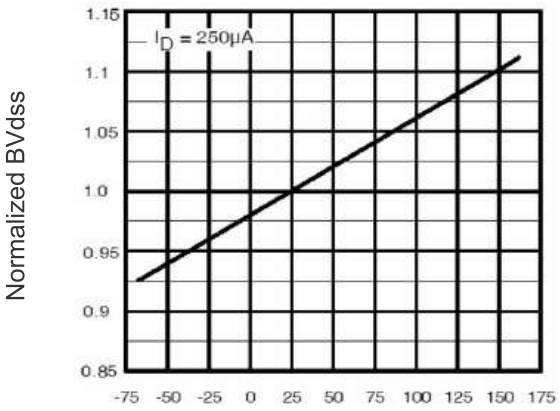


Figure 6 Source- Drain Diode Forward



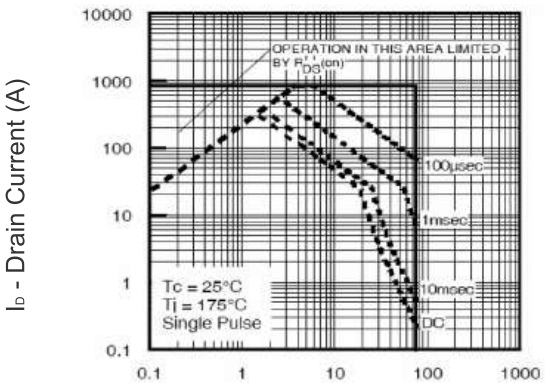
Vds Drain-Source Voltage (V)

Figure 7 Capacitance vs Vds



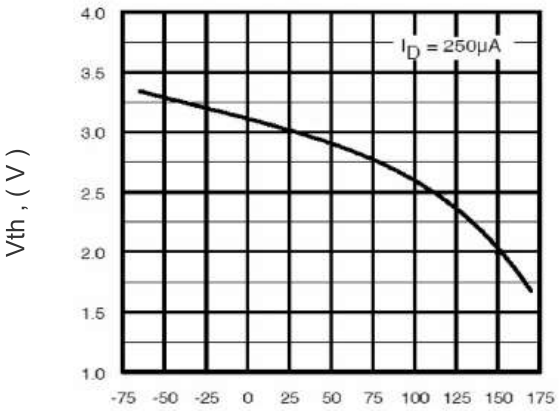
TJ -Junction Temperature(℃)

Figure 9 BVDSS vs Junction Temperature



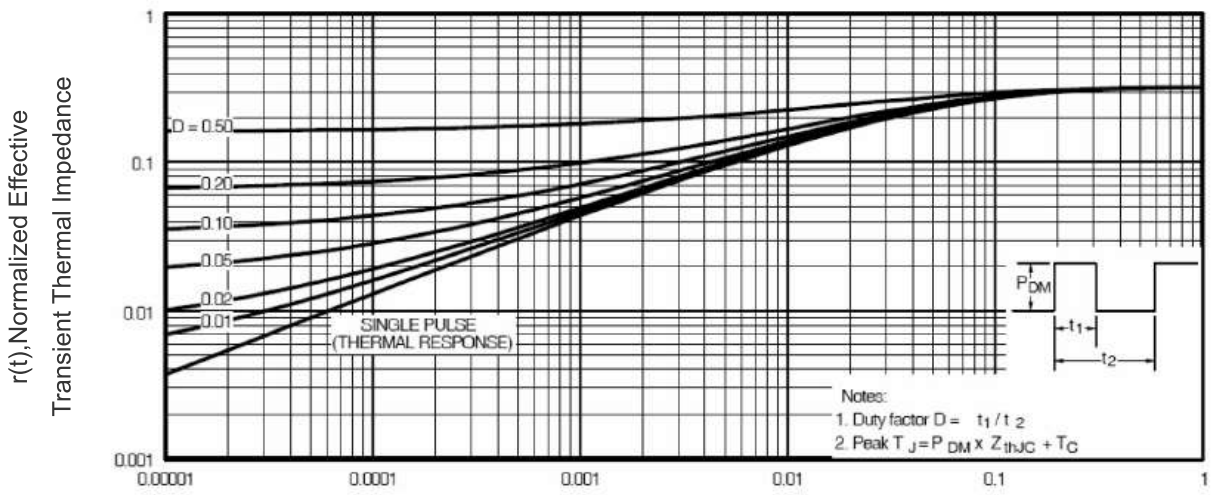
Vds Drain-Source Voltage (V)

Figure 8 Safe Operation Area



TJ -Junction Temperature(℃)

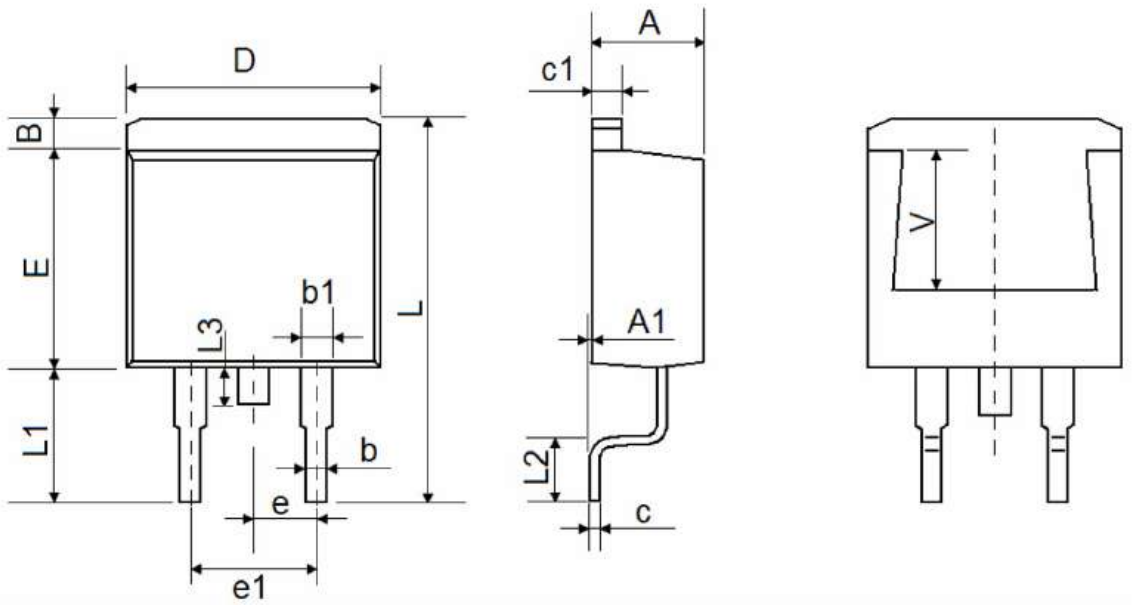
Figure 10 VGS(th) vs Junction Temperature



Square Wave Pluse Duration(sec)

Figure 11 Normalized Maximum Transient Thermal Impedance

TO-263-2L Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.470	4.670	0.176	0.184
A1	0.000	0.150	0.000	0.006
B	1.170	1.370	0.046	0.054
b	0.710	0.910	0.028	0.036
b1	1.170	1.370	0.046	0.054
c	0.310	0.530	0.012	0.021
c1	1.170	1.370	0.046	0.054
D	10.010	10.310	0.394	0.406
E	8.500	8.900	0.335	0.350
e	2.540 TYP.		0.100 TYP.	
e1	4.980	5.180	0.196	0.204
L	15.050	15.450	0.593	0.608
L1	5.080	5.480	0.200	0.216
L2	2.340	2.740	0.092	0.108
L3	1.300	1.700	0.051	0.067
V	5.600 REF		0.220 REF	

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