

MJ N-Channel Enhancement Mode Power MOSFET

Description

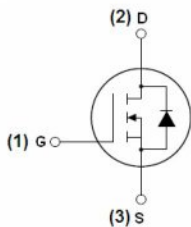
The MJ0115K uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications.

General Features

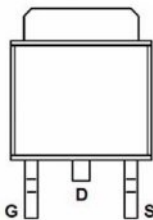
- ◆ $V_{DS} = 100V, I_D = 15A$
 $R_{DS(ON)} < 100m\Omega$ @ $V_{GS} = 10V$ (Typ: 80m Ω)
 $R_{DS(ON)} < 110m\Omega$ @ $V_{GS} = 4.5V$ (Typ: 85m Ω)
- ◆ High density cell design for ultra low R_{dson}
- ◆ Fully characterized avalanche voltage and current
- ◆ Good stability and uniformity with high E_{AS}
- ◆ Excellent package for good heat dissipation

Application

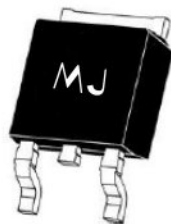
- ◆ Power switching application
- ◆ Hard switched and high frequency circuits



Schematic diagram



Marking and pin assignment



TO-252-2L top view

100% UIS TESTED! 100% ΔV_{ds} TESTED!

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
MJ0115K	MJ0115K	TO-252-2L	-	-	-

Absolute Maximum Ratings ($T_c = 25\text{ }^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	100	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current-Continuous	I_D	15	A
Drain Current-Continuous($T_c = 100^{\circ}\text{C}$)	$I_{D(100^{\circ}\text{C})}$	10.6	A
Pulsed Drain Current	I_{DM}	60	A
Maximum Power Dissipation	P_D	50	W
Single pulse avalanche energy ^(Note 5)	E_{AS}	200	mJ
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 175	$^{\circ}\text{C}$

Thermal Characteristic

Thermal Resistance, Junction-to-Case ^(Note 2)	$R_{\theta JC}$	3	$^{\circ}\text{C/W}$
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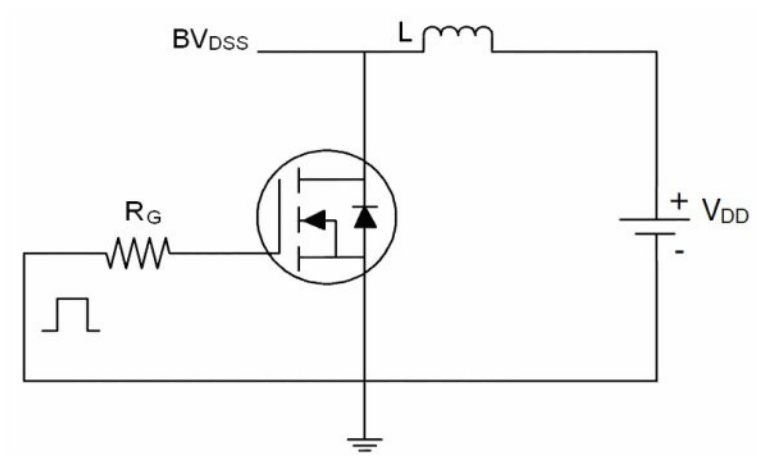
Electrical Characteristics (Tc =25℃unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V I _D =250μA	100	110	-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =100V,V _{GS} =0V	-	-	1	μA
Gate-Body Leakage Current	I _{GSS}	V _{DS} =±20V,V _{DS} =0V	-	-	±100	nA
On Characteristics <small>(Note 3)</small>						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} ,I _D =250μA	1.0	1.6	2.5	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =10A	-	80	100	mΩ
		V _{GS} =4.5V, I _D =10A	-	85	110	mΩ
Forward Transconductance	g _{FS}	V _{DS} =5V,I _D =10A	-	10	-	S
Dynamic Characteristics <small>(Note 4)</small>						
Input Capacitance	C _{iss}	V _{DS} =50V,V _{GS} =0V F=1.0MHz	-	830	-	PF
Output Capacitance	C _{oss}		-	44.2	-	PF
Reverse Transfer Capacitance	C _{rss}		-	30.1	-	PF
Switching Characteristics <small>(Note 4)</small>						
Turn-on Delay Time	t _{d(on)}	V _{DD} =50V, R _L =6.4Ω V _{GS} =10V,R _G =3Ω	-	15	-	nS
Turn-on Rise Time	t _r		-	5	-	nS
Turn-Off Delay Time	t _{d(off)}		-	25	-	nS
Turn-Off Fall Time	t _f		-	7	-	nS
Total Gate Charge	Q _g	V _{DS} =50V,I _D =10A V _{GS} =10V	-	22.3	-	nC
Gate-Source Charge	Q _{gs}		-	2.87	-	nC
Gate-Drain Charge	Q _{gd}		-	6.14	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage <small>(Note 3)</small>	V _{SD}	V _{GS} =0V,I _S =15A	-	-	1.2	V
Diode Forward Current <small>(Note 2)</small>	I _S		-	-	15	A

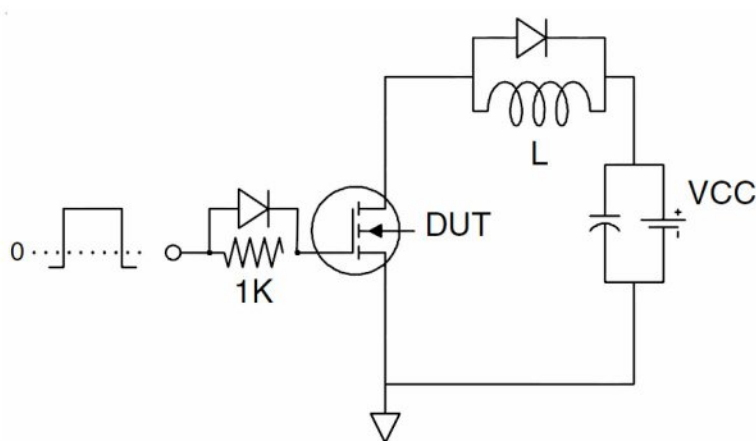
Notes:

- 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
- ⑤ EAS condition：Tj=25℃,V_{DD}=50V,V_G=10V,L=0.5mH,R_G=25Ω

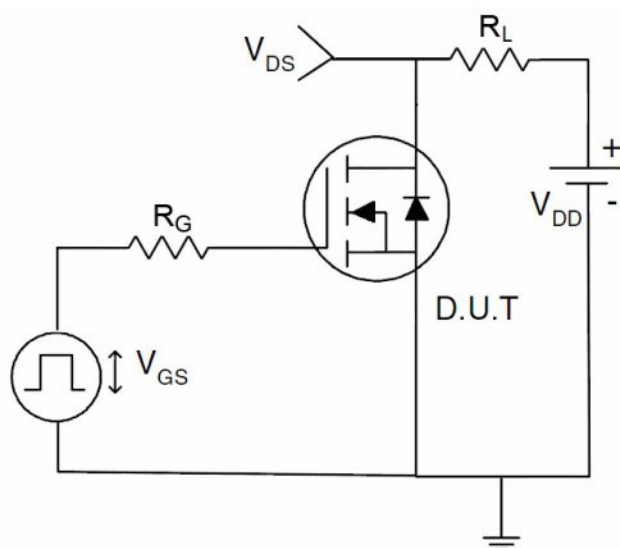
Test circuit



EAS test Circuit

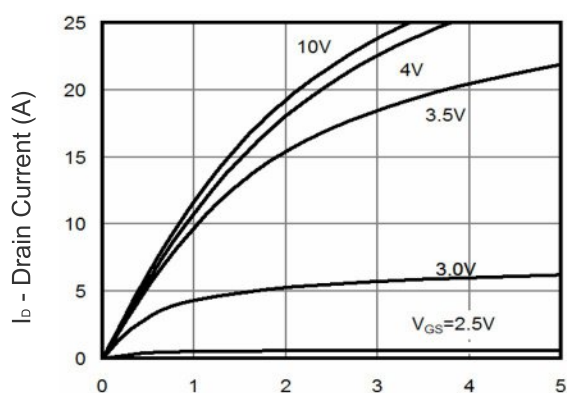


Gate charge test Circuit



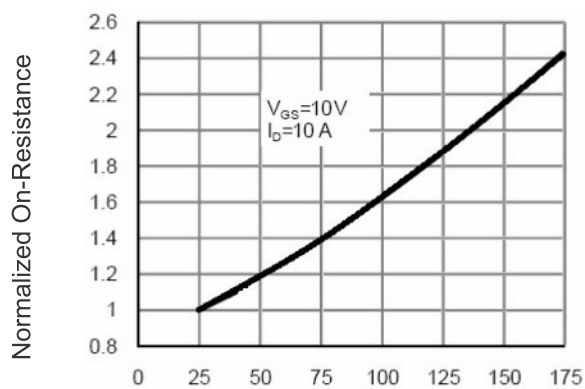
Switch Time Test Circuit

Typical Electrical and Thermal Characteristics (Curves)



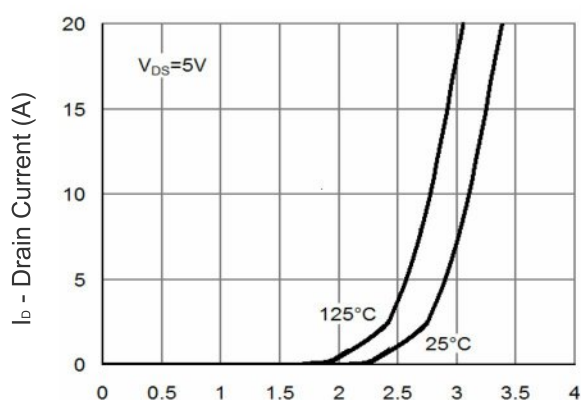
V_{DS} Drain-Source Voltage (V)

Figure 1 Output Characteristics



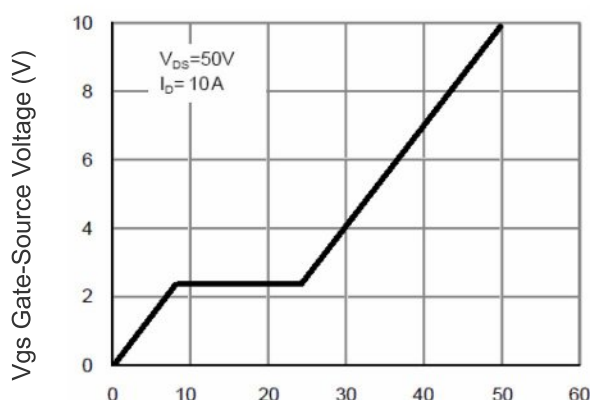
T_J -Junction Temperature(°C)

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



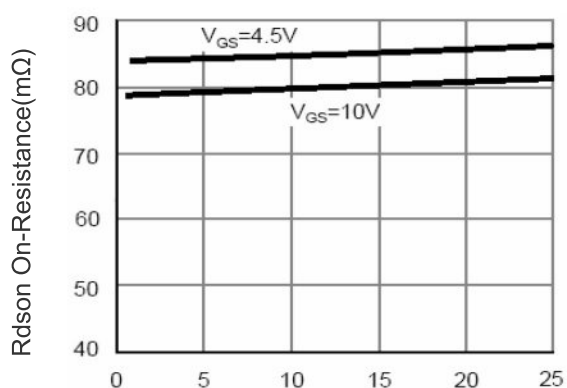
V_{GS} Gate-Source Voltage (V)

Figure 2 Transfer Characteristics



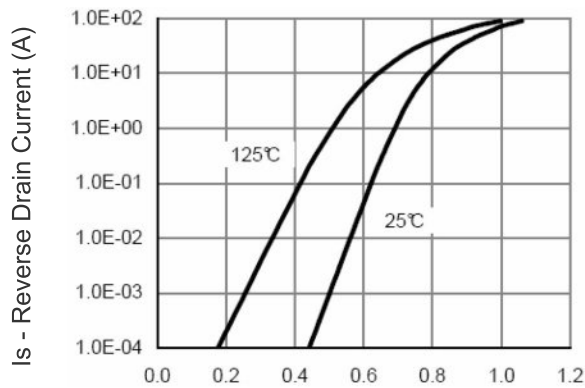
Q_g Gate Charge (nC)

Figure 5 Gate Charge



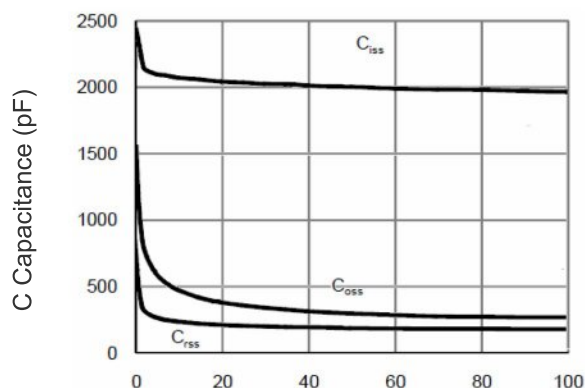
I_D - Drain Current (A)

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

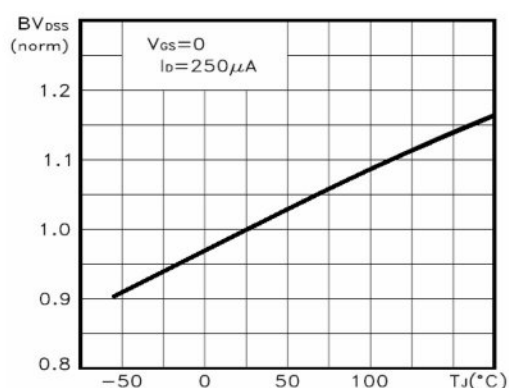


V_{SD} Source-Drain Voltage (V)

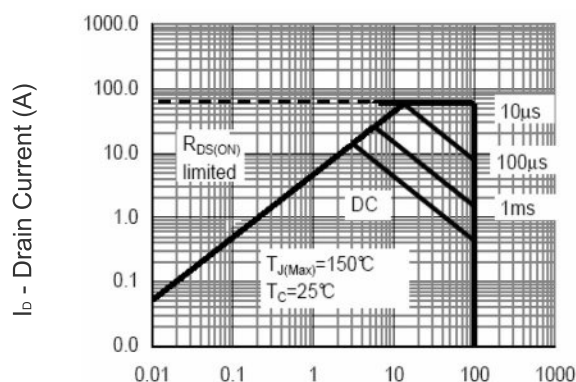
Figure 6 Source- Drain Diode Forward



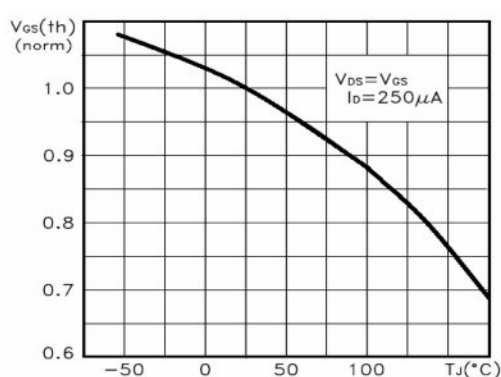
Vds Drain-Source Voltage (V)
Figure 7 Capacitance vs Vds



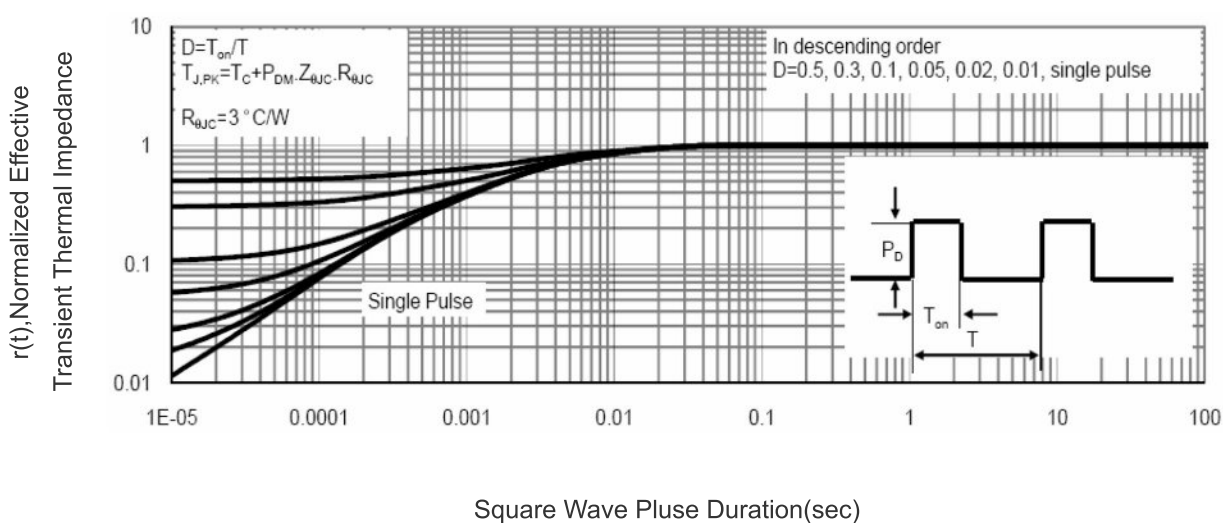
Tj -Junction Temperature(°C)
Figure 9 BV_{DSS} vs Junction Temperature



Vds Drain-Source Voltage (V)
Figure 8 Safe Operation Area

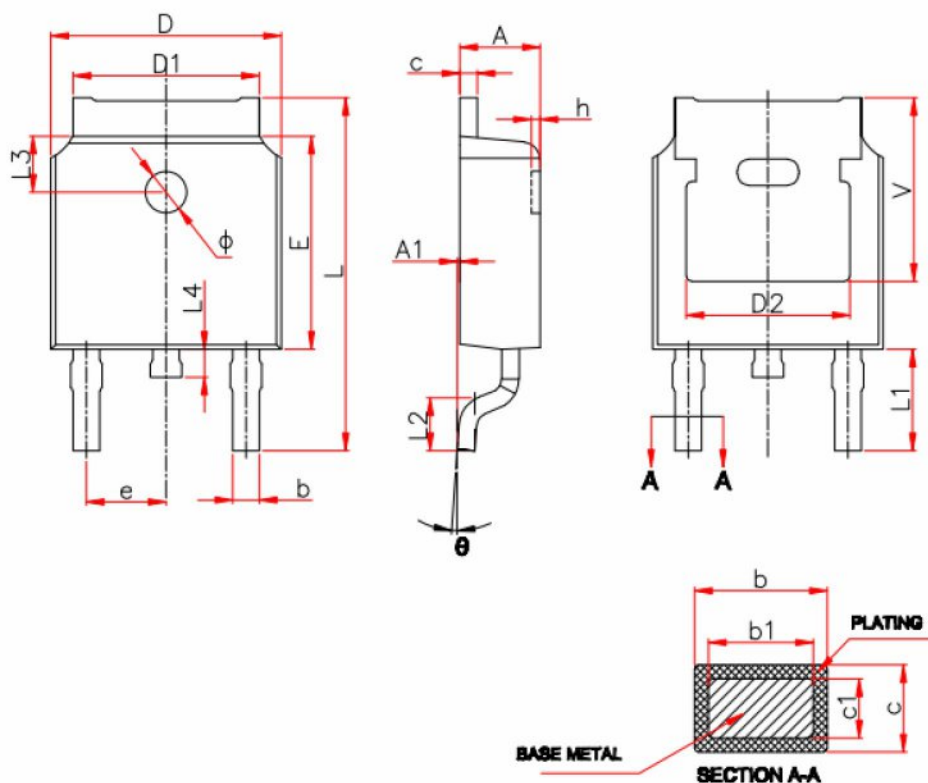


Tj -Junction Temperature(°C)
Figure 10 V_{GS(th)} vs Junction Temperature



Square Wave Pluse Duration(sec)
Figure 11 Normalized Maximum Transient Thermal Impedance

TO-252 Package Information



Symbol	Millimeters	
	Min.	Max.
A	2.20	2.40
A1	0.00	0.13
b	0.66	0.86
b1	0.73	0.79
c	0.46	0.58
c1	0.50	0.52
D	6.50	6.70
D1	5.10	5.46
D2	4.83 REF.	
E	6.00	6.20
e	2.19	2.39
L	9.80	10.40
L1	2.90 REF.	
L2	1.40	1.70
L3	1.60 REF.	
L4	0.60	1.00
Φ	1.10	1.30
θ	0°	8°

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