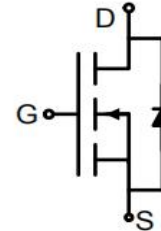




**N-Channel Enhancement Mode Power MOSFET**

**Description**

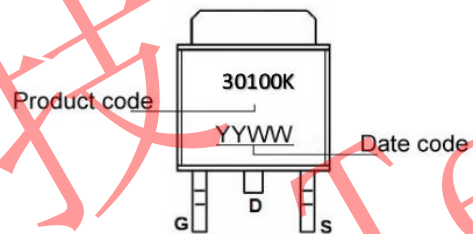
The MXD30N100 uses advanced trench technology and design to provide excellent  $R_{DS(ON)}$ , with low gate charge . It can be used in a wide variety of applications.



**General Features**

- ◆  $V_{DS} = 30V$ ,  $I_D = 100A$
- ◆  $R_{DS(ON)}$ (Typ.) $4m\Omega$  @  $V_{gs}=10V$
- ◆  $R_{DS(ON)}$ (Typ.) $7m\Omega$  @  $V_{gs}=4.5V$
- ◆ High density cell design for ultra low  $R_{dson}$
- ◆ Fully characterized avalanche voltage and current
- ◆ Good stability and uniformity with high EAS
- ◆ Excellent package for good heat dissipation
- ◆ Special process technology for high ESD capability

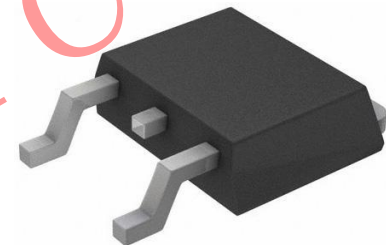
Schematic diagram



Marking and pin assignment

**Application**

- ◆ Power switching application
- ◆ Hard switched and high frequency circuits
- ◆ Uninterruptible power supply



TO-252-2L top view

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	$V_{DS}$	30	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Drain Current-Continuous	$I_D$	100	A
Drain Current-Continuous( $T_c=100^\circ C$ )	$I_D(100^\circ C)$	70	A
Pulsed Drain Current	$I_{DM}$	400	A
Maximum Power Dissipation	$P_D$	110	W
Single pulse avalanche energy (Note 5)	EAS	350	mJ
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 To 175	$^\circ C$



**Electrical Characteristics** (TA=25°C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
<b>Off Characteristics</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	30	-	-	V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =30V, V <sub>GS</sub> =0V	-	-	1	μA
Gate-Body Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V	-	-	±100	nA
<b>On Characteristics (Note 3)</b>						
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	1	1.6	3	V
Drain-Source On-State Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =30A	-	4.0	5.5	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =30A	-	7.0	8.5	mΩ
Forward Transconductance	g <sub>FS</sub>	V <sub>DS</sub> =10V, I <sub>D</sub> =20A	50	-	-	S
<b>Dynamic Characteristics (Note4)</b>						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =25V, V <sub>GS</sub> =0V, F=1.0MHz		2100		PF
Output Capacitance	C <sub>oss</sub>			390		PF
Reverse Transfer Capacitance	C <sub>rss</sub>			270		PF
<b>Switching Characteristics (Note 4)</b>						
Turn-on Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> =15V, I <sub>D</sub> =60A V <sub>GS</sub> =4.5V, R <sub>GEN</sub> =1.8Ω	-	11	-	nS
Turn-on Rise Time	t <sub>r</sub>		-	12	-	nS
Turn-Off Delay Time	t <sub>d(off)</sub>		-	35	-	nS
Turn-Off Fall Time	t <sub>f</sub>		-	30	-	nS
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =15V, I <sub>D</sub> =30A, V <sub>GS</sub> =5V		50		nC
Gate-Source Charge	Q <sub>gs</sub>			6		nC
Gate-Drain Charge	Q <sub>gd</sub>			13		nC
<b>Drain-Source Diode Characteristics</b>						
Diode Forward Voltage (Note 3)	V <sub>SD</sub>	V <sub>GS</sub> =0V, I <sub>S</sub> =20A	-	-	1.2	V
Diode Forward Current (Note 2)	I <sub>S</sub>	-	-	-	100	A
Reverse Recovery Time	t <sub>rr</sub>	T <sub>J</sub> = 25°C, I <sub>F</sub> = 60A	-	56	-	nS
Reverse Recovery Charge	Q <sub>rr</sub>	di/dt = 100A/μs(Note3)	-	110	-	nC
Forward Turn-On Time	t <sub>on</sub>	Intrinsic turn-on time is negligible (turn-on is dominated by LS+LD)				

**Notes:**

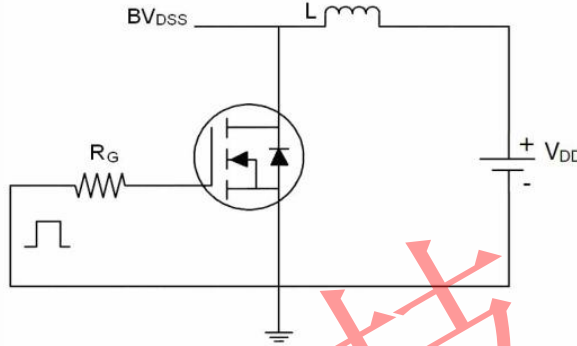
1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production
5. EAS condition: T<sub>J</sub>=25°C, V<sub>DD</sub>=15V, V<sub>G</sub>=10V, L=0.5mH, R<sub>g</sub>=25Ω



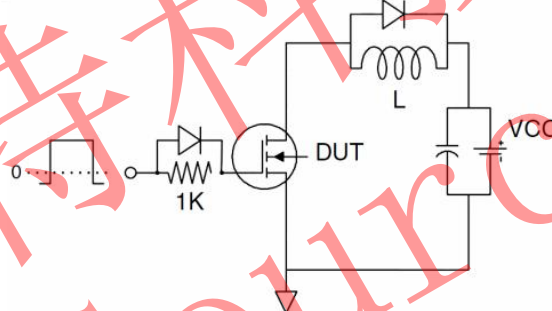
## Typical Performance Characteristics

Test circuit

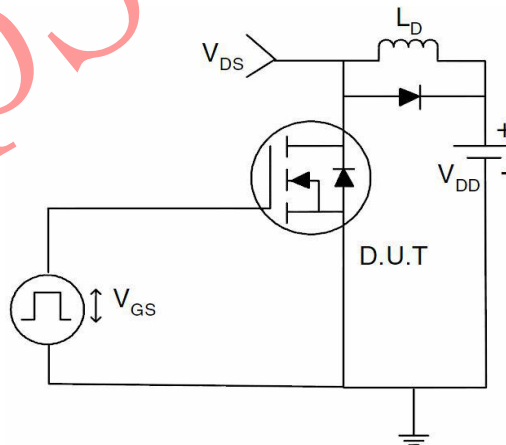
1) EAs test Circuits

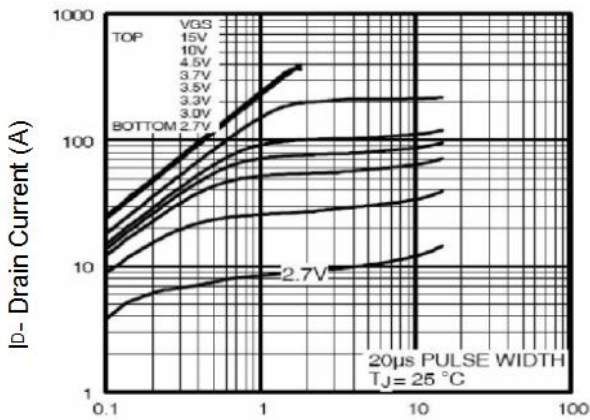


2) Gate charge test Circuit:



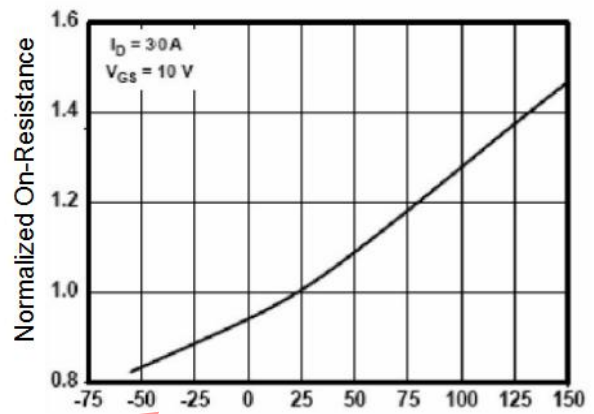
3) Switch Time Test Circuit:





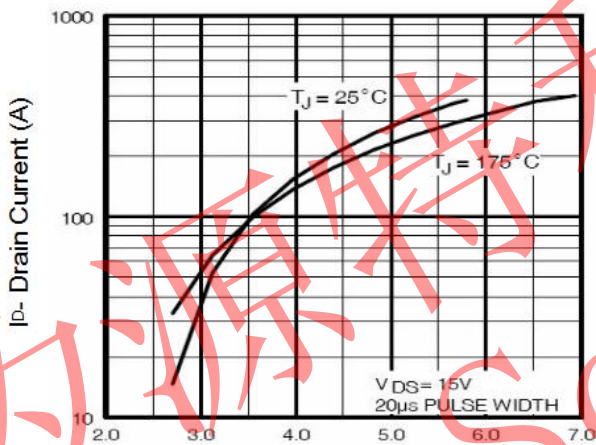
Vds Drain-Source Voltage (V)

**Figure 1 Output Characteristics Figure**



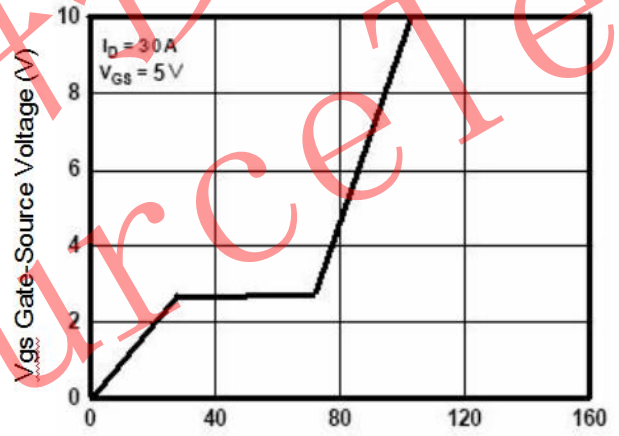
TJ-Junction Temperature(°C)

**4 Rdson-Junction Temperature**



Vgs Gate-Source Voltage (V)

**Figure 2 Transfer Characteristics**



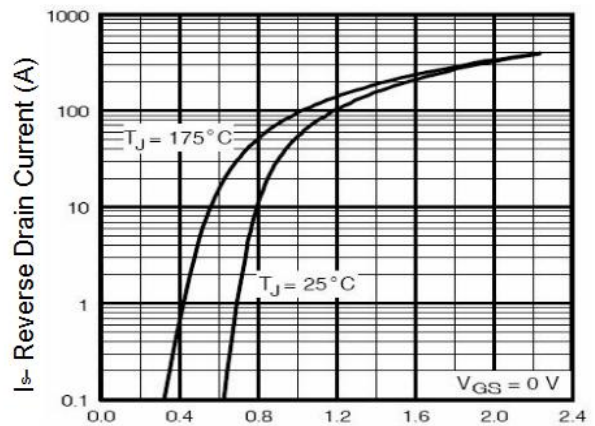
Qg Gate Charge (nC)

**Figure 5 Gate Charge**



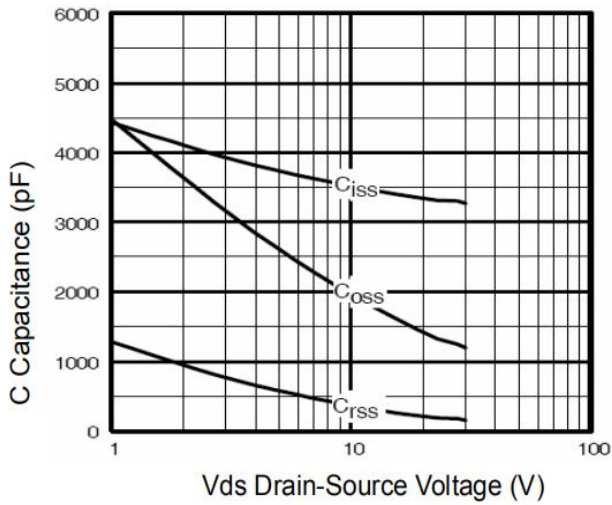
ID- Drain Current (A)

**Figure 3 Rdson- Drain Current**

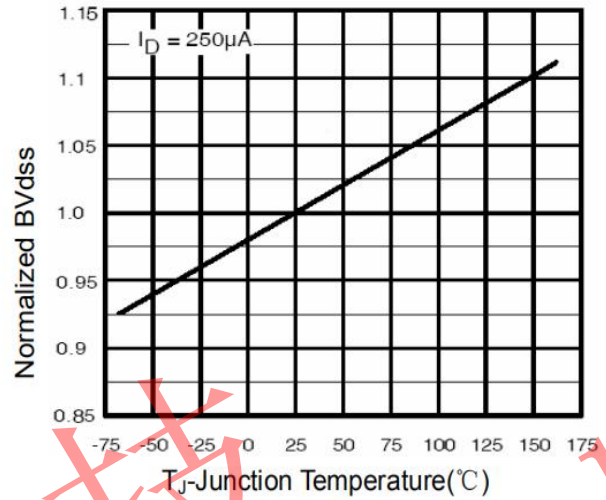


Vsd Source-Drain Voltage (V)

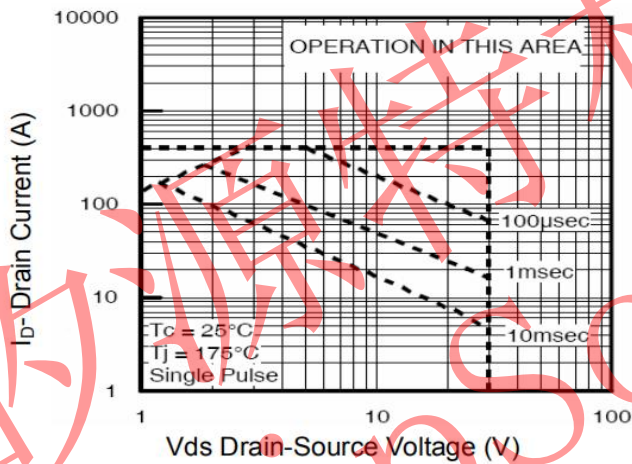
**Figure 6 Source- Drain Diode Forward**



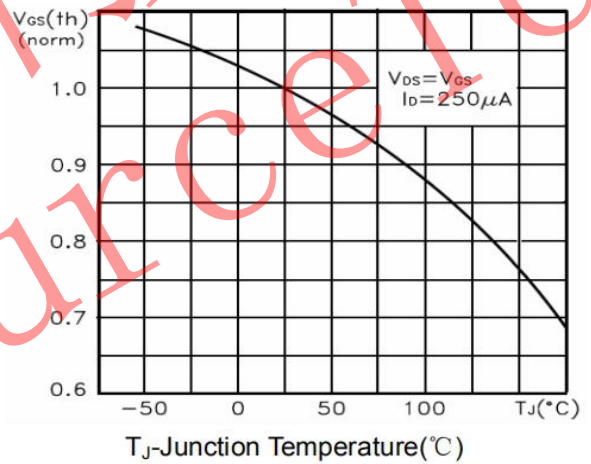
**Figure 7 Capacitance vs Vds**



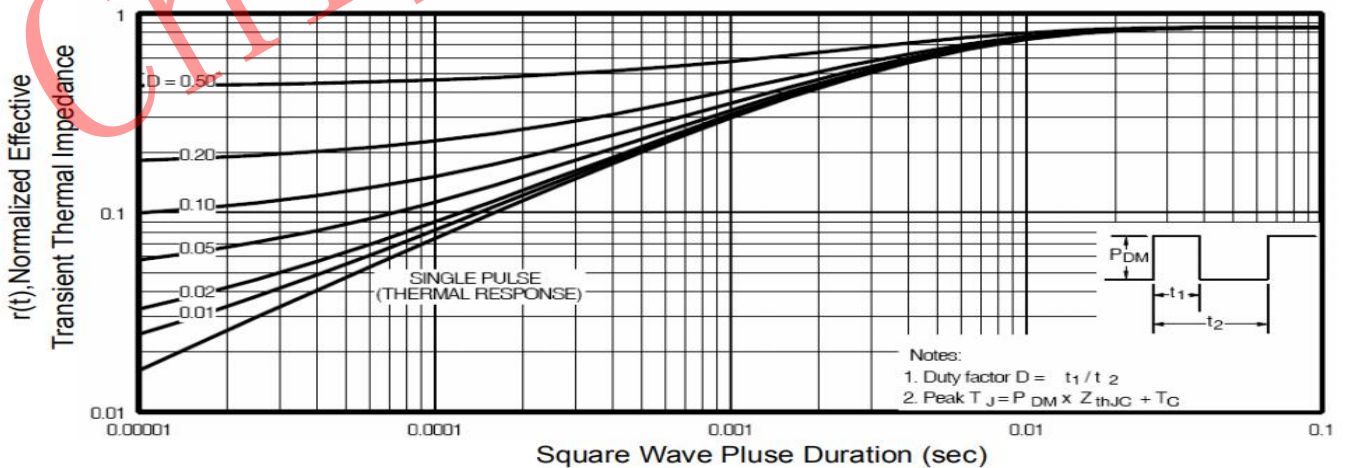
**Figure 9 BV<sub>DSS</sub> vs Junction Temperature**



**Figure 8 Safe Operation Area**



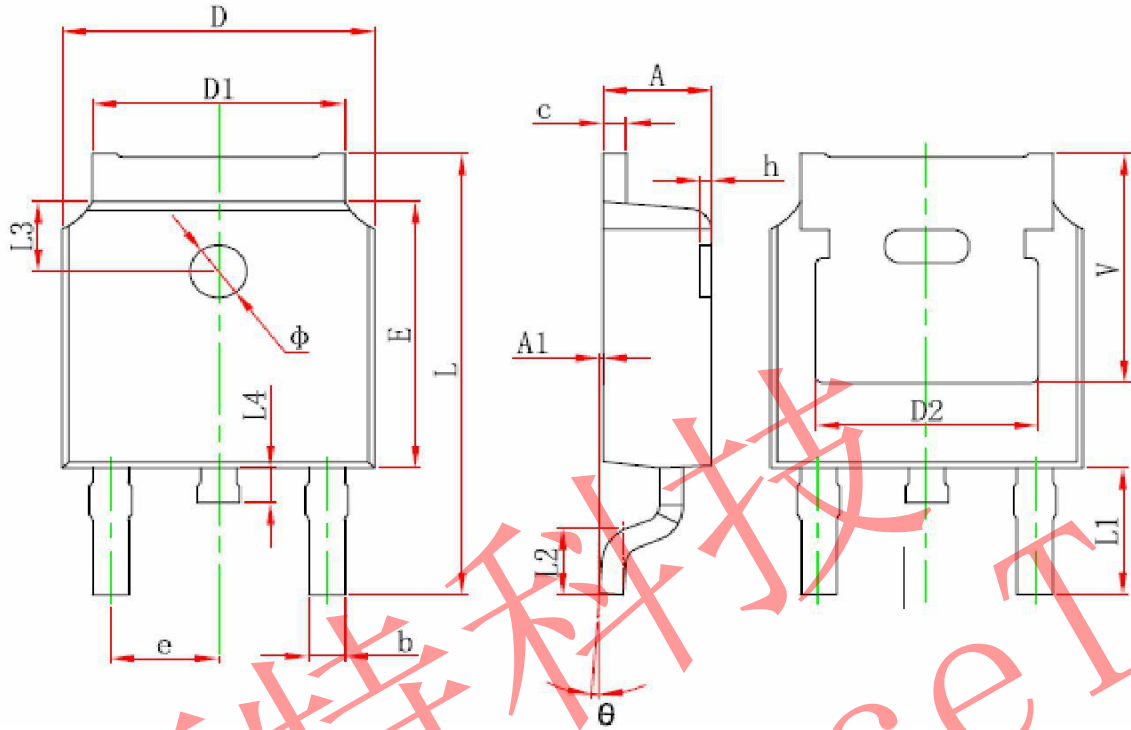
**Figure 10 V<sub>GS(th)</sub> vs Junction Temperature**



**Figure 11 Normalized Maximum Transient Thermal Impedance**



**TO-252-2L Package Information**



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.660	0.860	0.026	0.034
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.830 REF.		0.190 REF.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.800	10.400	0.386	0.409
L1	2.900 REF.		0.114 REF.	
L2	1.400	1.700	0.055	0.067
L3	1.600 REF.		0.063 REF.	
L4	0.600	1.000	0.024	0.039
φ	1.100	1.300	0.043	0.051
θ	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
V	5.350 REF.		0.211 REF.	