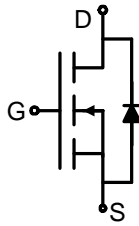



<p><b>Description</b> The XM2N200. uses advanced trench technology and design to provide excellent <math>R_{DS(ON)}</math> with low gate charge. It can be used in a wide variety of applications.</p> <p><b>General Features</b></p> <ul style="list-style-type: none"> <li>●</li> </ul> <table border="1" style="width: 100%; border-collapse: collapse; margin-bottom: 10px;"> <tr> <td style="padding: 5px;"><math>V_{DSS}</math></td> <td style="padding: 5px;"><math>R_{DS(ON)}</math> @ 10V (typ)</td> <td style="padding: 5px;"><math>I_D</math></td> </tr> <tr> <td style="padding: 5px;">190V</td> <td style="padding: 5px;">356.6 mΩ</td> <td style="padding: 5px;">2A</td> </tr> </table> <ul style="list-style-type: none"> <li>● High density cell design for ultra low <math>R_{dson}</math></li> <li>● Fully characterized avalanche voltage and current</li> <li>● Excellent package for good heat dissipation</li> <li>● RoHS Compliant</li> </ul> <p><b>Application</b></p> <ul style="list-style-type: none"> <li>● Power switching application</li> <li>● Hard switched and high frequency circuits</li> <li>● Uninterruptible power supply</li> </ul>	$V_{DSS}$	$R_{DS(ON)}$ @ 10V (typ)	$I_D$	190V	356.6 mΩ	2A	<div style="text-align: center;">  <p>Schematic diagram</p>  <p>TO-92</p> </div>
$V_{DSS}$	$R_{DS(ON)}$ @ 10V (typ)	$I_D$					
190V	356.6 mΩ	2A					

## Ordering Information

Part Number	Marking	Case	Packaging
XM2N200.	XM2N200.	TO-92	1000pcs/Carton

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	$V_{DS}$	190	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Drain Current-Continuous	$I_D$	2	A
Drain Current-Pulsed <sup>(Note 1)</sup>	$I_{DM}$	8	A
Maximum Power Dissipation	$P_D$	3	W
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 To 150	$^\circ\text{C}$

## Thermal Characteristic

Thermal Resistance, Junction-to-Ambient <sup>(Note 2)</sup>	$R_{\theta JA}$	41.7	$^\circ\text{C/W}$
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## Electrical Characteristics ( $T_A=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
<b>Off Characteristics</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A$	190	-	-	V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=190V, V_{GS}=0V$	-	-	1	$\mu A$

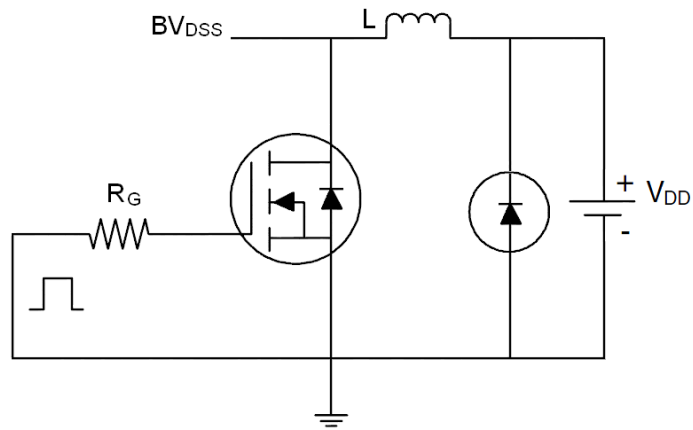
Gate-Body Leakage Current	$I_{GSS}$	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	$\pm 100$	nA
<b>On Characteristics</b> <sup>(Note 3)</sup>						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1	2	3	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=1A$	-	356.6	540	m $\Omega$
		$V_{GS}=4.5V, I_D=1A$	-	362.3	560	
Forward Transconductance	$g_{FS}$	$V_{DS}=15V, I_D=2A$	-	8	-	S
<b>Dynamic Characteristics</b> <sup>(Note 4)</sup>						
Input Capacitance	$C_{ISS}$	$V_{DS}=25V, V_{GS}=0V,$ $F=1.0MHz$	-	1325	-	PF
Output Capacitance	$C_{OSS}$		-	90	-	PF
Reverse Transfer Capacitance	$C_{RSS}$		-	3	-	PF
<b>Switching Characteristics</b> <sup>(Note 4)</sup>						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=100V, R_L=15\Omega$ $V_{GS}=10V, R_G=2.5\Omega$	-	10	-	nS
Turn-on Rise Time	$t_r$		-	12	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	15	-	nS
Turn-Off Fall Time	$t_f$		-	15	-	nS
Total Gate Charge	$Q_g$	$V_{DS}=100V, I_D=2A,$ $V_{GS}=10V$	-	12	-	nC
Gate-Source Charge	$Q_{gs}$		-	2.5	-	nC
Gate-Drain Charge	$Q_{gd}$		-	3.8	-	nC
<b>Drain-Source Diode Characteristics</b>						
Diode Forward Voltage <sup>(Note 3)</sup>	$V_{SD}$	$V_{GS}=0V, I_S=1A$	-	-	12	V
Diode Forward Current <sup>(Note 2)</sup>	$I_S$		-	-	2	A

### Notes:

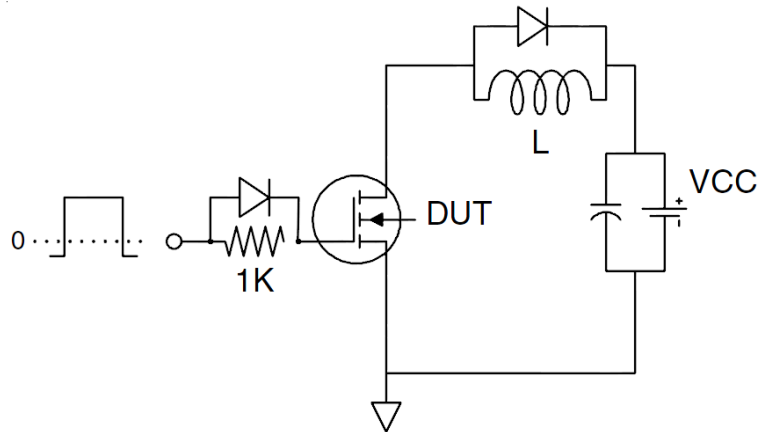
1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board,  $t \leq 10$  sec.
3. Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$ .
4. Guaranteed by design, not subject to production

**Test Circuit**

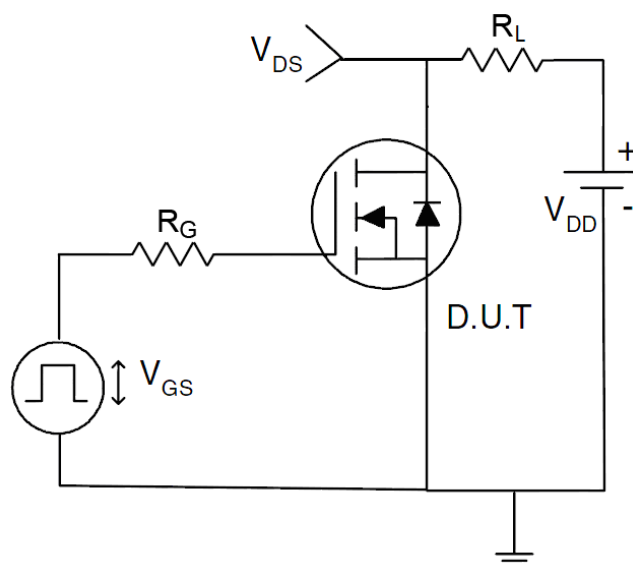
**1)  $E_{AS}$  test circuit**



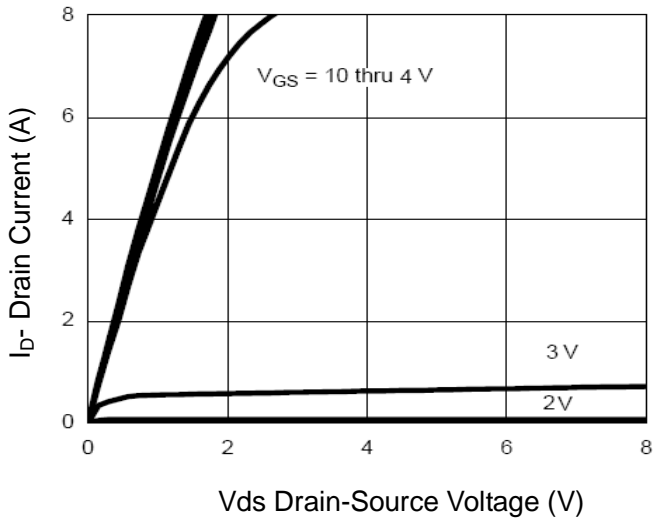
**2) Gate charge test circuit**



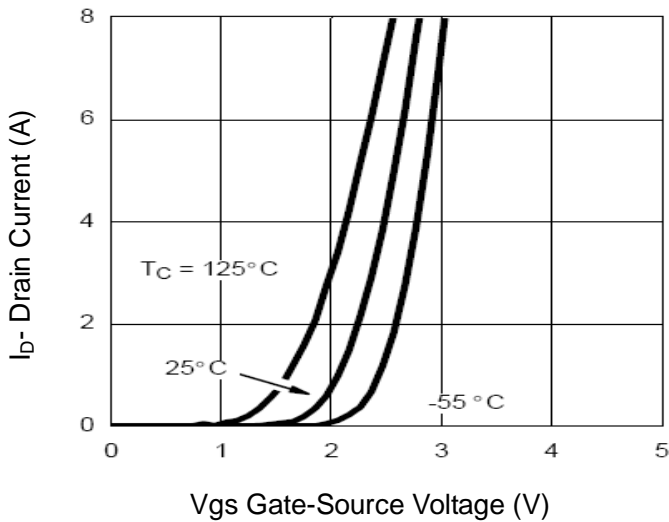
**3) Switch Time Test Circuit**



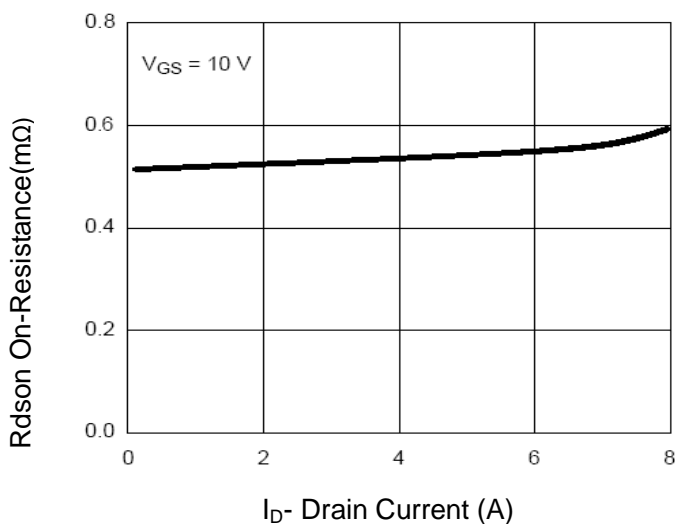
## Typical Electrical and Thermal Characteristics (Curves)



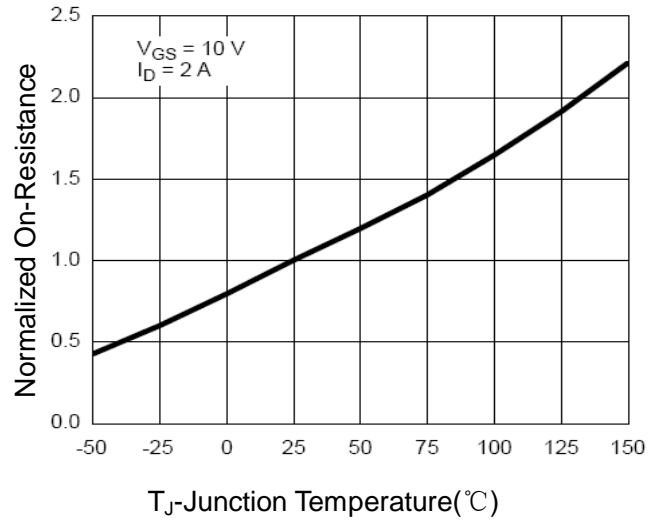
**Figure 1 Output Characteristics**



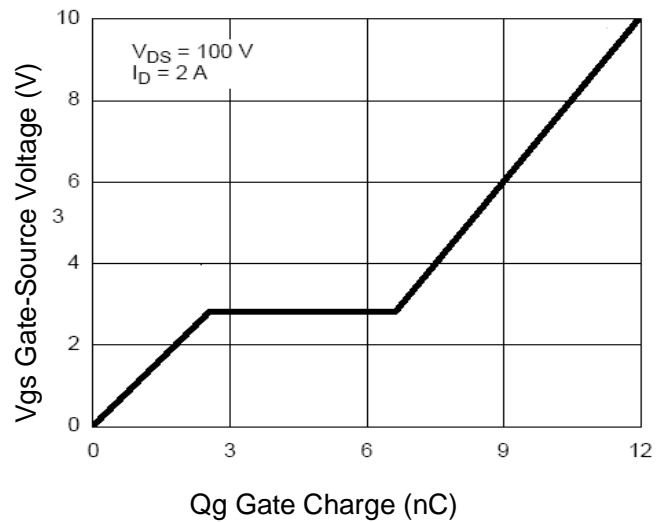
**Figure 2 Transfer Characteristics**



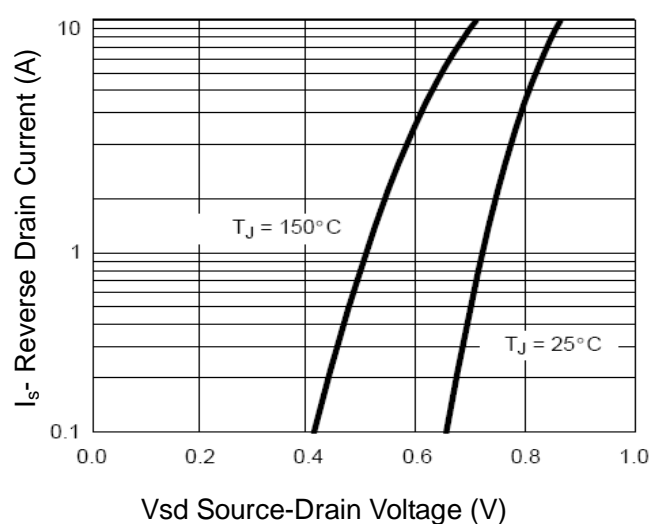
**Figure 3  $R_{DS(on)}$ - Drain Current**



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



**Figure 5 Gate Charge**



**Figure 6 Source- Drain Diode Forward**

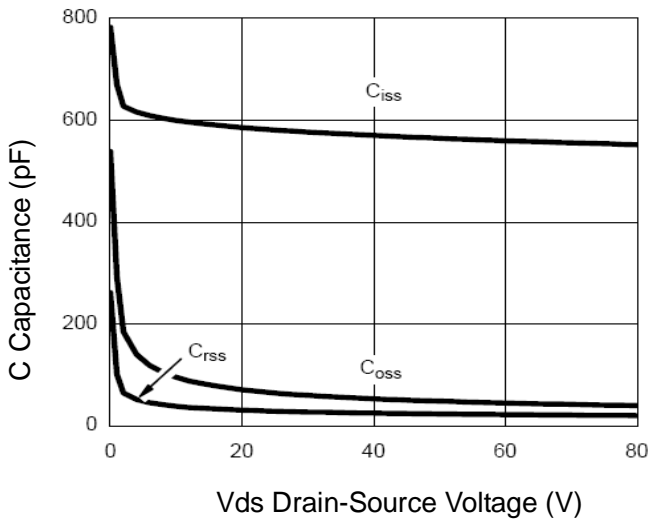


Figure 7 Capacitance vs Vds

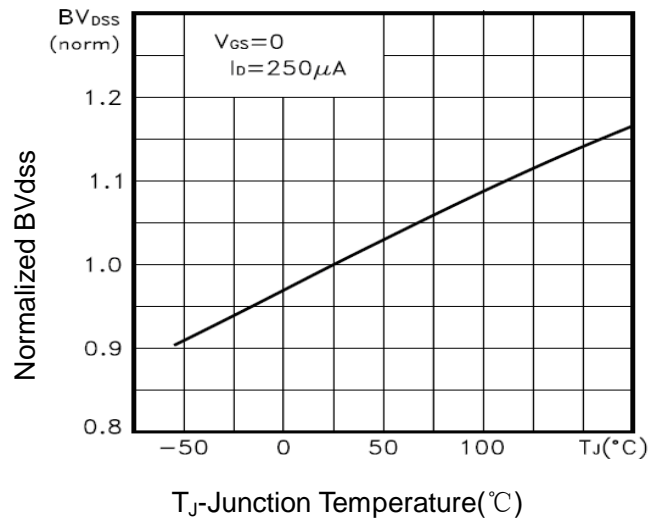


Figure 9  $BV_{DSS}$  vs Junction Temperature

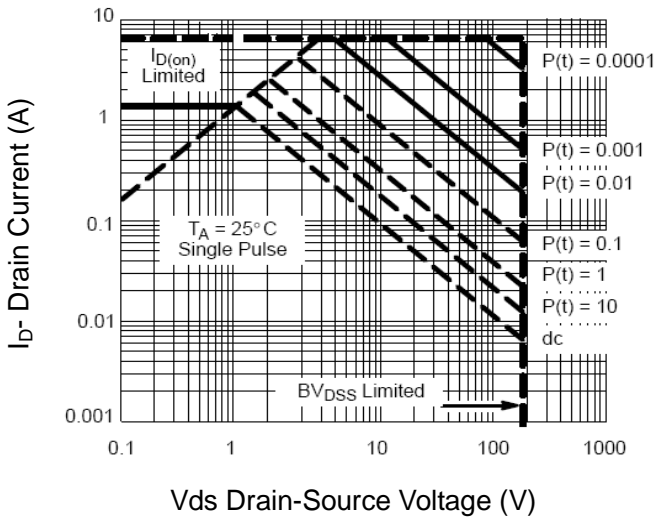


Figure 8 Safe Operation Area

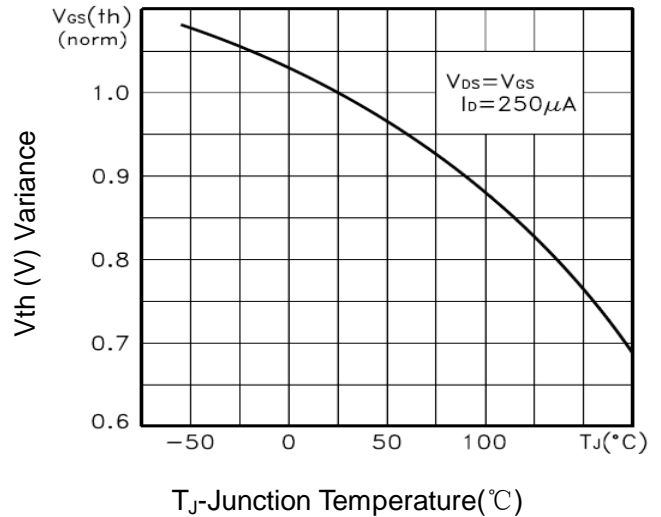


Figure 10  $V_{GS(th)}$  vs Junction Temperature

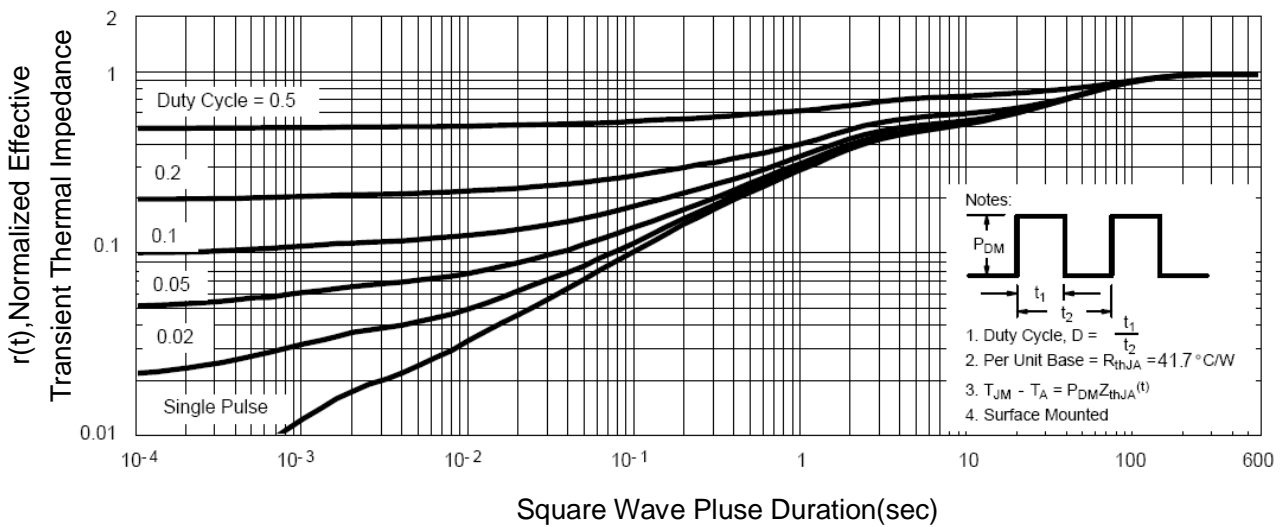
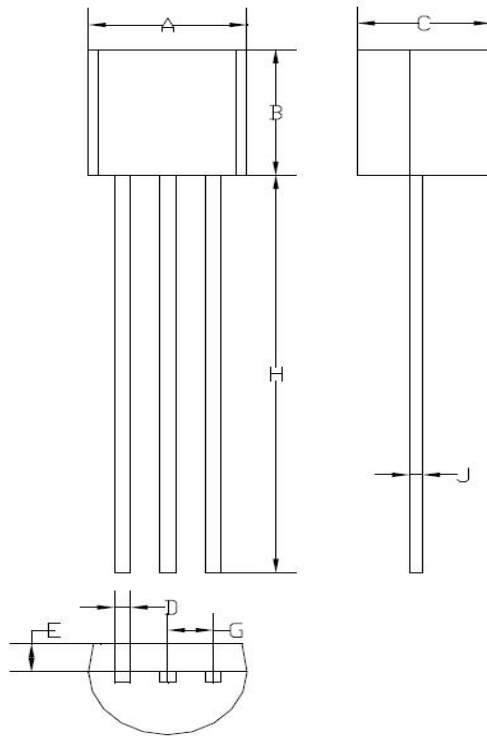


Figure 11 Normalized Maximum Transient Thermal Impedance

**TO-92 package information**



TO-92			
Dim	MIN	NOM	MAX
A	4.59	4.60	-
B	4.58	4.60	4.62
C	3.50	3.55	3.60
D	2.50	2.55	2.60
E	-	1.25	1.30
G	1.24	1.27	1.30
H	14.28	14.30	14.32
J	0.38		
All Dimensions in mm			

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