

**190V N-CHANNEL ENHANCEMENT MODE MOSFET**

**MAIN CHARACTERISTICS**

<b>I<sub>D</sub></b>	3A
<b>V<sub>DS</sub></b>	190V
<b>R<sub>DS(on)-typ(@V<sub>GS</sub>=10V)</sub></b>	<540mΩ(Typ:430mΩ)
<b>R<sub>DS(on)-typ(@V<sub>GS</sub>=4.5V)</sub></b>	<560mΩ(Typ:440mΩ)

**DESCRIPTION**

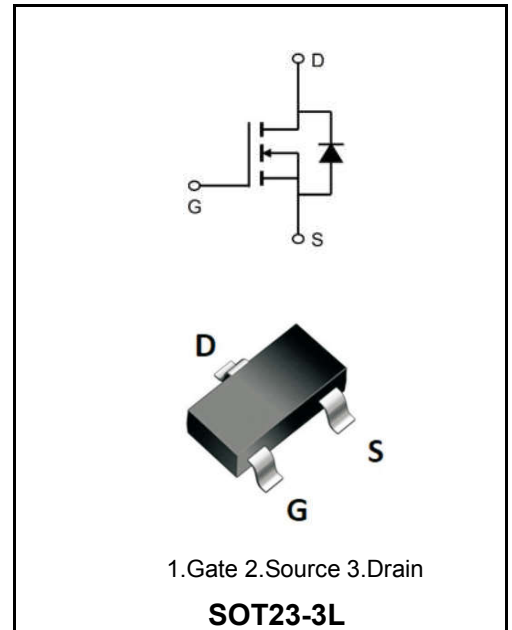
The G2003A uses advanced trench technology and design to provide excellent R<sub>DS(on)</sub> with low gate charge. It can be used in a wide variety of applications.

**GENERAL FEATURES**

- ◆ High density cell design for ultra low R<sub>DS(on)</sub>
- ◆ Fully characterized avalanche voltage and current
- ◆ Excellent package for good heat dissipation
- ◆ RoHS Compliant

**APPLICATION**

- ◆ Power switching application



<b>Marking Code</b>	
<b>G2003A</b>	<b>G2003A</b>

**Absolute Maximum Ratings(T<sub>A</sub>=25°C unless otherwise noted)**

Characteristics	Symbols	Value	Units
Drain-Source Voltage	<b>V<sub>DS</sub></b>	190	<b>V</b>
Gate - Source Voltage	<b>V<sub>GS</sub></b>	±20	<b>V</b>
Continuous Drain Current	<b>I<sub>D</sub></b>	3	<b>A</b>
Drain Current-Pulsed(note 1)	<b>I<sub>DM</sub></b>	8	<b>A</b>
Power Dissipation	<b>P<sub>D</sub></b>	1.8	<b>mW</b>
Storage Temperature Range	<b>T<sub>STG</sub></b>	-55 to +150	<b>°C</b>
Operating Junction Temperature Range	<b>T<sub>J</sub></b>	-55 to +150	<b>°C</b>
Thermal Resistance From Junction to Ambient (note 2)	<b>R<sub>θJA</sub></b>	70	<b>°C/W</b>

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

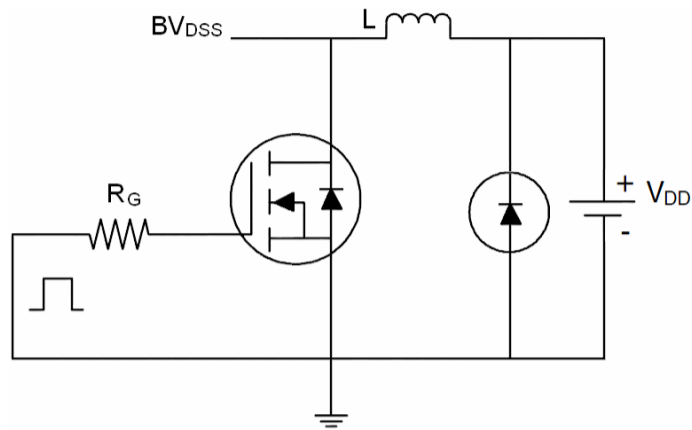
Characteristics	Test Condition	Symbols	Min	Typ	Max	Units
Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	$BV_{DSS}$	190	-	-	V
Zero Gate Voltage Drain current	$V_{DS}=190V, V_{GS}=0V$	$I_{DSS}$	-	-	1	$\mu A$
Gate-body Leakage	$V_{GS}=\pm 20V, V_{DS}=0V$	$I_{GSS}$	-	-	$\pm 100$	nA
Gate-Threshold voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	$V_{GS(th)}$	1.0	1.7	3.0	V
Drain-Source On-Resistance	$V_{GS}=10V, I_D=2.0A$	$R_{DS(on)}$	-	430	540	m $\Omega$
	$V_{GS}=4.5V, I_D=2.0A$		-	440	560	
Forward Transconductance	$V_{DS}=15V, I_D=2A$	$g_{fs}$	-	8	-	S
Input Capacitance	$V_{DS}=25V$ $V_{GS}=0V$ $f=1.0MHz$	$C_{iss}$	-	580	-	$\mu F$
Output Capacitance		$C_{oss}$	-	90	-	
Reverse Transfer Capacitance		$C_{rss}$	-	3.0	-	
Turn-on delay time	$V_{DD}=100V$ $R_L=15\Omega$ $V_{GS}=10V$ $R_G=2.5\Omega$	$t_{d(on)}$	-	10	-	ns
Rise Time		$T_r$	-	12	-	
Turn-Off Delay Time		$t_{d(OFF)}$	-	15	-	
Fall Time		$t_f$	-	15	-	
Total Gate Charge	$V_{DS}=100V$ $I_D=2A$ $V_{GS}=10V$	$Q_g$	-	12	-	nC
Gate to Source Charge		$Q_{gs}$	-	2.5	-	nC
Gate to Drain Charge		$Q_{gd}$	-	3.8	-	nC
Diode forward voltage(note 3)	$I_S=3A, V_{GS}=0V$	$V_{SD}$	-	-	1.2	V
Maximum Body-Diode Continuous Current(note 2)		$I_S$	-	-	3.0	A

**Notes:**

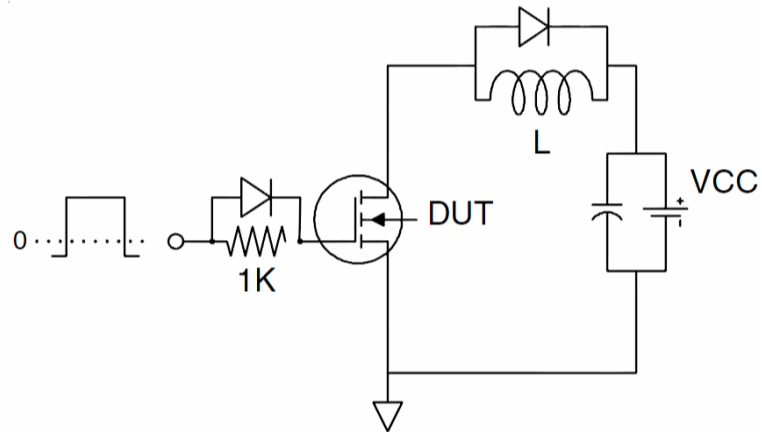
1. Repetitive Rating:Pulse width limited by maximum junction temperature.
- 2.Surface Mounted on FR4 Board, $t_s \leq 10$  sec.
- 3.Pulse Test:Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$ .
4. Guaranteed by design, not subject to production

Test Circuit

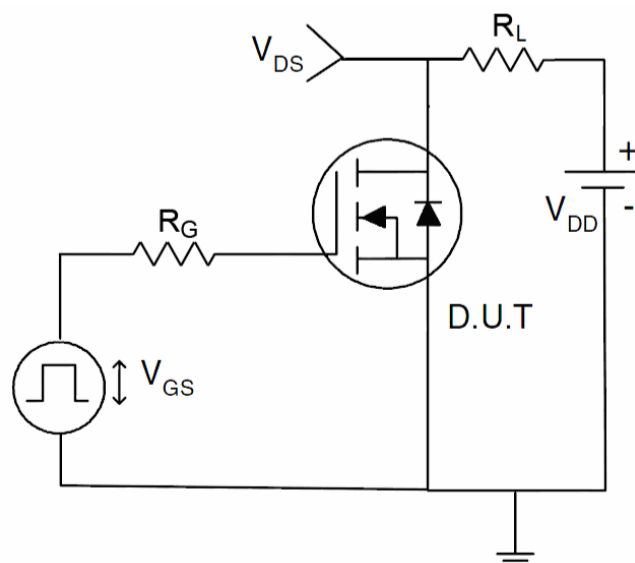
1)  $E_{AS}$  test circuit



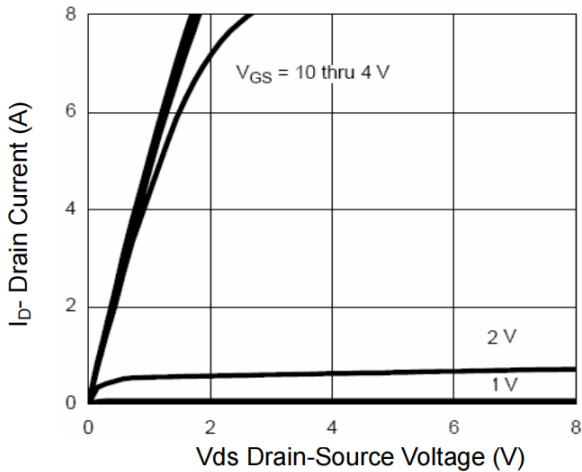
2) Gate charge test circuit



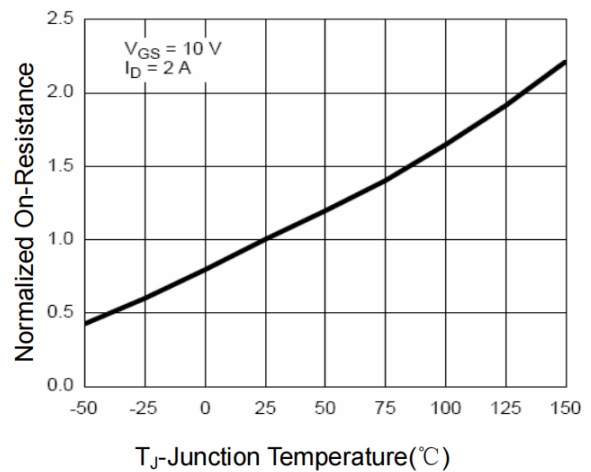
3) Switch Time Test Circuit



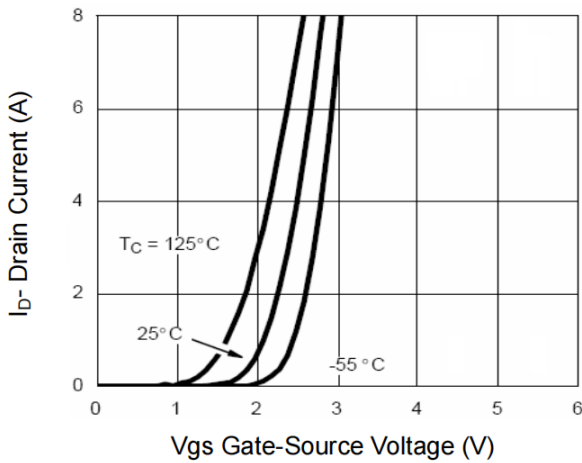
Typical Electrical and Thermal Characteristics (Curves)



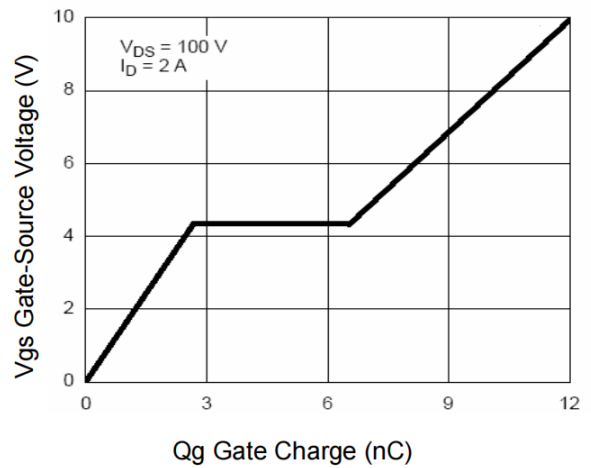
**Figure 1 Output Characteristics**



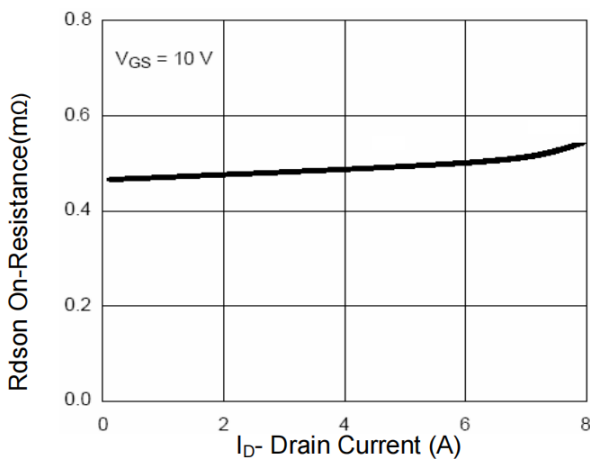
**Figure 4 Rdson-Junction Temperature**



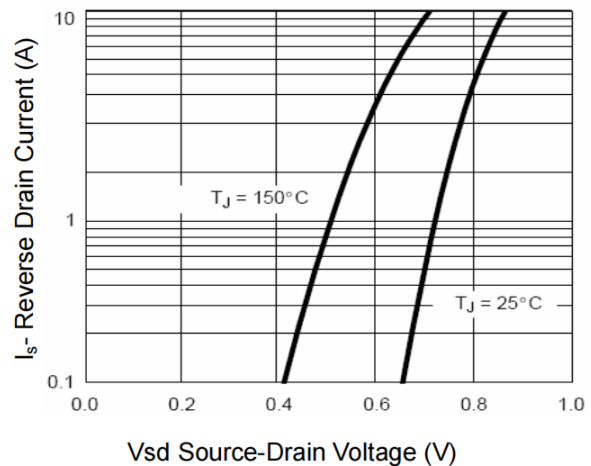
**Figure 2 Transfer Characteristics**



**Figure 5 Gate Charge**



**Figure 3 Rdson- Drain Current**



**Figure 6 Source- Drain Diode Forward**

Typical Electrical and Thermal Characteristics (Curves)

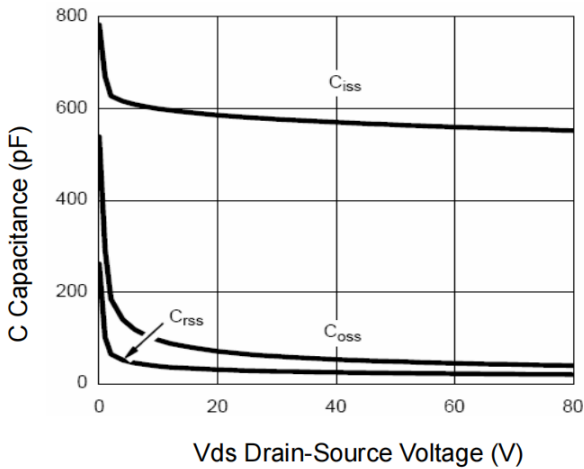


Figure 7 Capacitance vs Vds

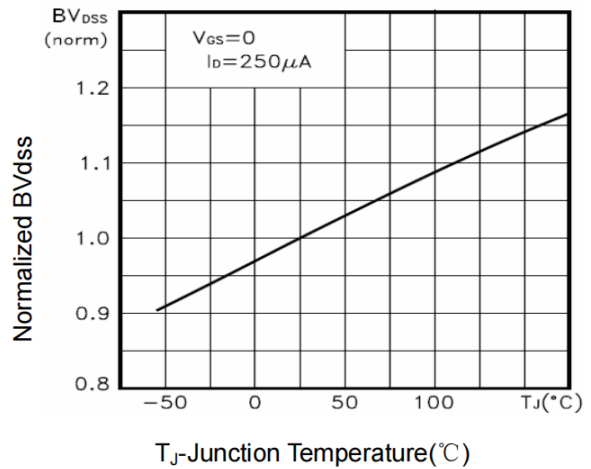


Figure 9 BV<sub>DSS</sub> vs Junction Temperature

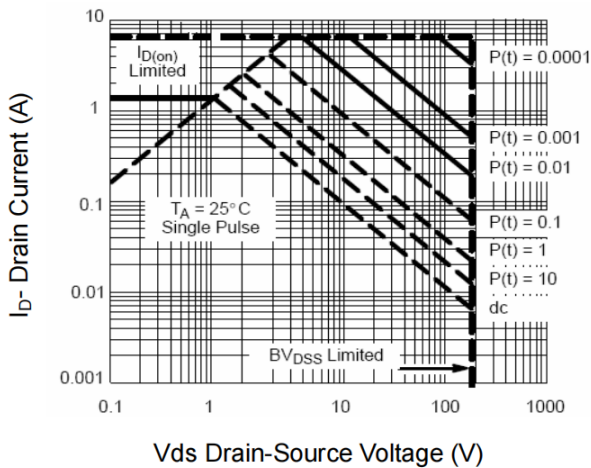


Figure 8 Safe Operation Area

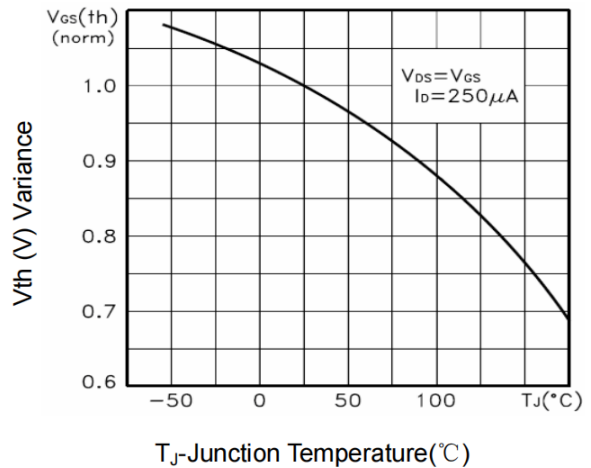


Figure 10 V<sub>GS(th)</sub> vs Junction Temperature

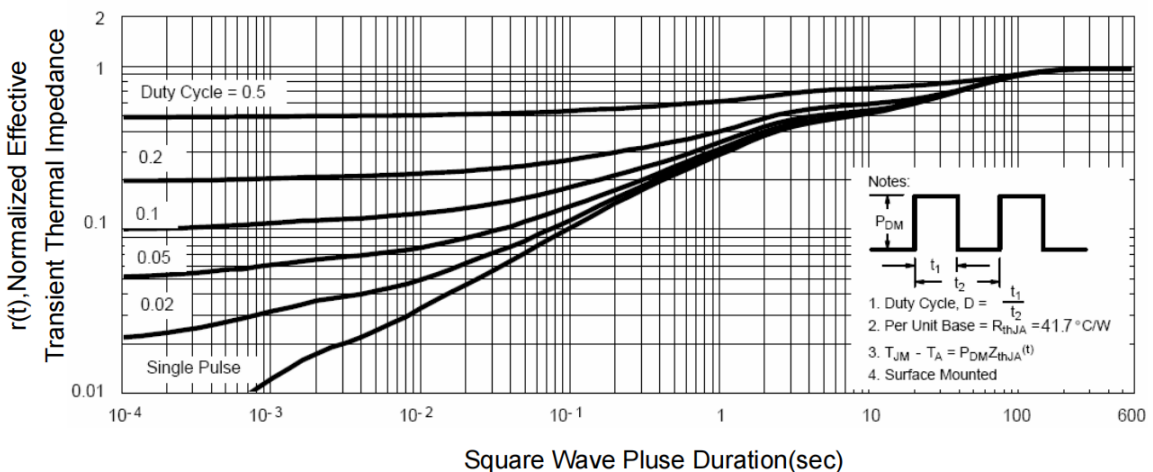


Figure 11 Normalized Maximum Transient Thermal Impedance

**Ordering information**

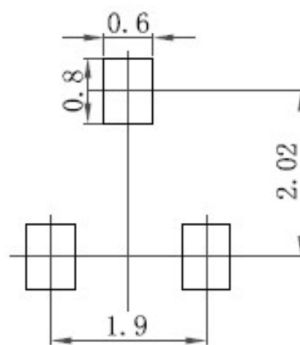
Package	Packing Description	Base Quantity	Packing Quantity
SOT23-3L	Tape/Reel, 7" reel	3000pcs/Reel	24000PCS/Box 120000PCS/Carton

**Package Dimensions**

**SOT23-3L**

Dim.	Millimeter (mm)		mil	
	Min.	Max.	Min.	Max.
A	1.05	1.25	41	49.2
A1	0.10		3.93	
A2	1.05	1.15	41	45
b	0.30	0.50	12	20
c	0.10	0.20	3.93	7.9
D	2.82	3.02	111	119
E	1.50	1.70	59	67
E1	2.65	2.95	104	116
a	0.95		37.4	
a1	1.80	2.00	71	78
L	0.30	0.066	12	26
Θ	8°			

**The recommended mounting pad size**



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