

■ **Description**

The G1003A 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. It is ESD protected.

■ **General Features**

$V_{DSS}$	$R_{DS(ON)}$ @10V (typ)	$I_D$
100V	135mΩ	5A

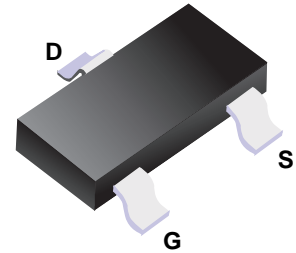
- High density cell design for ultra low Rdson
- Fully characterized avalanche voltage and current
- Excellent package for good heat dissipation

■ **Application**

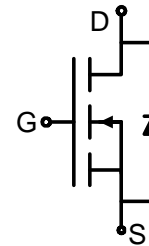
- Power switching application
- Hard switched and high frequency circuits
- Uninterruptible power supply

■ **Marking**

Marking	<b>G1003A</b>
---------	---------------



■ **Simplified outline(SOT23-3L)**



■ **Schematic diagram**

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	$V_{DS}$	100	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Drain Current-Continuous	$I_D$	5	A
Drain Current-Pulsed <sup>(Note 1)</sup>	$I_{DM}$	24	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	$^\circ\text{C/W}$
---	-----------------	------	--------------------

**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	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A$	100	105	-	V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=80V, V_{GS}=0V$	-	-	800	nA

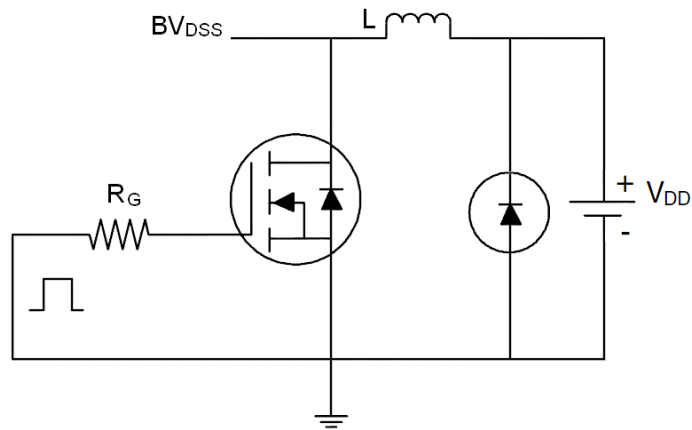
Gate-Body Leakage Current	$I_{GSS}$	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	$\pm 30$	$\mu A$
<b>On Characteristics</b> (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1	2	3	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=5A$ -		135	145	m $\Omega$
Forward Transconductance	$g_{FS}$	$V_{DS}=5V, I_D=2.9A$	-	8	-	S
<b>Dynamic Characteristics</b> (Note4)						
Input Capacitance	$C_{iss}$	$V_{DS}=25V, V_{GS}=0V,$ $F=1.0MHz$	-	690	-	PF
Output Capacitance	$C_{oss}$		-	120	-	PF
Reverse Transfer Capacitance	$C_{rss}$		-	90	-	PF
<b>Switching Characteristics</b> (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=30V, I_D=2A, R_L=15\Omega$ $V_{GS}=10V, R_G=2.5\Omega$	-	11	-	nS
Turn-on Rise Time	$t_r$		-	7.4	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	35	-	nS
Turn-Off Fall Time	$t_f$		-	9.1	-	nS
Total Gate Charge	$Q_g$	$V_{DS}=30V, I_D=3A,$ $V_{GS}=10V$	-	15.5		nC
Gate-Source Charge	$Q_{gs}$		-	3.2	-	nC
Gate-Drain Charge	$Q_{gd}$		-	4.7	-	nC
<b>Drain-Source Diode Characteristics</b>						
Diode Forward Voltage (Note 3)	$V_{SD}$	$V_{GS}=0V, I_S=6A$	-	-	1.2	V
Diode Forward Current (Note 2)	$I_S$		-	-	6	A

**Notes:**

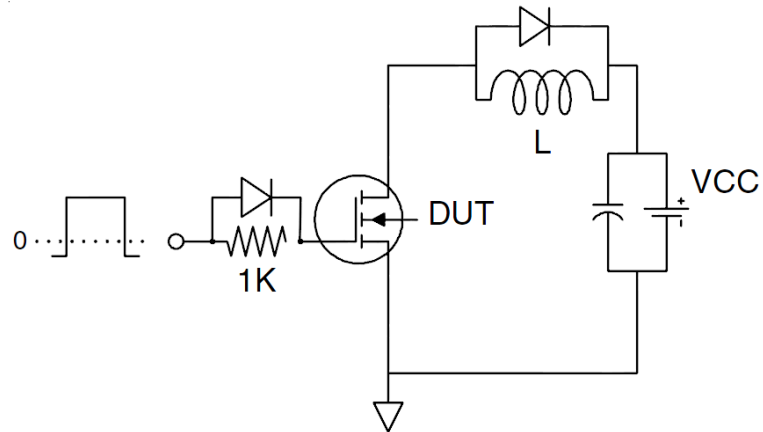
1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board,  $t \leq 10$  sec.
3. Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$ .
4. Guaranteed by design, not subject to production

**Test Circuit**

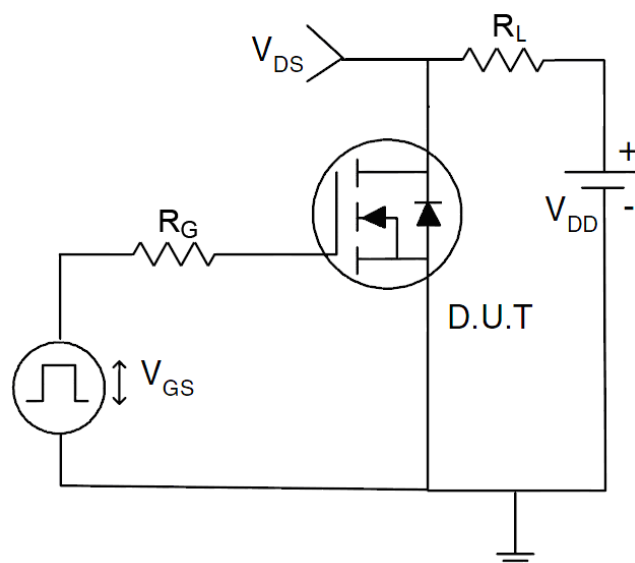
**1) E<sub>AS</sub> test circuit**



**2) Gate charge test circuit**

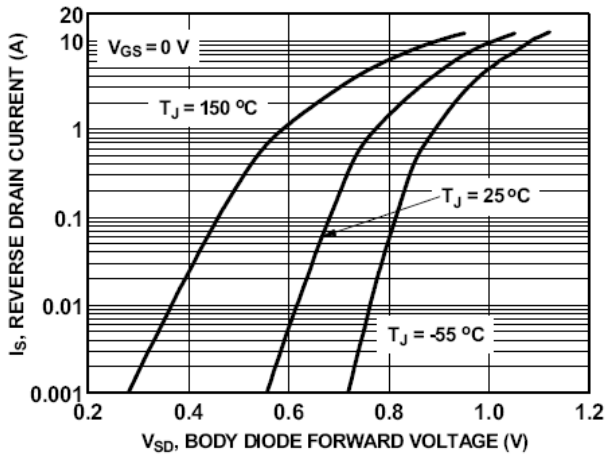


**3) Switch Time Test Circuit**

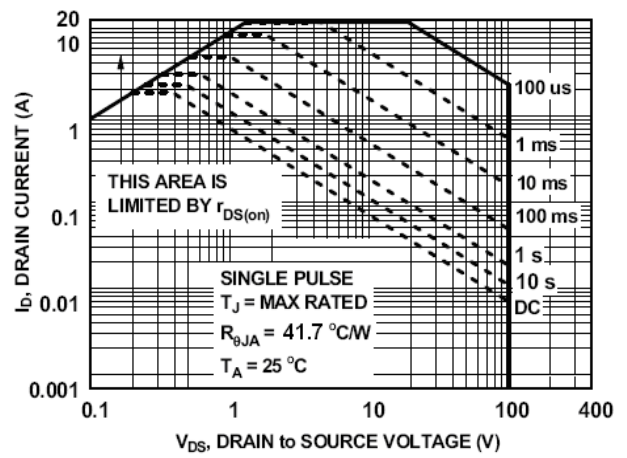


**Typical Electrical and Thermal Characteristics (curves)**

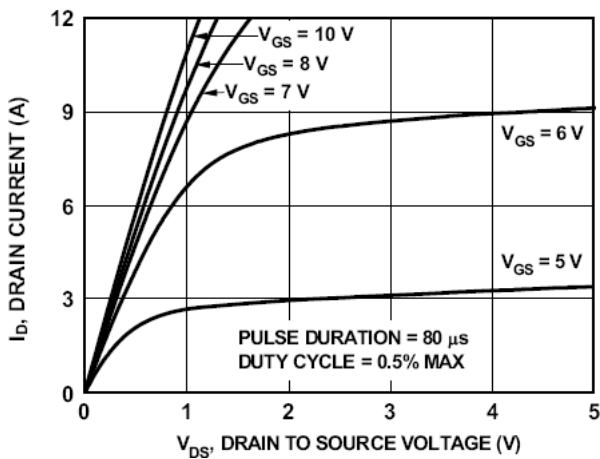
**Figure1. Source-Drain Diode Forward Voltage**



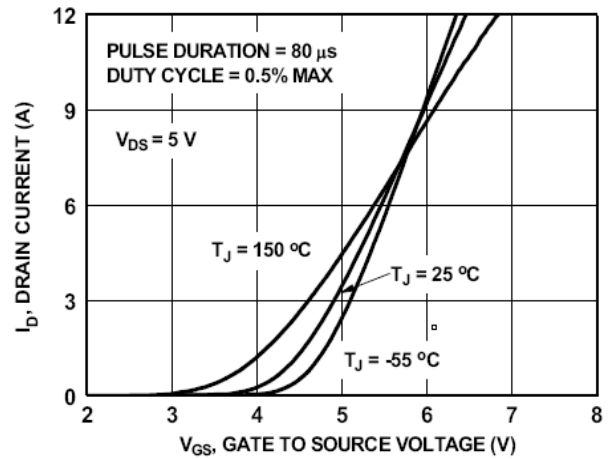
**Figure2. Safe operating area**



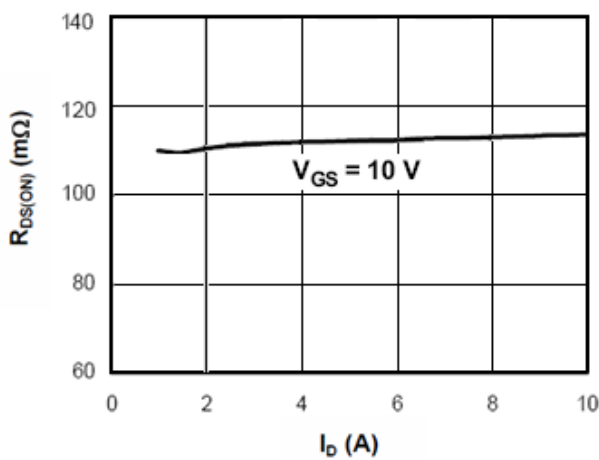
**Figure3. Output characteristics**



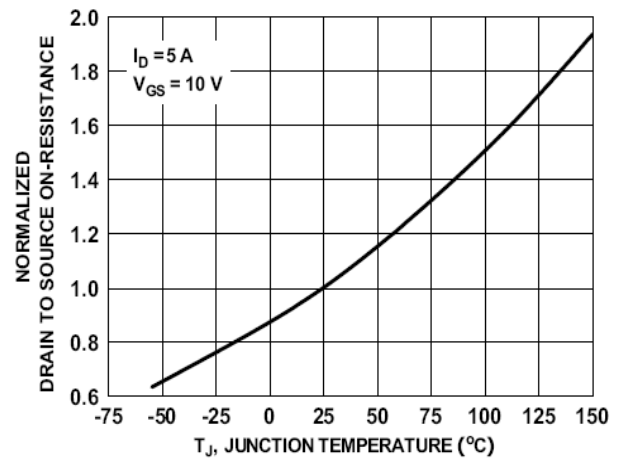
**Figure4. Transfer characteristics**



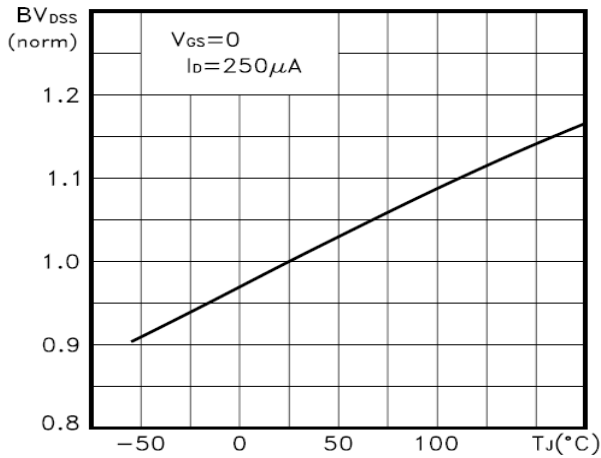
**Figure5. Static drain-source on resistance**



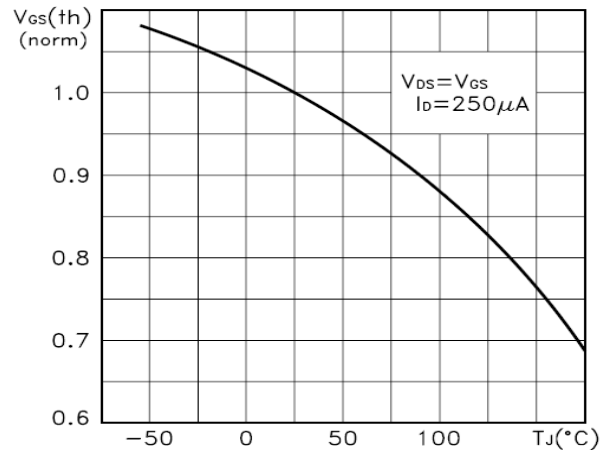
**Figure6.  $R_{DS(ON)}$  vs Junction Temperature**



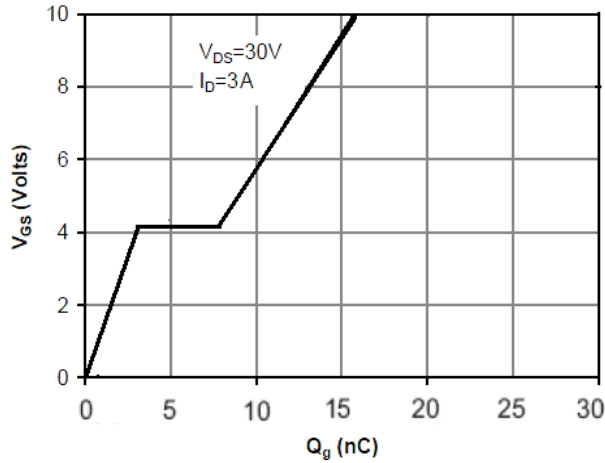
**Figure7.  $BV_{DSS}$  vs Junction Temperature**



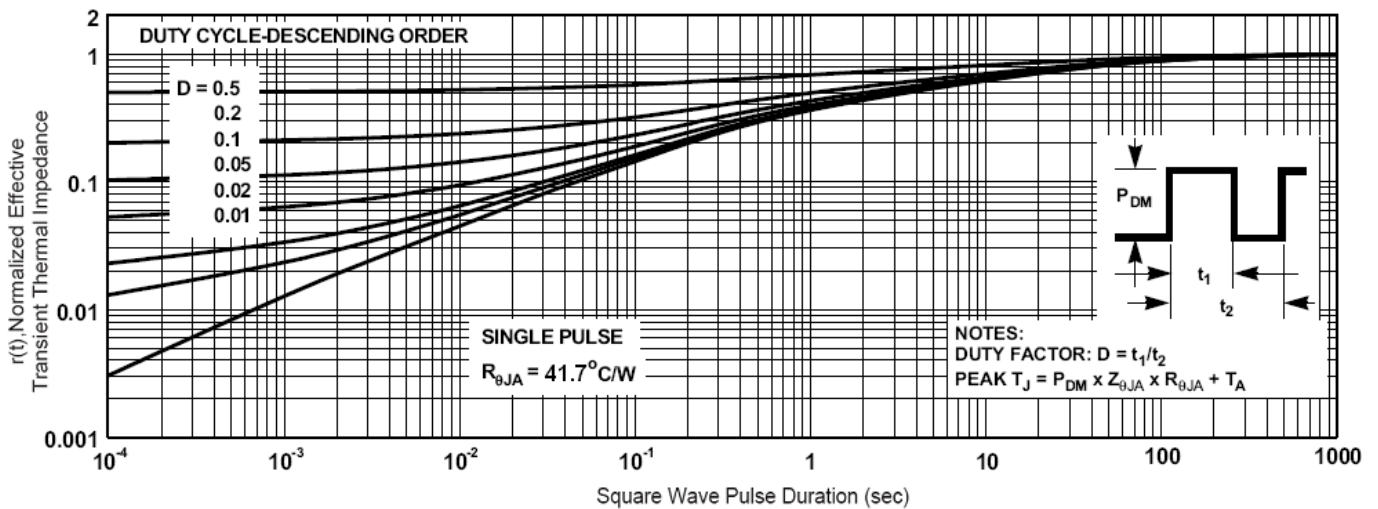
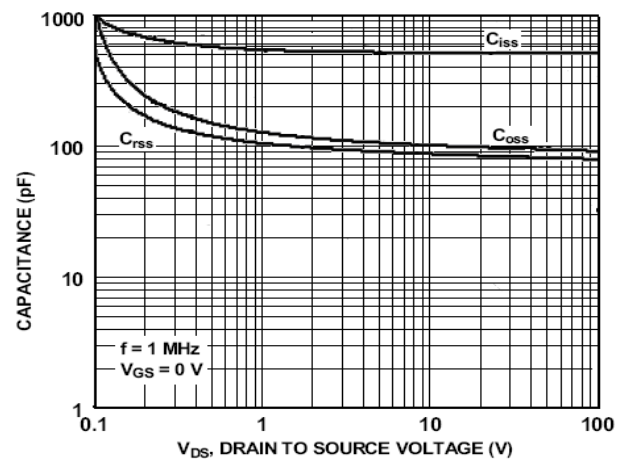
**Figure8.  $V_{GS(th)}$  vs Junction Temperature**



**Figure9. Gate charge waveforms**



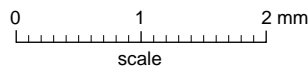
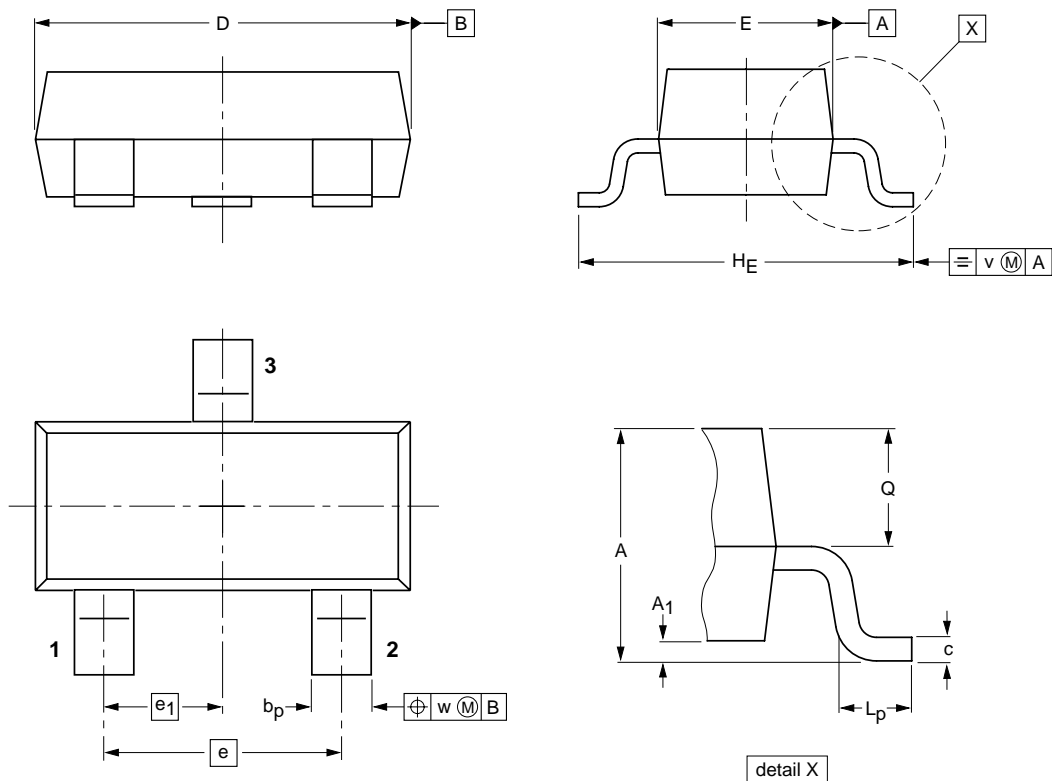
**Figure10. Capacitance**



**Figure11. Normalized Maximum Transient Thermal Impedance**

**Package Outline**

**SOT-23**



**DIMENSIONS (mm are the original dimensions)**

UNIT	A	A <sub>1</sub> max.	b <sub>p</sub>	c	D	E	e	e <sub>1</sub>	H <sub>E</sub>	L <sub>p</sub>	Q	v	w
mm	1.1 0.9	0.1	0.48 0.38	0.15 0.09	3.0 2.8	1.4 1.2	1.9	0.95	2.5 2.1	0.45 0.15	0.55 0.45	0.2	0.1

**Summary of Packing Options**

Package	Packing Description	Packing Quantity	Industry Standard
SOT-23	Tape/Reel, 7" reel	3000	EIA-481-1