

**Description**

The G1002 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**

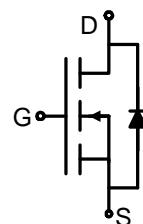
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$V_{DSS}$	$R_{DS(ON)}$ @ 10V (typ)	$I_D$
100V	200mΩ	2A

- High density cell design for ultra low  $R_{DS(ON)}$
- 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

**Schematic diagram****TO-92 view****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	$I_D$	2	A
Drain Current-Pulsed <sup>(Note 1)</sup>	$I_{DM}$	5	A
Maximum Power Dissipation	$P_D$	1.25	W
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 To 150	°C

**Thermal Characteristic**

Thermal Resistance, Junction-to-Ambient <sup>(Note 2)</sup>	$R_{\theta JA}$	100	°C/W
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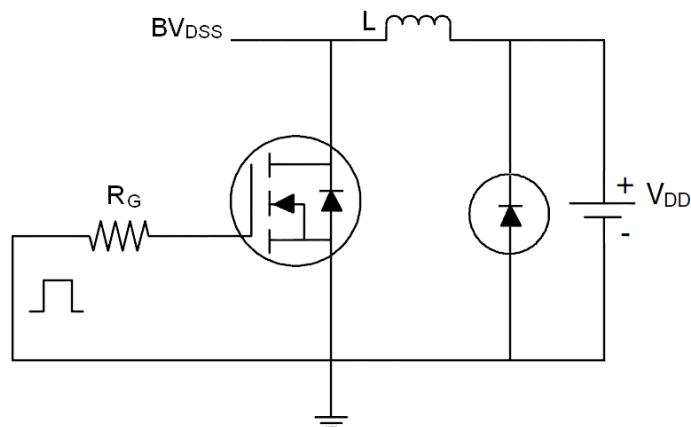
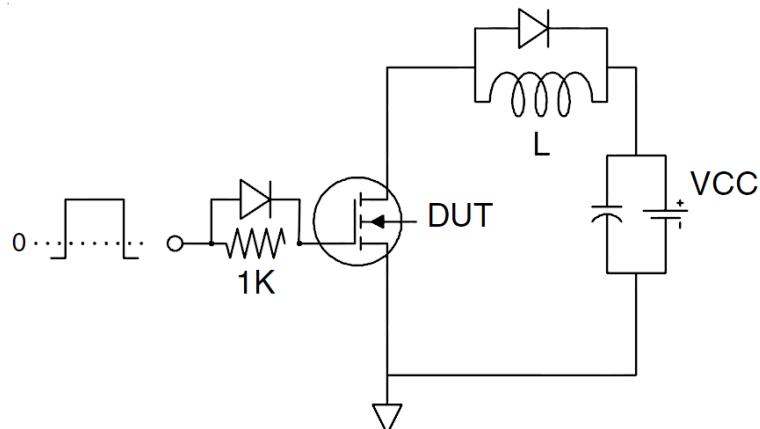
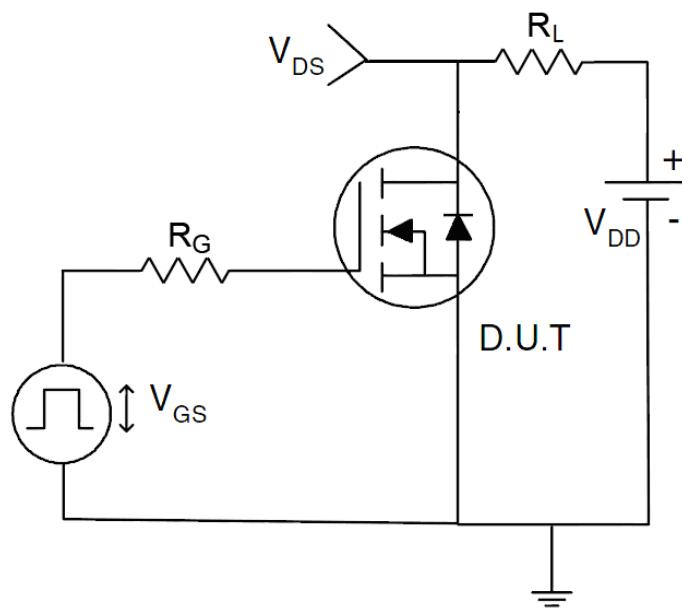
**Electrical Characteristics ( $T_A=25^\circ\text{C}$  unless otherwise noted)**

Parameter	Symbol	Condition	Min	Typ	Max	Unit
<b>Off Characteristics</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0\text{V}$ $I_D=250\mu\text{A}$	100	110	-	V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=100\text{V}$ , $V_{GS}=0\text{V}$	-	-	1	$\mu\text{A}$

Gate-Body Leakage Current	$I_{GSS}$	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	$\pm 100$	nA
<b>On Characteristics</b> <small>(Note 3)</small>						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1.2	1.8	2.5	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=1A$	-	200	240	$m\Omega$
Forward Transconductance	$g_{FS}$	$V_{DS}=5V, I_D=1A$	1	-	-	S
<b>Dynamic Characteristics</b> <small>(Note 4)</small>						
Input Capacitance	$C_{iss}$	$V_{DS}=50V, V_{GS}=0V,$ $F=1.0MHz$	-	190	-	PF
Output Capacitance	$C_{oss}$		-	22	-	PF
Reverse Transfer Capacitance	$C_{rss}$		-	13	-	PF
<b>Switching Characteristics</b> <small>(Note 4)</small>						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=50V, I_D=1.3A, R_L=39\Omega$ $V_{GS}=10V, R_G=1\Omega$	-	6	-	nS
Turn-on Rise Time	$t_r$		-	10	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	10	-	nS
Turn-Off Fall Time	$t_f$		-	6	-	nS
Total Gate Charge	$Q_g$	$V_{DS}=50V, I_D=1.3A,$ $V_{GS}=10V$	-	5.2	-	nC
Gate-Source Charge	$Q_{gs}$		-	0.75	-	nC
Gate-Drain Charge	$Q_{gd}$		-	1.4	-	nC
<b>Drain-Source Diode Characteristics</b>						
Diode Forward Voltage <small>(Note 3)</small>	$V_{SD}$	$V_{GS}=0V, I_s=1.3A$	-	-	1.2	V
Diode Forward Current <small>(Note 2)</small>	$I_s$		-	-	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<sub>AS</sub> test circuit**2) **Gate charge test circuit**3) **Switch Time Test Circuit**

## Typical Electrical and Thermal Characteristics (Curves)

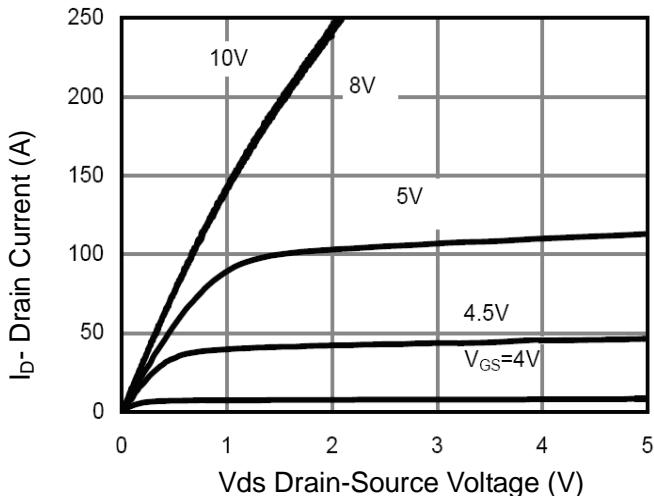


Figure 1 Output Characteristics

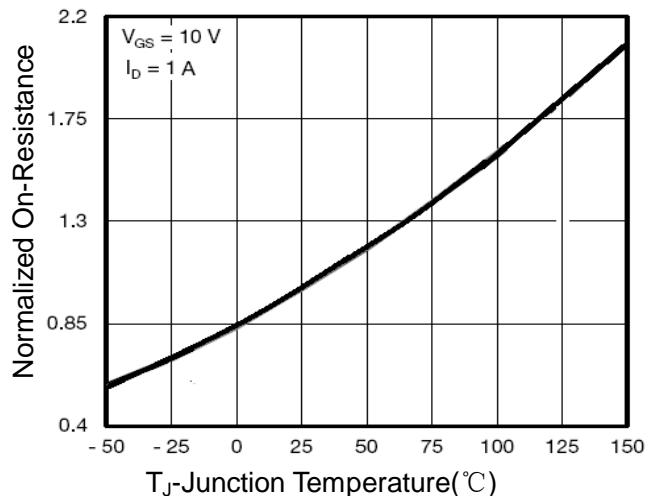


Figure 4 Rdson-JunctionTemperature

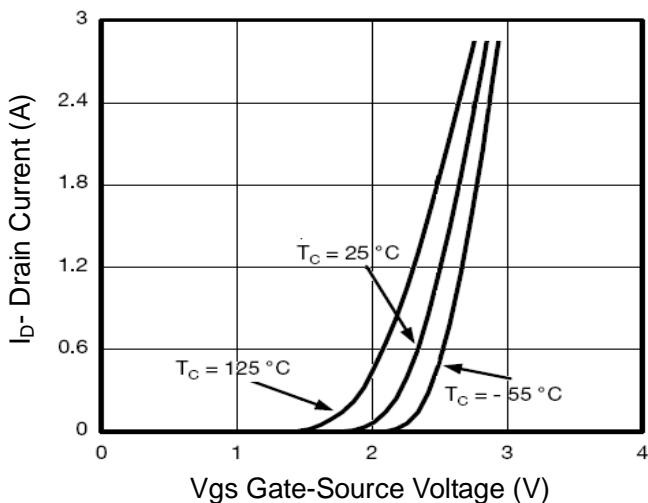


Figure 2 Transfer Characteristics

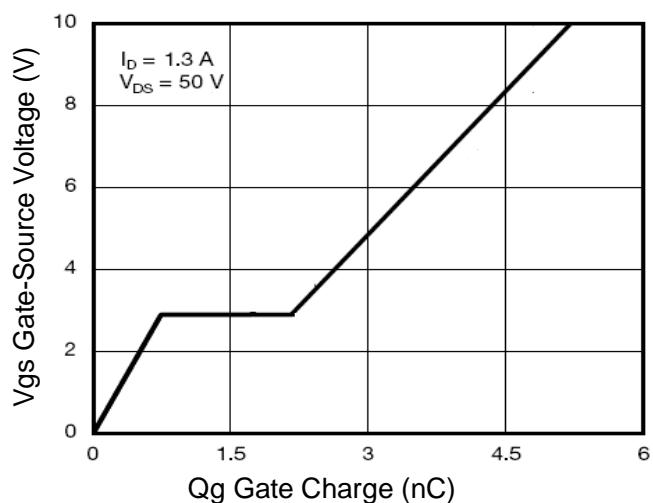


Figure 5 Gate Charge

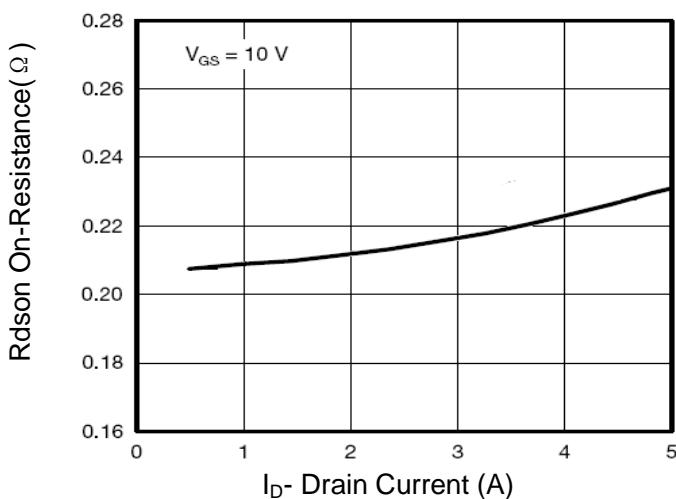


Figure 3 Rdson-Drain Current

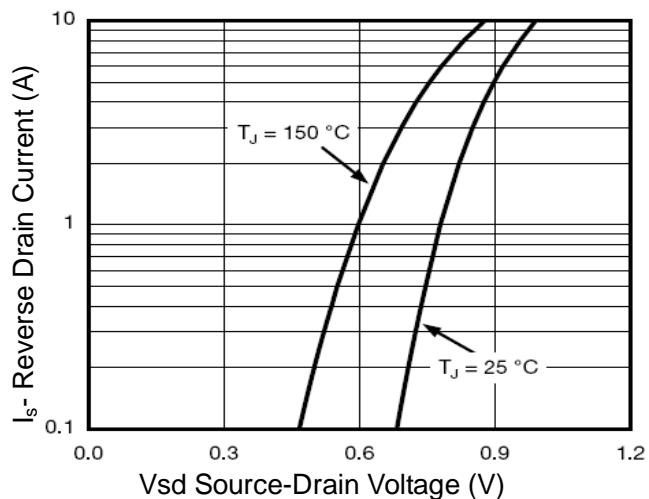
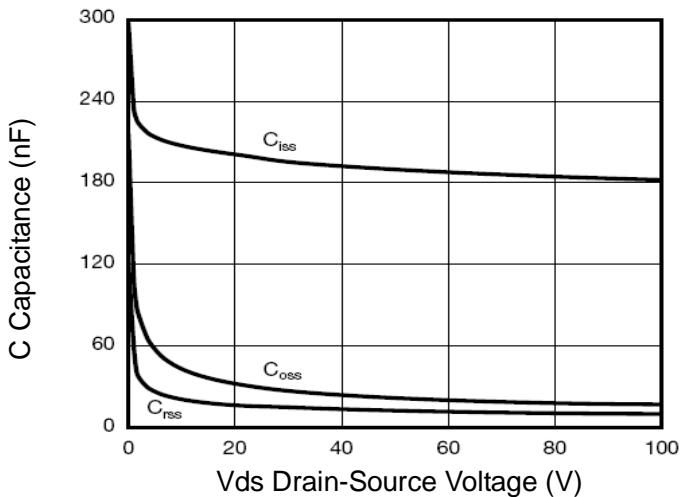
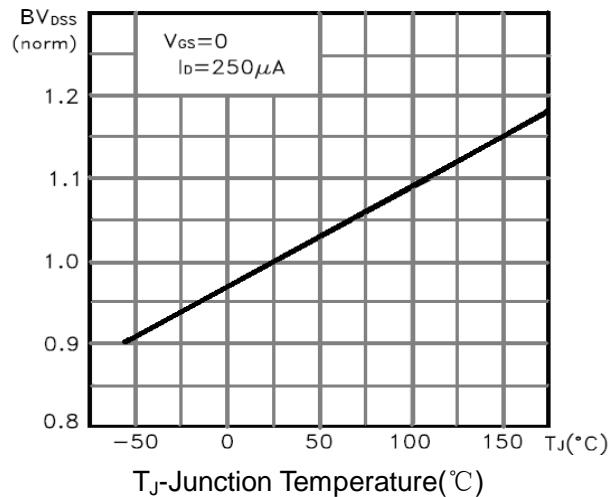


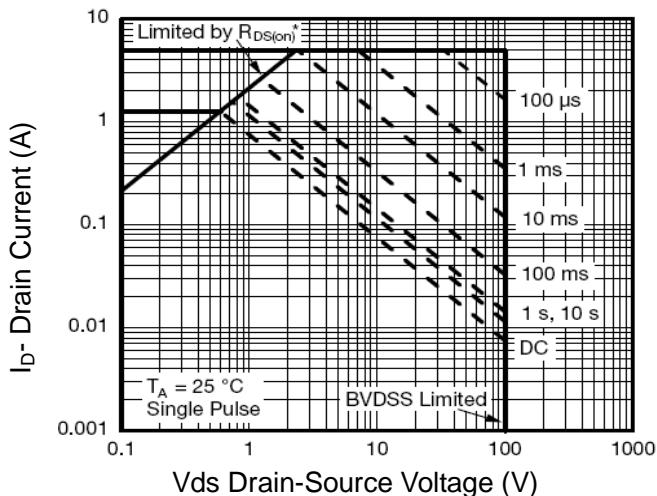
Figure 6 Source- Drain Diode Forward



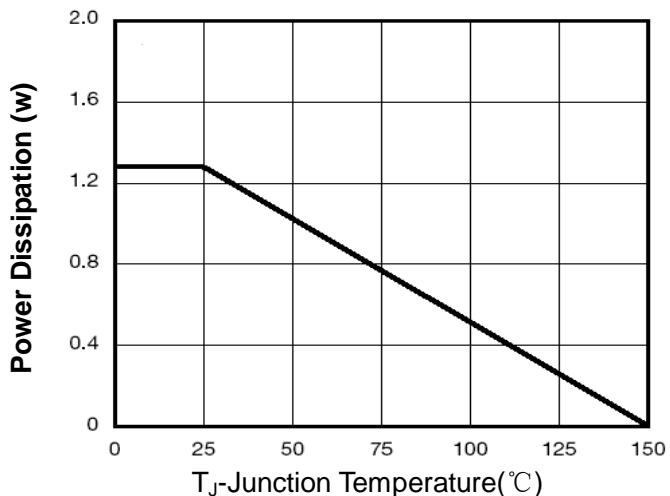
**Figure 7 Capacitance vs Vds**



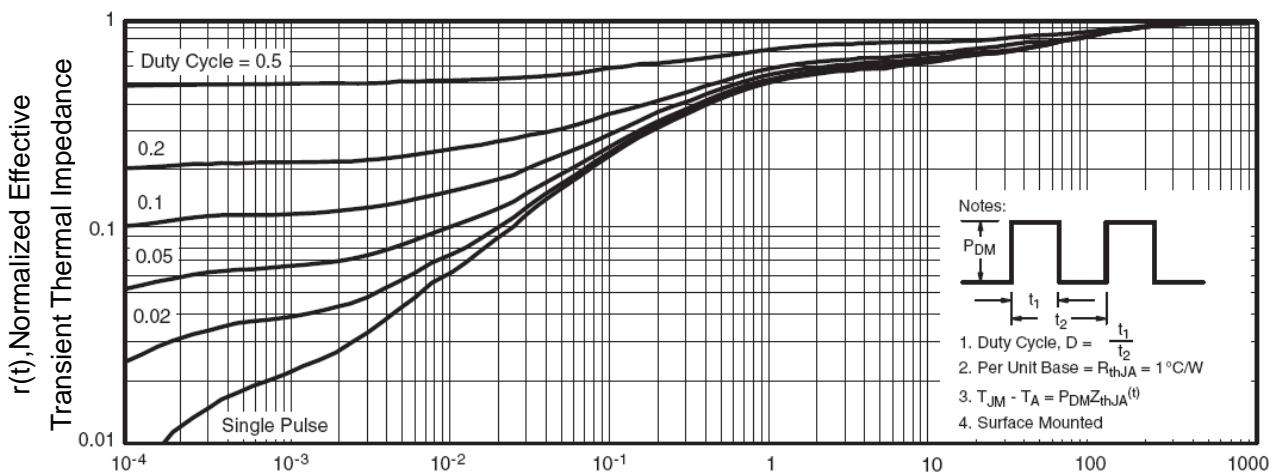
**Figure 9  $BV_{DSS}$  vs Junction Temperature**



**Figure 8 Safe Operation Area**



**Figure 10 Power De-rating**



**Figure 11 Normalized Maximum Transient Thermal Impedance**