
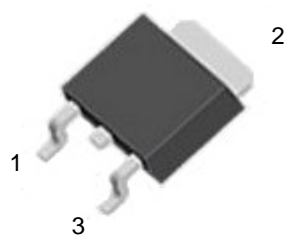
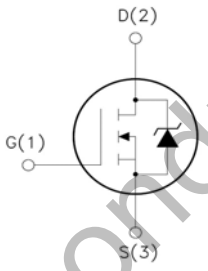


## WGD120N03

**Features:**

- Low Intrinsic Capacitances.
- Excellent Switching Characteristics.
- Extended Safe Operating Area.
- Unrivalled Gate Charge :Qg= 70nC (Typ.).
- BVDSS=30V,I<sub>D</sub>=120A
- R<sub>DS(on)</sub> : 4.2mΩ (Max) @V<sub>G</sub>=10V
- 100% Avalanche Tested

TO-252 

- 1.Gate (G)
- 2.Drain (D)
- 3.Source (S)

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

Symbol	Parameter	Value	Unit
V <sub>DSS</sub>	Drain-Source Voltage	30	V
I <sub>D</sub>	Drain Current	T <sub>j</sub> =25°C	120
		T <sub>j</sub> =100°C	70
V <sub>GSS</sub>	Gate Threshold Voltage	±20	V
E <sub>AS</sub>	Single Pulse Avalanche Energy (note5)	350	mJ
I <sub>DM</sub>	Pulsed Drain Current	400	A
P <sub>D</sub>	Power Dissipation (T <sub>j</sub> =25°C)	110	W
T <sub>j</sub>	Junction Temperature(Max)	175	°C
T <sub>stg</sub>	Storage Temperature	-55~+175	
TL	Maximum lead temperature for soldering purpose,1/8" from case for 5 seconds	300	

**Thermal Characteristics**

Symbol	Parameter	Typ.	Max.	Unit
R <sub>θJC</sub>	Thermal Resistance,Junction to Case	-	1.36	°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	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A$	30	-	-	V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=30V, V_{GS}=0V$	-	-	1	$\mu A$
Gate-Body Leakage Current	$I_{GSS}$	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	$\pm 100$	nA
<b>On Characteristics</b> (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1	1.6	3	V
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=20A$	-	3.3	4.2	m $\Omega$
Forward Transconductance	$g_{FS}$	$V_{DS}=10V, I_D=20A$	50	-	-	S
<b>Dynamic Characteristics</b> (Note 4)						
Input Capacitance	$C_{iss}$	$V_{DS}=25V, V_{GS}=0V,$ $F=1.0\text{MHz}$		3400		PF
Output Capacitance	$C_{oss}$			356		PF
Reverse Transfer Capacitance	$C_{rss}$			308		PF
<b>Switching Characteristics</b> (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=15V, I_D=60A$ $V_{GS}=4.5V, R_{GEN}=1.8\Omega$	-	11	-	nS
Turn-on Rise Time	$t_r$		-	160	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	25	-	nS
Turn-Off Fall Time	$t_f$		-	60	-	nS
Total Gate Charge	$Q_g$	$V_{DS}=15V, I_D=30A,$ $V_{GS}=10V$		70		nC
Gate-Source Charge	$Q_{gs}$			8.8		nC
Gate-Drain Charge	$Q_{gd}$			16.3		nC
<b>Drain-Source Diode Characteristics</b>						
Diode Forward Voltage	$V_{SD}$	$V_{GS}=0V, I_S=20A$	-	-	1.2	V
Diode Forward Current	$I_S$	-	-	-	120	A
Reverse Recovery Time	$t_{rr}$	$T_J = 25^\circ\text{C}, I_F = 60A$ $di/dt = 100A/\mu s$ (Note 3)	-	56	-	nS
Reverse Recovery Charge	$Q_{rr}$		-	110	-	nC
Forward Turn-On Time	$t_{on}$	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,  $t \leq 10$  sec.
3. Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$ .
4. Guaranteed by design, not subject to production
5. EAS condition:  $T_J=25^\circ\text{C}, V_{DD}=15V, V_G=10V, L=0.5\text{mH}, R_g=25\Omega$

Typical Electrical and Thermal Characteristics (Curves)

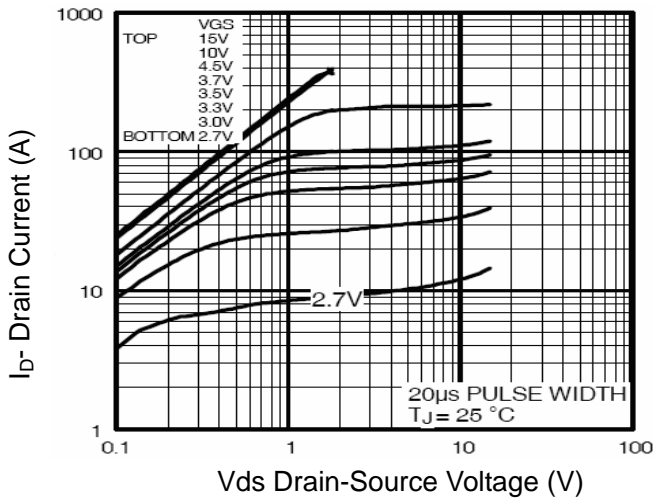


Figure 1 Output Characteristics

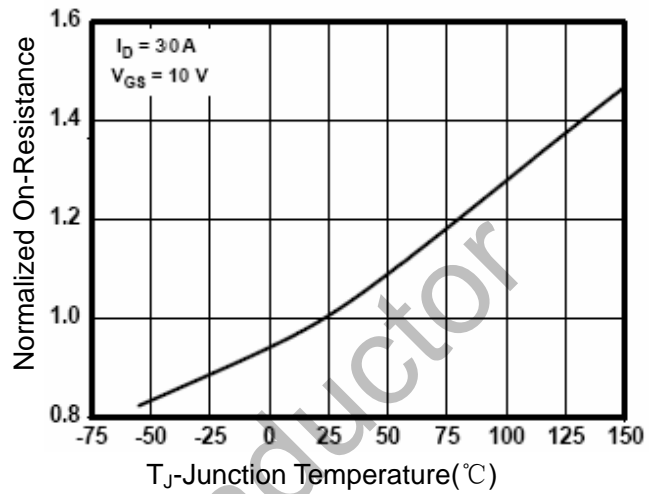


Figure 4 Rdson-Junction Temperature

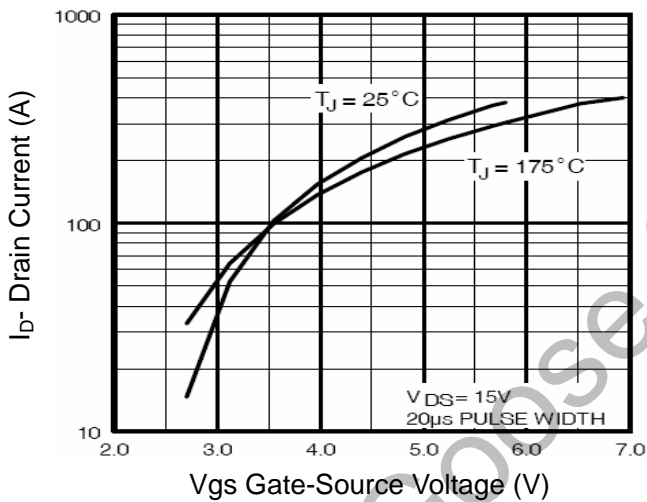


Figure 2 Transfer Characteristics

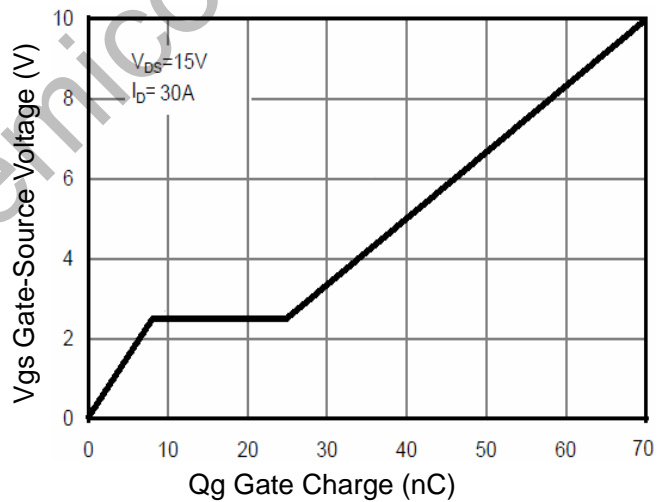


Figure 5 Gate Charge

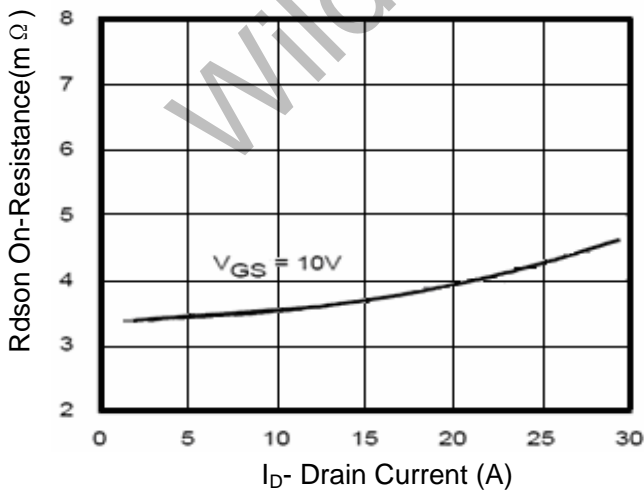


Figure 3 Rdson- Drain Current

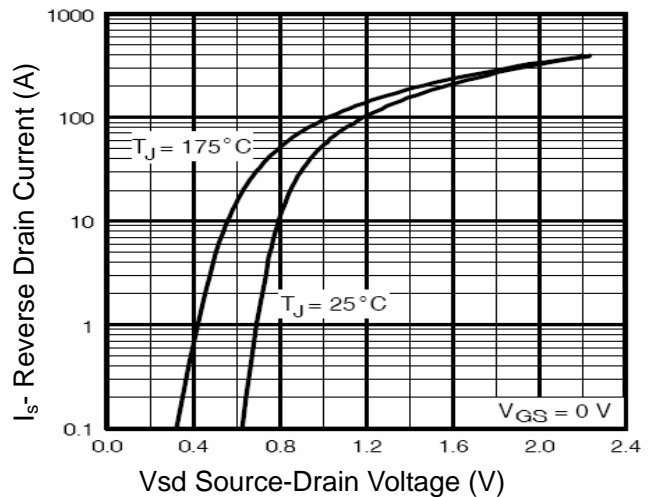


Figure 6 Source- Drain Diode Forward

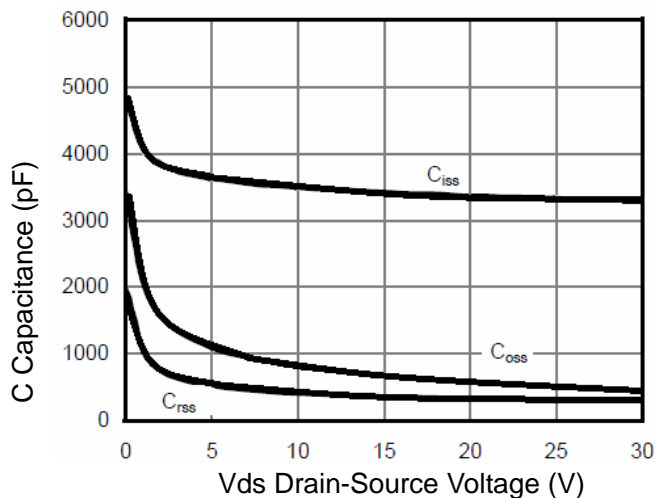


Figure 7 Capacitance vs Vds

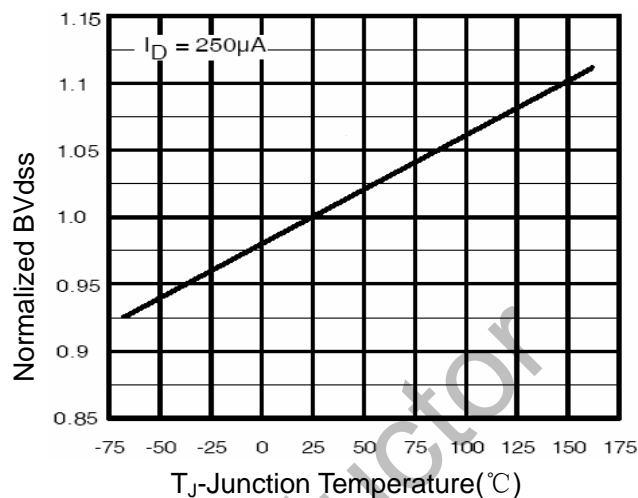


Figure 9  $BV_{DSS}$  vs Junction Temperature

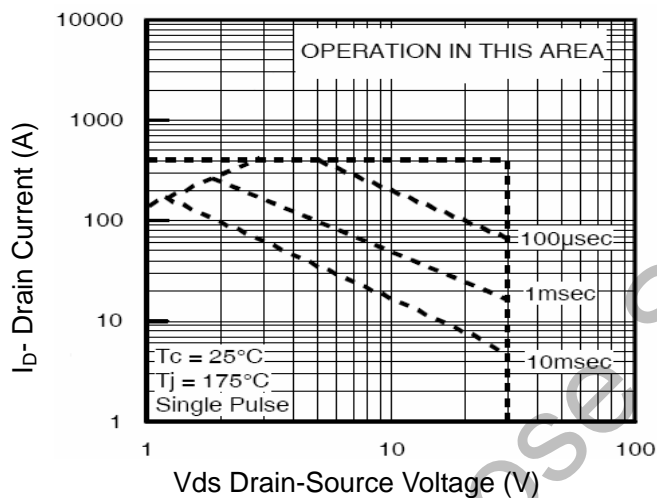


Figure 8 Safe Operation Area

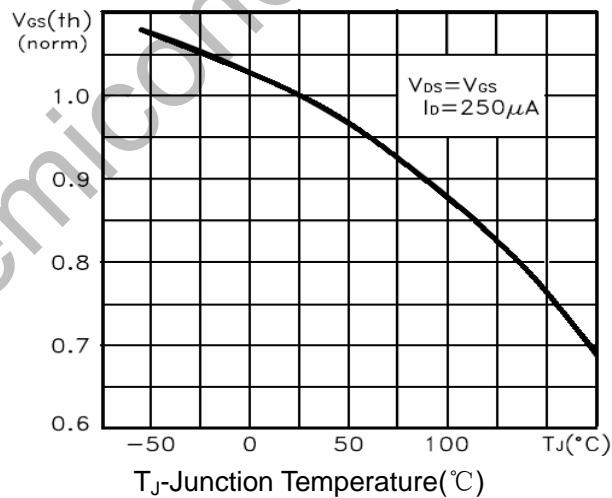


Figure 10  $V_{GS(th)}$  vs Junction Temperature

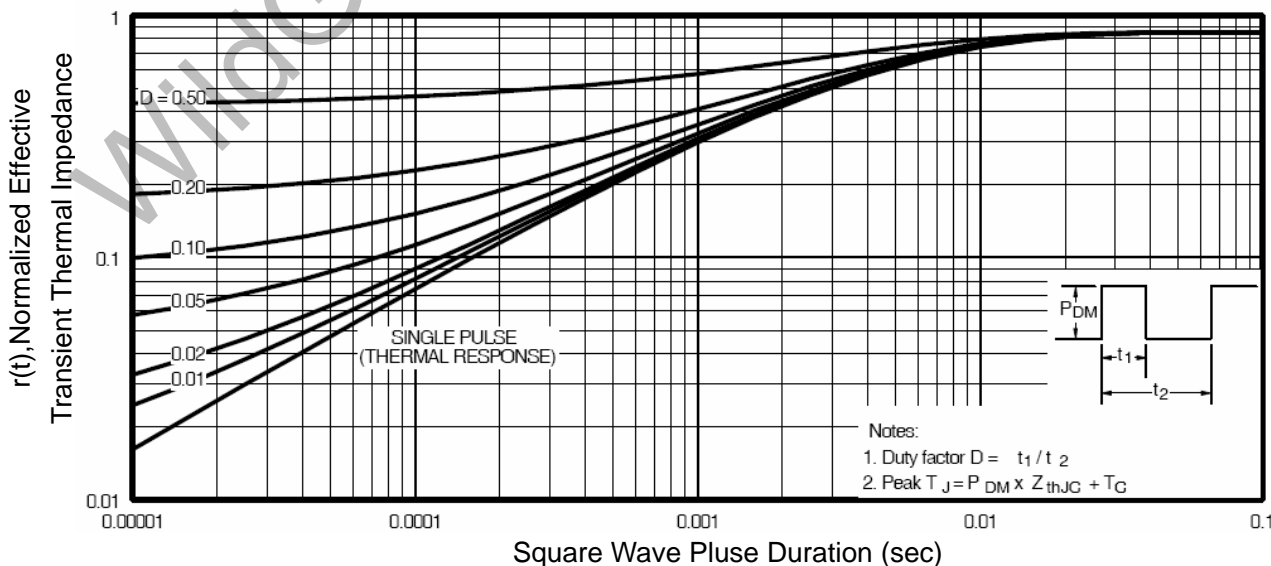
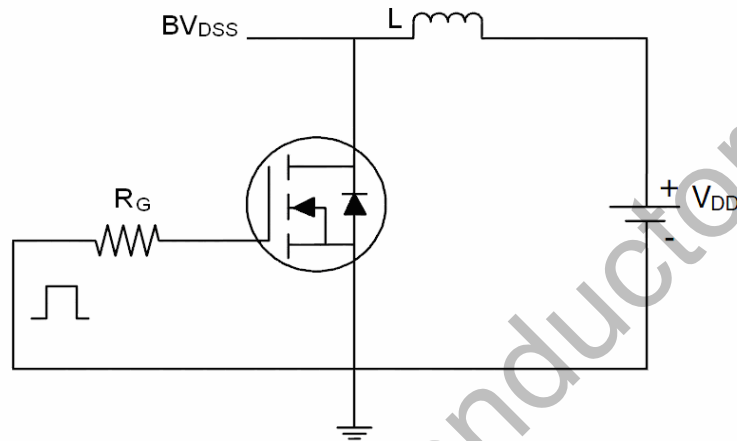


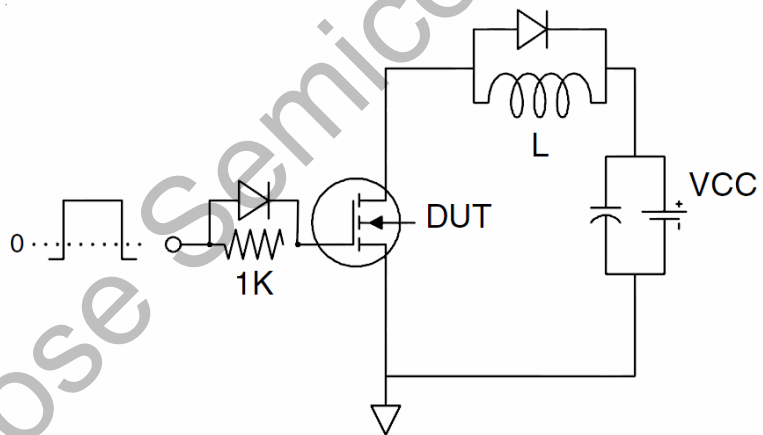
Figure 11 Normalized Maximum Transient Thermal Impedance

**Test circuit**

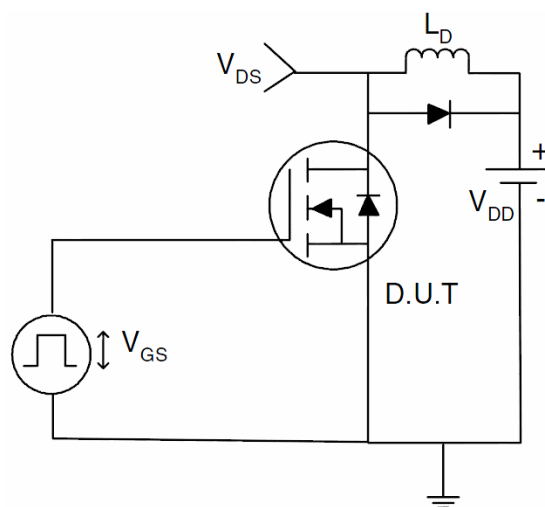
**1)  $E_{AS}$  test Circuit**



**2) Gate charge test Circuit**



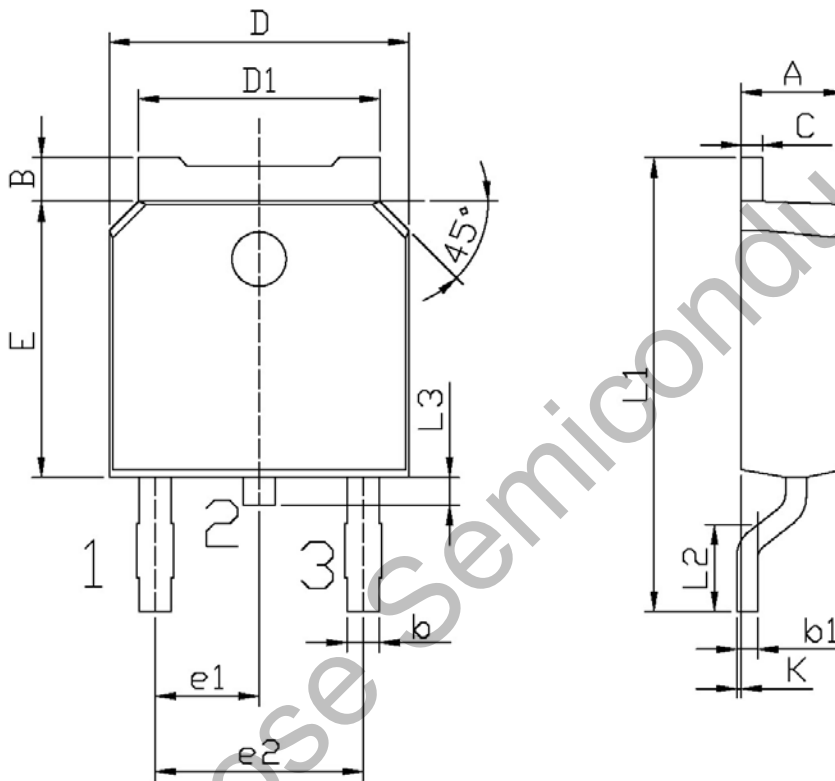
**3) Switch Time Test Circuit**



**Package Dimension**

**TO-252**

Unit: mm



Symbol	Dimensions In Millimeters		Symbol	Dimensions In Millimeters	
	Min	Max		Min	Max
A	2.20	2.40	E	5.95	6.25
B	0.95	1.25	e1	2.24	2.34
b	0.70	0.90	e2	4.43	4.73
b1	0.45	0.55	L1	9.85	10.35
C	0.45	0.55	L2	1.25	1.75
D	6.45	6.75	L3	0.60	0.90
D1	5.20	5.40	K	0.00	0.10