

N-Channel Trench MOSFET

Description

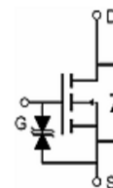
This Product uses advanced trench technology MOSFETs to provide excellent $R_{DS(ON)}$ and low gate charge. The complementary MOSFETs may be used to form a level shifted high side switch, and for a host of other applications.

General Features

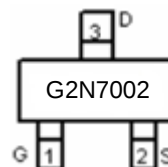
- V_{DS} 60V
- I_D (at $V_{GS} = 10V$) 0.2A
- $R_{DS(ON)}$ (at $V_{GS} = 10V$) $< 2.9\Omega$
- $R_{DS(ON)}$ (at $V_{GS} = 4.5V$) $< 3.5\Omega$
- 100% Avalanche Tested
- RoHS Compliant
- ESD (HBM) $>2.0KV$

Application

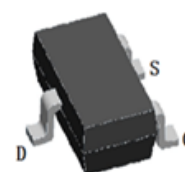
- Power switch
- DC/DC converters



Schematic diagram



Marking and pin assignment



SOT-23

Device	Package	Marking	Packaging
G2N7002E	SOT-23	G2N7002	3000pcs/Reel

Absolute Maximum Ratings $T_C = 25^\circ C$, unless otherwise noted

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	60	V
Continuous Drain Current	I_D	0.2	A
Pulsed Drain Current (note1)	I_{DM}	0.8	A
Gate-Source Voltage	V_{GS}	± 20	V
Power Dissipation	P_D	0.2	W
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55 To 150	$^\circ C$

Thermal Resistance

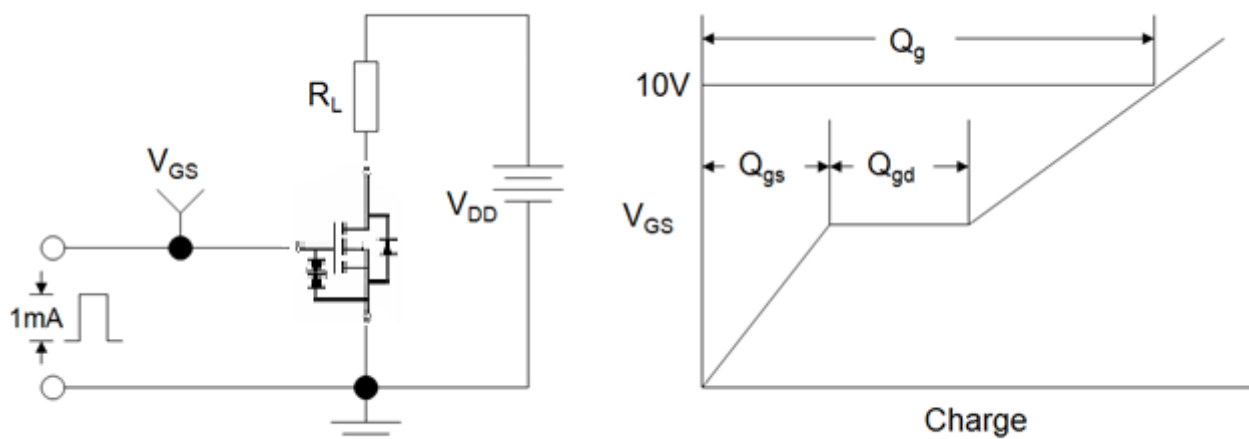
Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Ambient	R_{thJA}	625	$^\circ C/W$

Specifications T _J = 25°C, unless otherwise noted						
Parameter	Symbol	Test Conditions	Value			Unit
			Min.	Typ.	Max.	
Static Parameters						
Drain-Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} = 0V, I _D = 250μA	60	--	--	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 60V, V _{GS} = 0V	--	--	1	uA
Gate-Source Leakage	I _{GSS}	V _{GS} = ±20V	--	--	±10	uA
Gate-Source Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250μA	0.7	1.65	1.8	V
Drain-Source On-Resistance	R _{DS(on)}	V _{GS} = 10V, I _D = 0.2A	--	1.95	2.9	Ω
		V _{GS} = 4.5V, I _D = 0.15A	--	2.2	3.5	
Forward Transconductance	g _{FS}	V _{DS} =10V,I _D =0.2A	0.08	--	--	S
Dynamic Parameters						
Input Capacitance	C _{iss}	V _{GS} = 0V, V _{DS} = 30V, f = 1.0MHz	--	20	--	pF
Output Capacitance	C _{oss}		--	10	--	
Reverse Transfer Capacitance	C _{rss}		--	3.6	--	
Total Gate Charge	Q _g	V _{DD} = 10V, I _D = 0.2A, V _{GS} = 4.5V	--	1.7	--	nC
Gate-Source Charge	Q _{gs}		--	0.3	--	
Gate-Drain Charge	Q _{gd}		--	0.52	--	
Turn-on Delay Time	t _{d(on)}	V _{DD} = 30V, I _D = 0.2A, R _G = 10Ω	--	10	--	ns
Turn-on Rise Time	t _r		--	50	--	
Turn-off Delay Time	t _{d(off)}		--	17	--	
Turn-off Fall Time	t _f		--	10	--	
Drain-Source Body Diode Characteristics						
Continuous Body Diode Current	I _S	T _C = 25°C	--	--	0.3	A
Body Diode Voltage	V _{SD}	T _J = 25°C, I _{SD} = 0.2A, V _{GS} = 0V	--	--	1.2	V

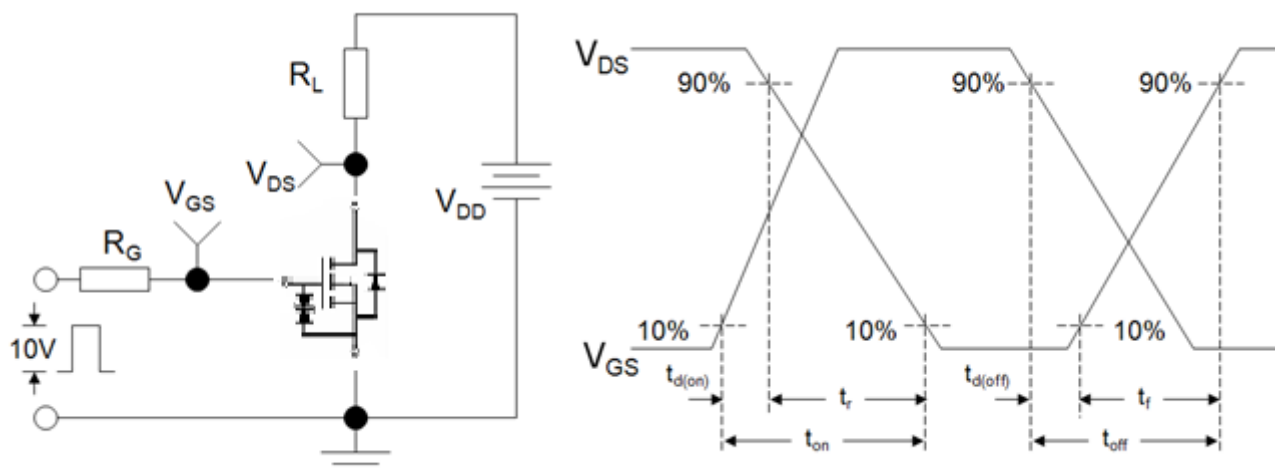
Notes

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. Identical low side and high side switch with identical R_G

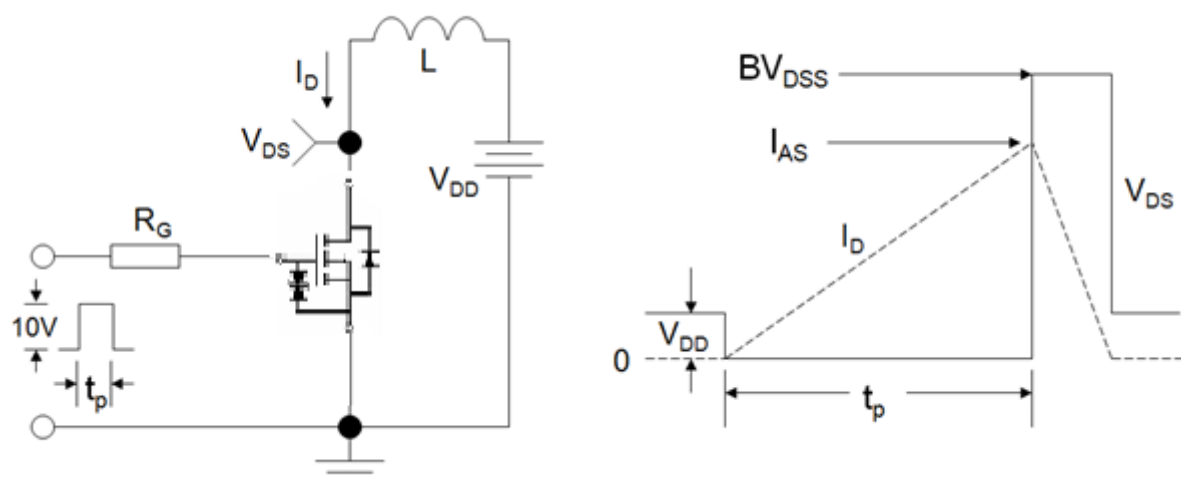
Gate Charge Test Circuit



Switch Time Test Circuit



EAS Test Circuit



Typical Characteristics $T_J = 25^\circ\text{C}$, unless otherwise noted

Figure 1. Output Characteristics

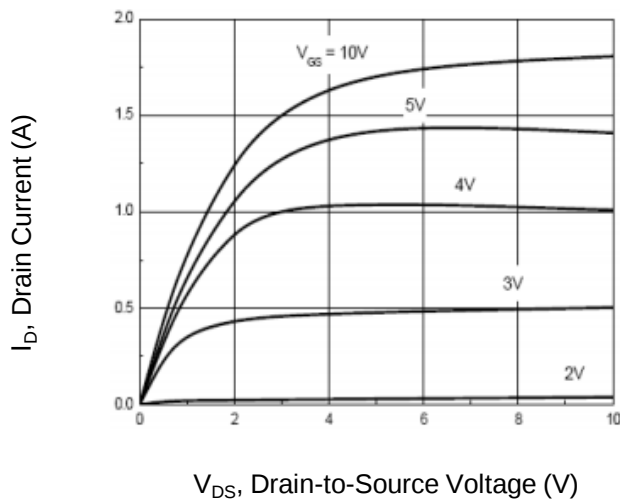


Figure 2. Transfer Characteristics

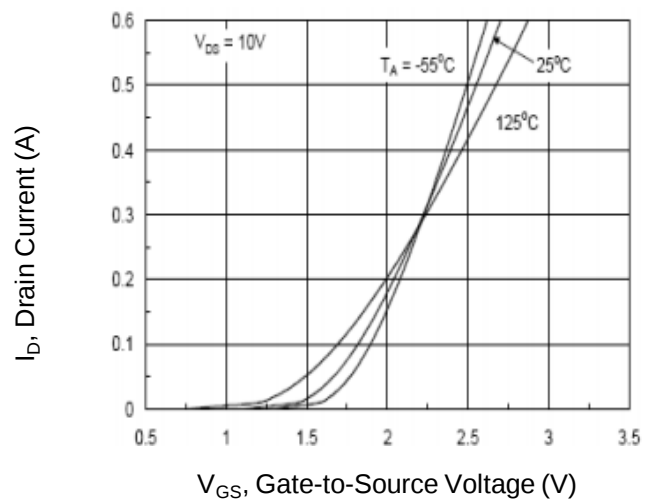


Figure 3. Drain Source On Resistance

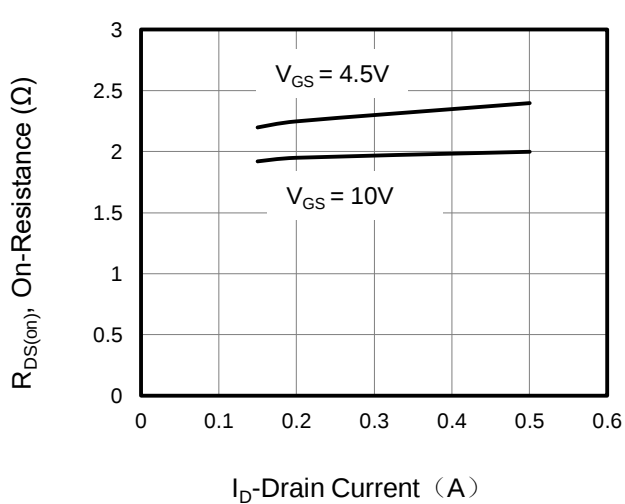


Figure 4. Gate Charge

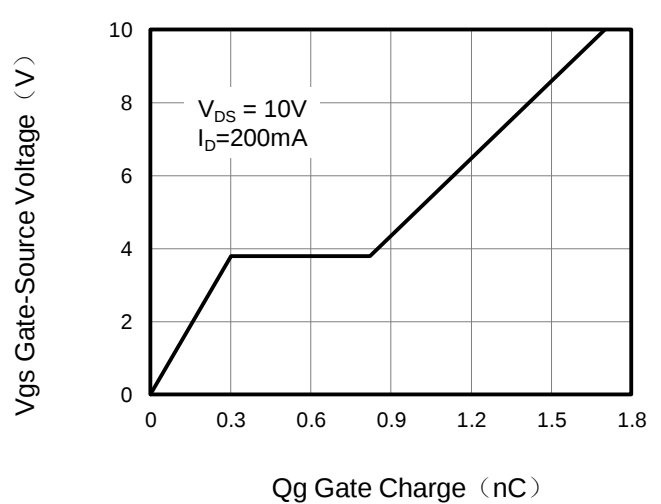


Figure 5. Capacitance vs Vds

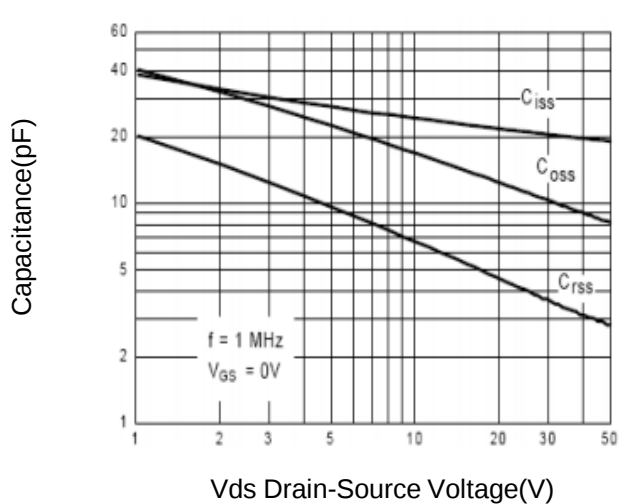
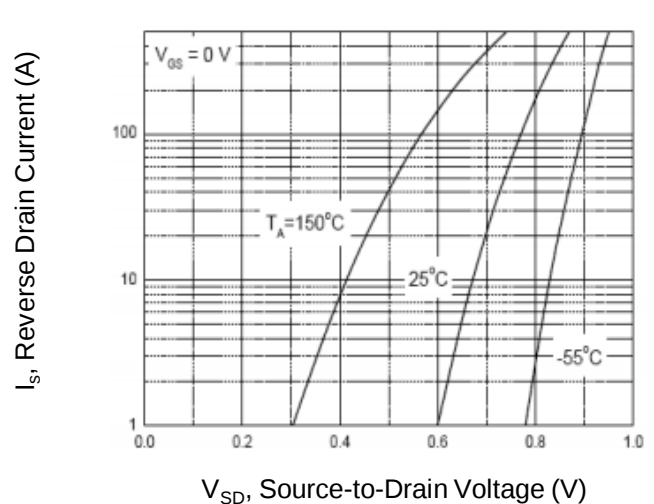


Figure 6. Source-Drain Diode Forward



Typical Characteristics $T_J = 25^\circ\text{C}$, unless otherwise noted

Figure 7. Drain-Source On-Resistance

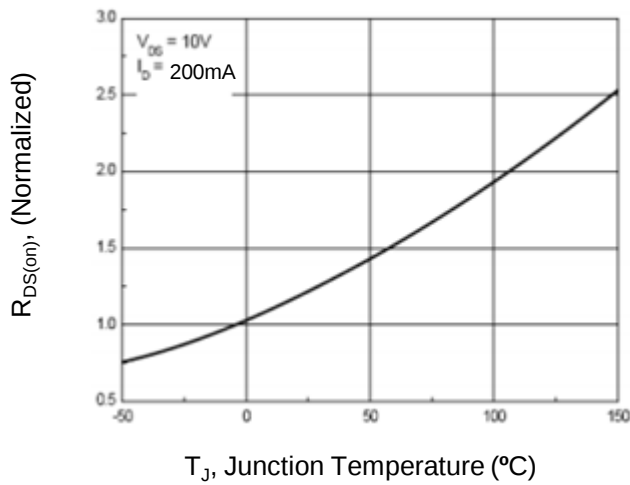


Figure 8. Safe Operation Area

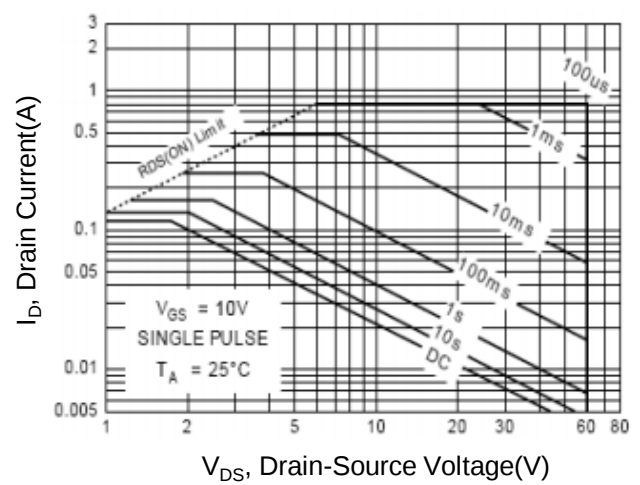
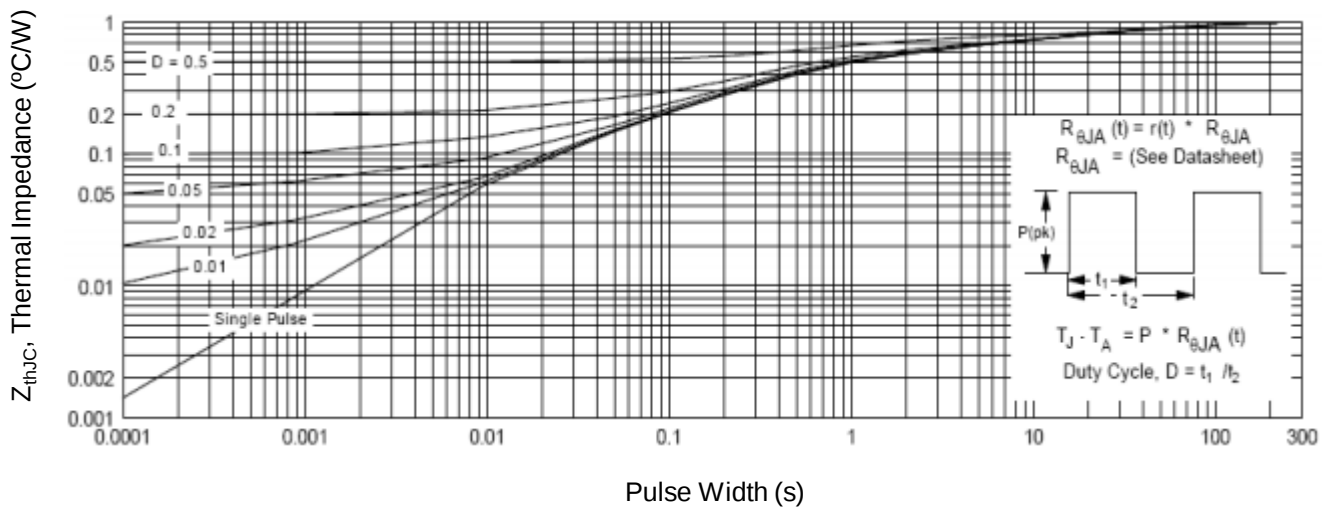
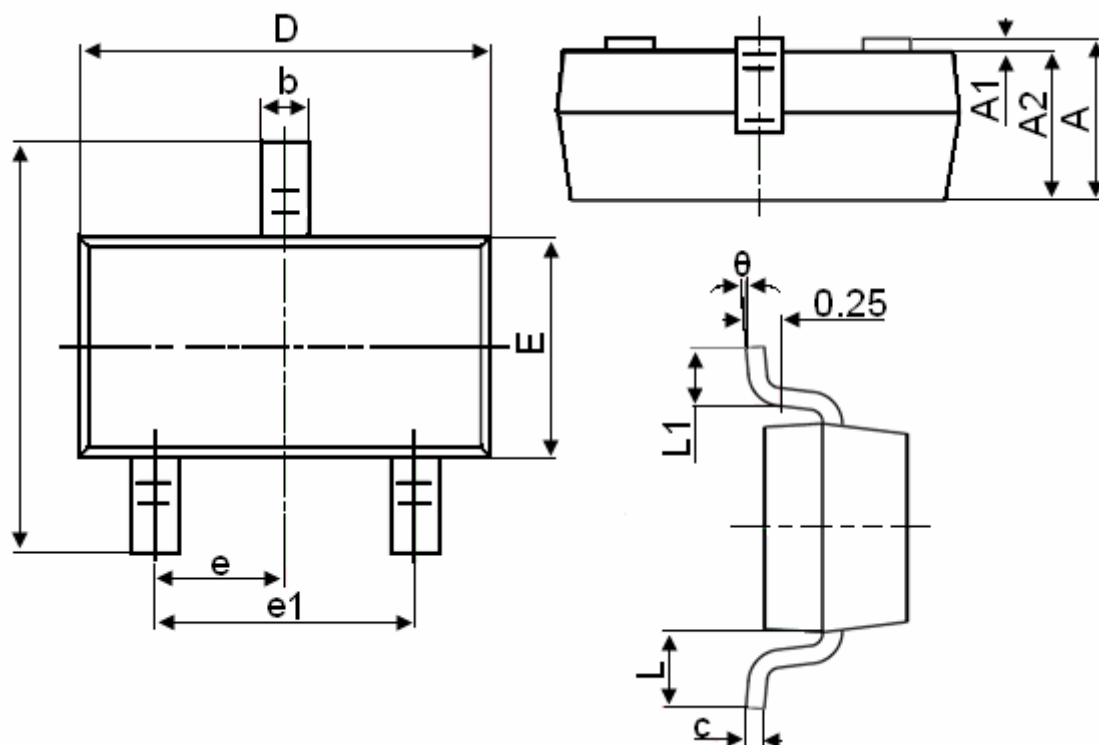


Figure 9. Normalized Maximum Transient Thermal Impedance



SOT-23 Package Information



Symbol	Dimensions in Millimeters	
	MIN.	MAX.
A	0.900	1.150
A1	0.000	0.100
A2	0.900	1.050
b	0.300	0.500
c	0.080	0.150
D	2.800	3.000
E	1.200	1.400
E1	2.250	2.550
e	0.950TYP	
e1	1.800	2.000
L	0.550REF	
L1	0.300	0.500
θ	0°	8°