

N-Channel Trench MOSFET

Description

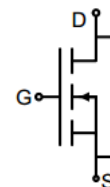
This Product uses advanced trench technology MOSFETs to provide excellent $R_{DS(ON)}$ and low gate charge. The complementary MOSFETs may be used to form a level shifted high side switch, and for a host of other applications.

General Features

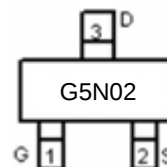
- V_{DS} 20V
- I_D (at $V_{GS} = 10V$) 5A
- $R_{DS(ON)}$ (at $V_{GS} = 10V$) $< 18m\Omega$
- $R_{DS(ON)}$ (at $V_{GS} = 4.5V$) $< 20m\Omega$
- $R_{DS(ON)}$ (at $V_{GS} = 2.5V$) $< 27m\Omega$
- 100% Avalanche Tested
- RoHS Compliant

Application

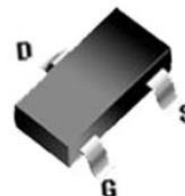
- Power switch
- DC/DC converters



Schematic diagram



Marking and pin assignment



SOT-23-3L

Device	Package	Marking	Packaging
G5N02L	SOT-23-3L	G5N02	3000pcs/Reel

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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	20	V
Continuous Drain Current	I_D	5	A
Pulsed Drain Current (note1)	I_{DM}	20	A
Gate-Source Voltage	V_{GS}	± 12	V
Power Dissipation	P_D	1.25	W
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55 To 150	$^\circ\text{C}$

Thermal Resistance

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Ambient	R_{thJA}	100	$^\circ\text{C/W}$

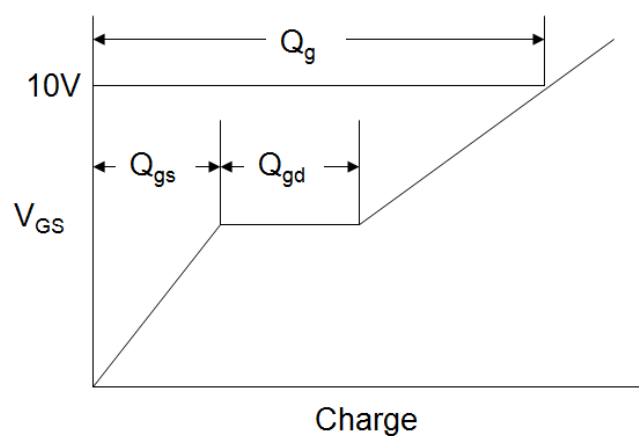
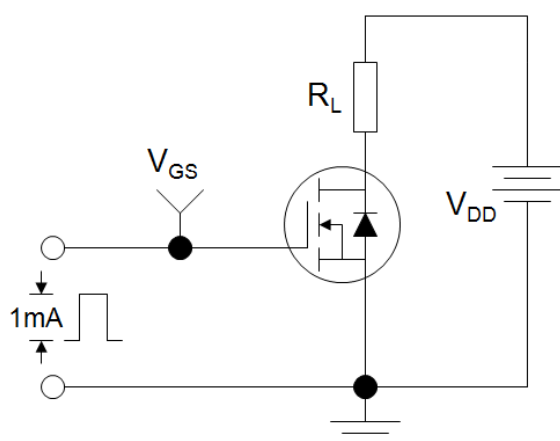
Specifications $T_J = 25^\circ\text{C}$, unless otherwise noted

Parameter	Symbol	Test Conditions	Value			Unit
			Min.	Typ.	Max.	
Static Parameters						
Drain-Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} = 0V, I _D = 250μA	20	--	--	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 20V, V _{GS} = 0V	--	--	100	nA
Gate-Source Leakage	I _{GSS}	V _{GS} = ±12V	--	--	±100	nA
Gate-Source Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250μA	0.4	0.8	1.0	V
Drain-Source On-Resistance	R _{DS(on)}	V _{GS} = 10V, I _D = 4.2A	--	11	18	mΩ
		V _{GS} = 4.5V, I _D = 4A	--	12	20	
		V _{GS} = 2.5V, I _D = 1A	--	15	27	
Forward Transconductance	g _{FS}	V _{Ds} =10V,I _D =5A	25	--	--	S
Dynamic Parameters						
Input Capacitance	C _{iss}	V _{GS} = 0V, V _{DS} = 10V, f = 1.0MHz	--	780	--	pF
Output Capacitance	C _{oss}		--	140	--	
Reverse Transfer Capacitance	C _{rss}		--	80	--	
Total Gate Charge	Q _g	V _{DD} = 10V, I _D = 5A, V _{GS} = 4.5V	--	11	--	nC
Gate-Source Charge	Q _{gs}		--	2.3	--	
Gate-Drain Charge	Q _{gd}		--	2.9	--	
Turn-on Delay Time	t _{d(on)}	V _{DD} = 10V, I _D = 1A, R _G = 6Ω	--	9	--	ns
Turn-on Rise Time	t _r		--	30	--	
Turn-off Delay Time	t _{d(off)}		--	35	--	
Turn-off Fall Time	t _f		--	10	--	
Drain-Source Body Diode Characteristics						
Continuous Body Diode Current	I _S	T _C = 25°C	--	--	5	A
Body Diode Voltage	V _{SD}	T _J = 25°C, I _{SD} = 1A, V _{GS} = 0V	--	--	1.2	V

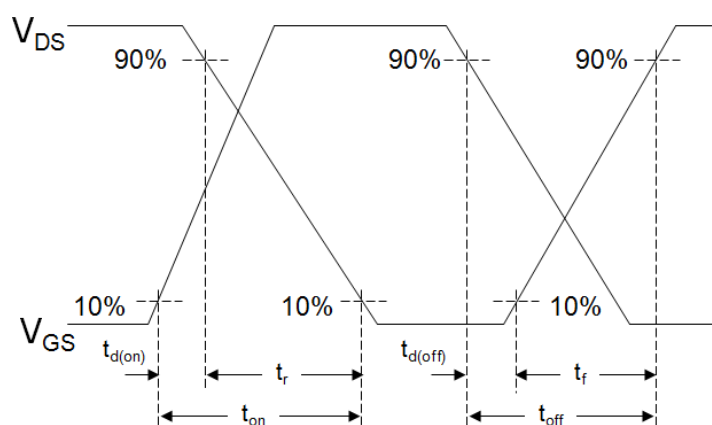
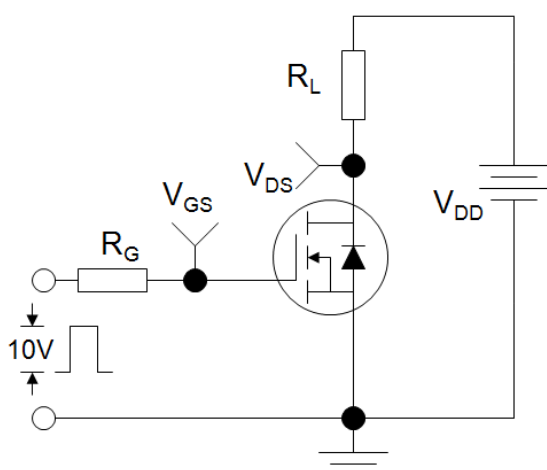
Notes

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

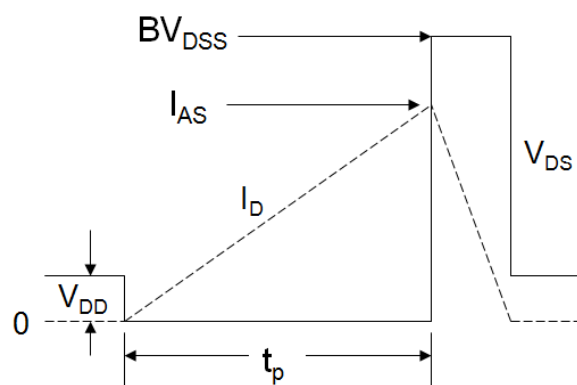
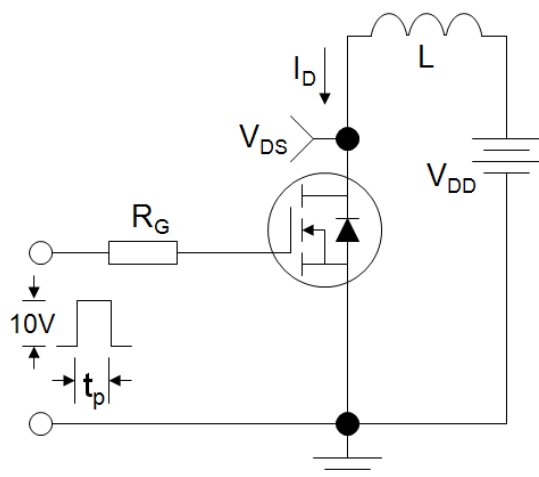
Gate Charge Test Circuit



Switch Time Test Circuit



EAS Test Circuit



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

Figure 1. Output Characteristics

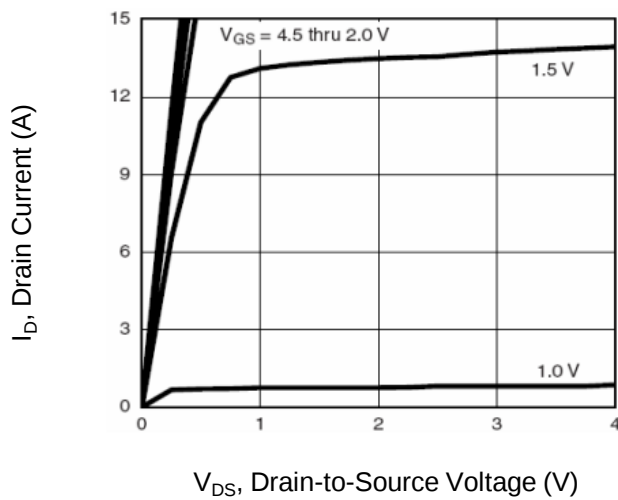


Figure 2. Transfer Characteristics

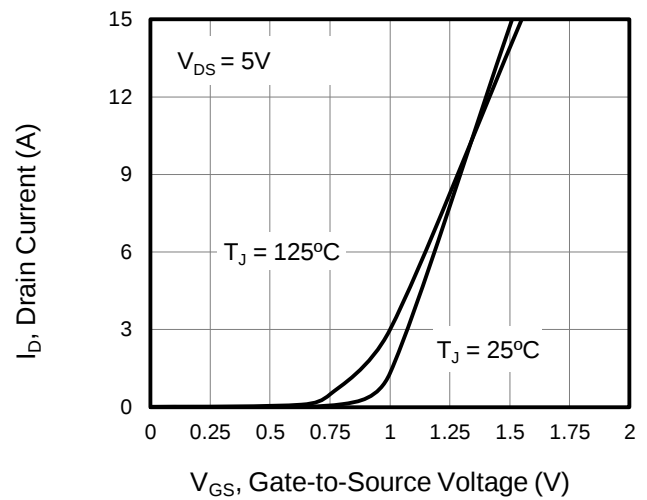


Figure 3. Drain Source On Resistance

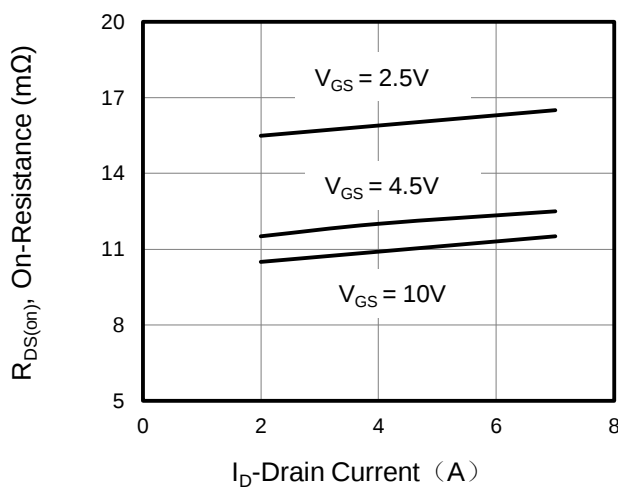


Figure 4. Gate Charge

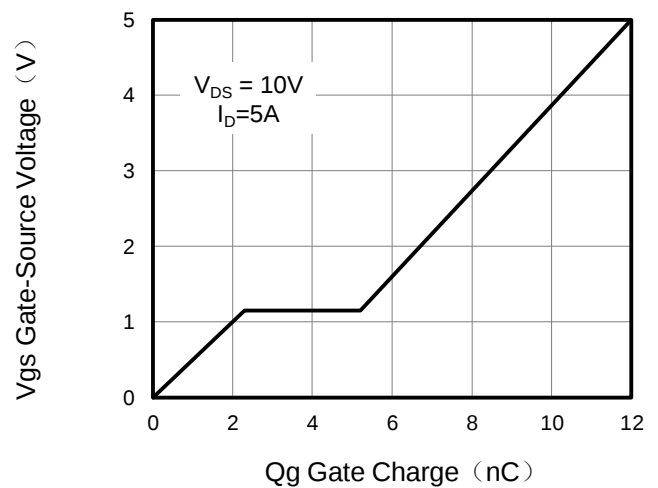


Figure 5. Capacitance vs Vds

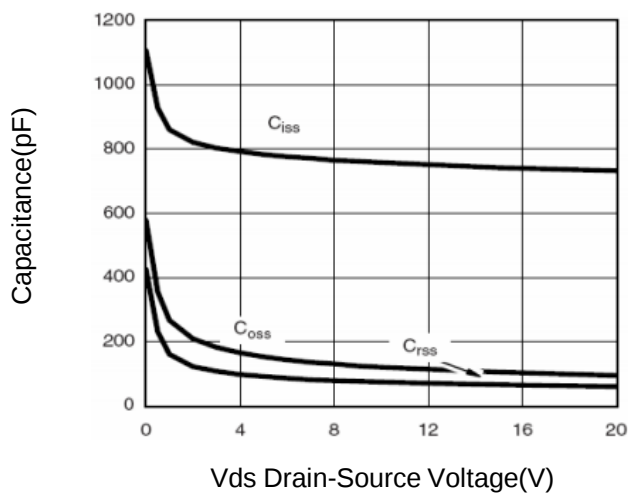
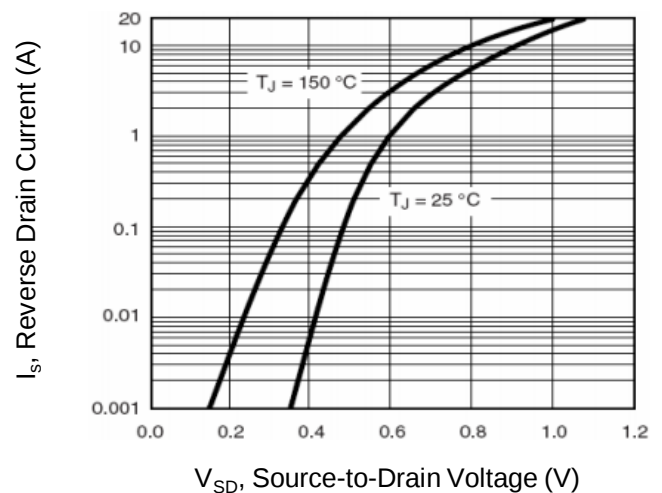


Figure 6. Source-Drain Diode Forward



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Figure 7. Drain-Source On-Resistance

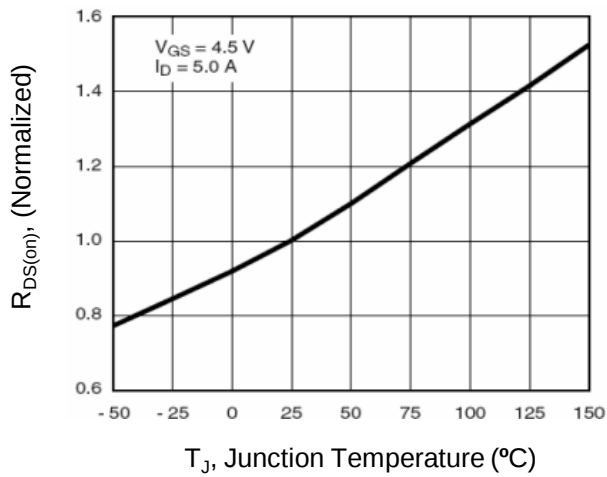


Figure 8. Safe Operation Area

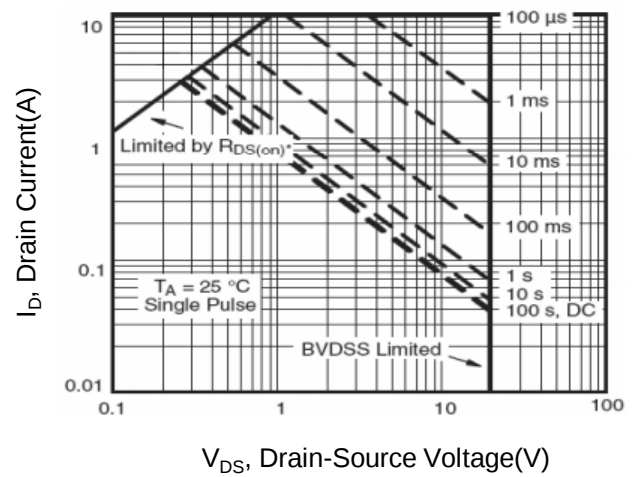
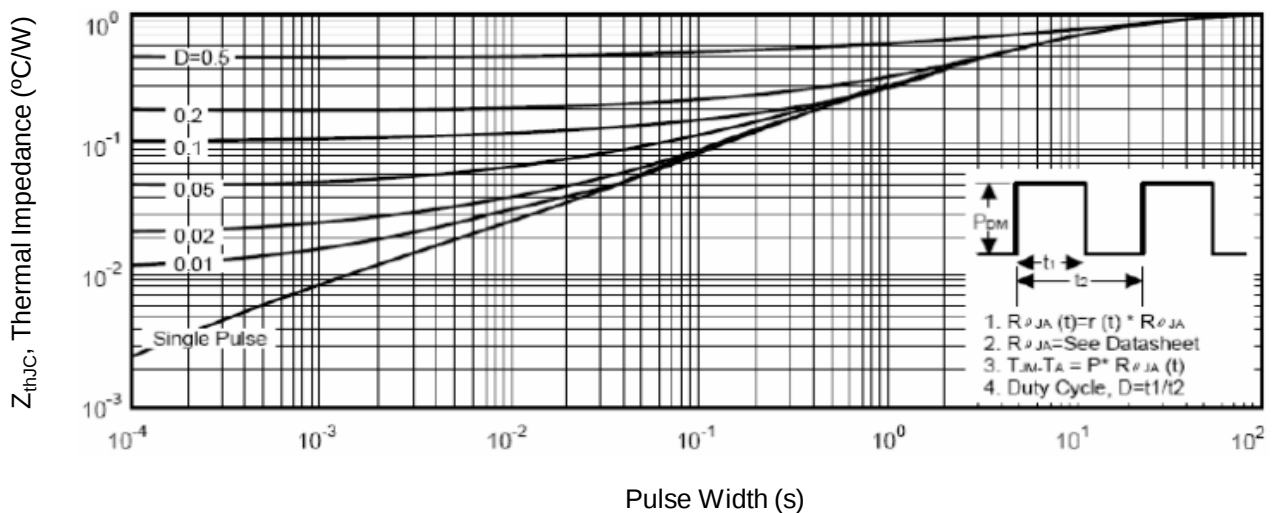
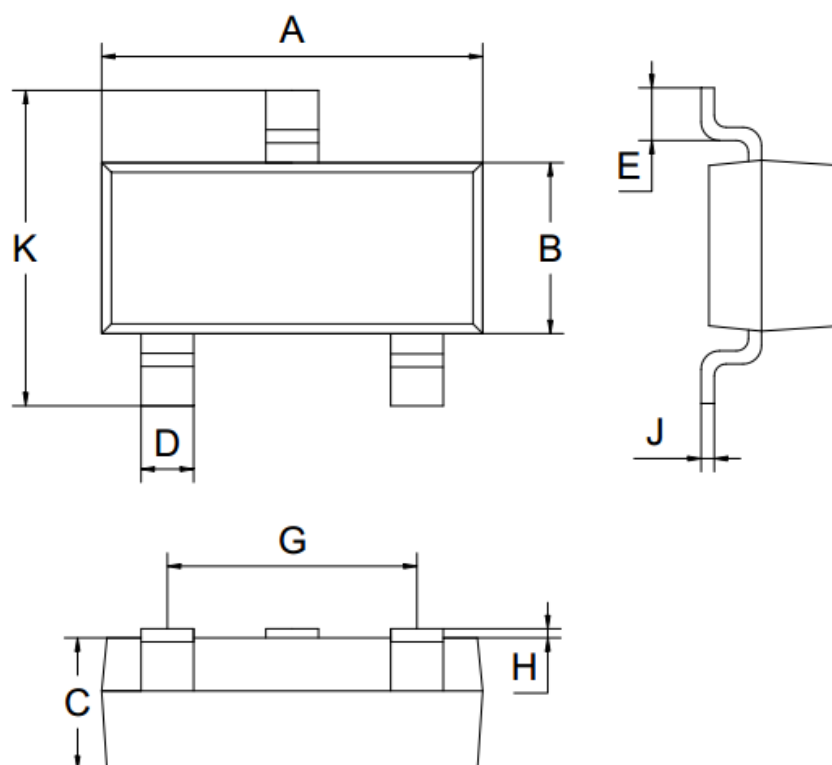


Figure 9. Normalized Maximum Transient Thermal Impedance



SOT-23-3L Package Information



Symbol	Dimensions in Millimeters		
	MIN.	NOM.	MAX.
A	2.80	2.90	3.00
B	1.50	1.60	1.70
C	1.00	1.10	1.20
D	0.30	0.40	0.50
E	0.25	0.40	0.55
G	1.90		
H	0.00	-	0.10
J	0.047	0.127	0.207
K	2.60	2.80	3.00
All Dimensions in mm			