

# N-Channel Trench MOSFET

<p><b>Description</b></p> <p>This Product uses advanced trench technology MOSFETs to provide excellent <math>R_{DS(ON)}</math> 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.</p> <p><b>General Features</b></p> <ul style="list-style-type: none"> <li>● <math>V_{DS}</math> 100V</li> <li>● <math>I_D</math> (at <math>V_{GS} = 10V</math>) 3A</li> <li>● <math>R_{DS(ON)}</math> (at <math>V_{GS} = 10V</math>) &lt; 150mΩ</li> <li>● <math>R_{DS(ON)}</math> (at <math>V_{GS} = 4.5V</math>) &lt; 180mΩ</li> <li>● ESD Rating: 6000V HBM</li> <li>● 100% Avalanche Tested</li> <li>● RoHS Compliant</li> </ul> <p><b>Application</b></p> <ul style="list-style-type: none"> <li>● Power switch</li> <li>● DC/DC converters</li> </ul>		<p>Schematic diagram</p> <p>Marking and pin assignment</p> <p>SOT-23-3L</p>	
<b>Device</b>	<b>Package</b>	<b>Marking</b>	<b>Packaging</b>
G1006LE	SOT-23-3L	G1006	3000pcs/Reel

Absolute Maximum Ratings $T_C = 25^{\circ}C$ , unless otherwise noted			
Parameter	Symbol	Value	Unit
Drain-Source Voltage	$V_{DS}$	100	V
Continuous Drain Current	$I_D$	3	A
Pulsed Drain Current (note1)	$I_{DM}$	12	A
Gate-Source Voltage	$V_{GS}$	±20	V
Power Dissipation	$P_D$	1.5	W
Operating Junction and Storage Temperature Range	$T_J, T_{stg}$	-55 To 150	°C

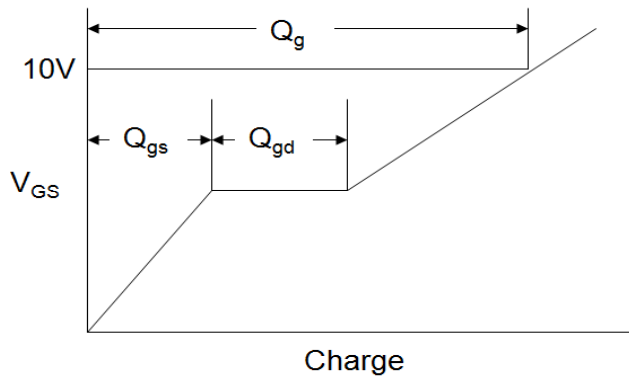
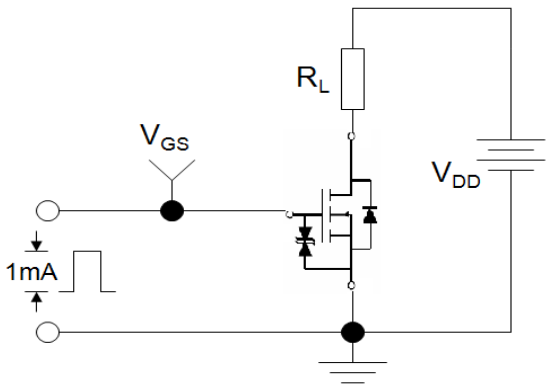
Thermal Resistance			
Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Ambient	$R_{thJA}$	100	°C/W

Specifications $T_J = 25^\circ\text{C}$ , unless otherwise noted						
Parameter	Symbol	Test Conditions	Value			Unit
			Min.	Typ.	Max.	
<b>Static Parameters</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	100	--	--	V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 95V, V_{GS} = 0V$	--	--	1	$\mu A$
Gate-Source Leakage	$I_{GSS}$	$V_{GS} = \pm 20V$	--	--	$\pm 50$	$\mu A$
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	1	1.7	2.2	V
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 3A$	--	143	150	m $\Omega$
		$V_{GS} = 4.5V, I_D = 3A$	--	154	180	
Forward Transconductance	$g_{FS}$	$V_{DS}=5V, I_D=3A$	--	7.4	--	S
<b>Dynamic Parameters</b>						
Input Capacitance	$C_{iss}$	$V_{GS} = 0V,$ $V_{DS} = 50V,$ $f = 1.0MHz$	--	622	--	pF
Output Capacitance	$C_{oss}$		--	35	--	
Reverse Transfer Capacitance	$C_{rss}$		--	24	--	
Total Gate Charge	$Q_g$	$V_{DD} = 50V,$ $I_D = 3A,$ $V_{GS} = 10V$	--	18.2	--	nC
Gate-Source Charge	$Q_{gs}$		--	3.3	--	
Gate-Drain Charge	$Q_{gd}$		--	3.8	--	
Turn-on Delay Time	$t_{d(on)}$	$V_{DD} = 50V,$ $I_D = 3A,$ $R_G = 3\Omega$	--	6	--	nS
Turn-on Rise Time	$t_r$		--	4	--	
Turn-off Delay Time	$t_{d(off)}$		--	20	--	
Turn-off Fall Time	$t_f$		--	4	--	
<b>Drain-Source Body Diode Characteristics</b>						
Continuous Body Diode Current	$I_S$	$T_C = 25^\circ\text{C}$	--	--	6	A
Body Diode Voltage	$V_{SD}$	$T_J = 25^\circ\text{C}, I_{SD} = 3A, V_{GS} = 0V$	--	--	1.2	V

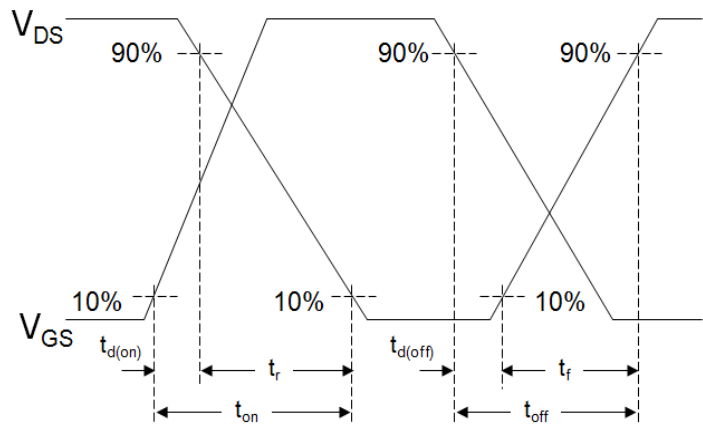
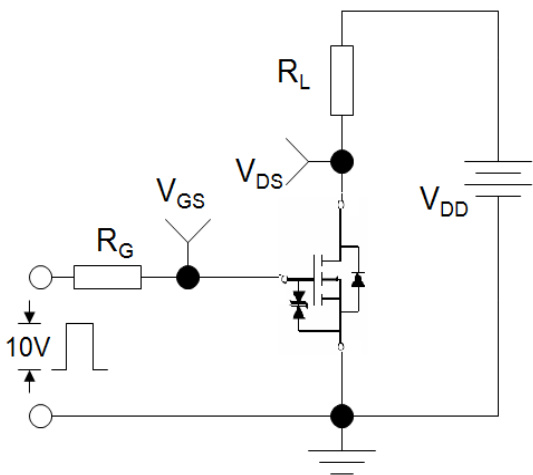
**Notes**

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

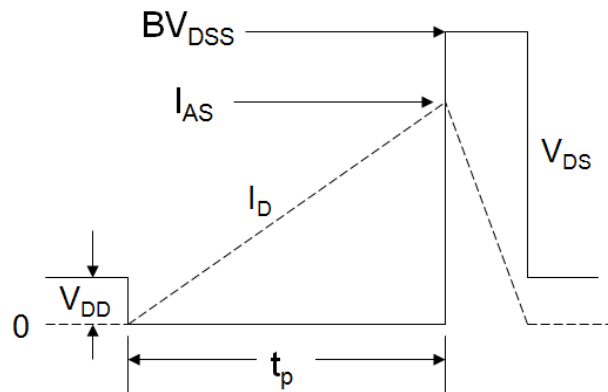
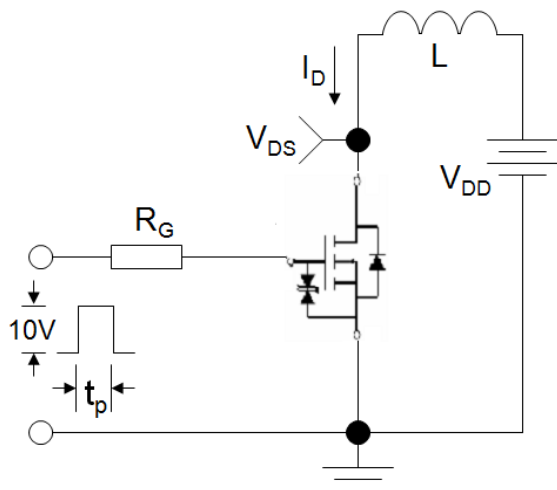
Gate Charge Test Circuit



Switch Time Test Circuit



EAS Test Circuit



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

Figure 1. Output Characteristics

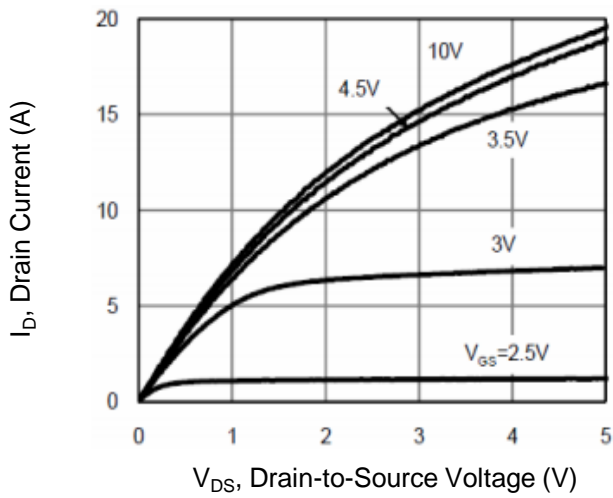


Figure 2. Transfer Characteristics

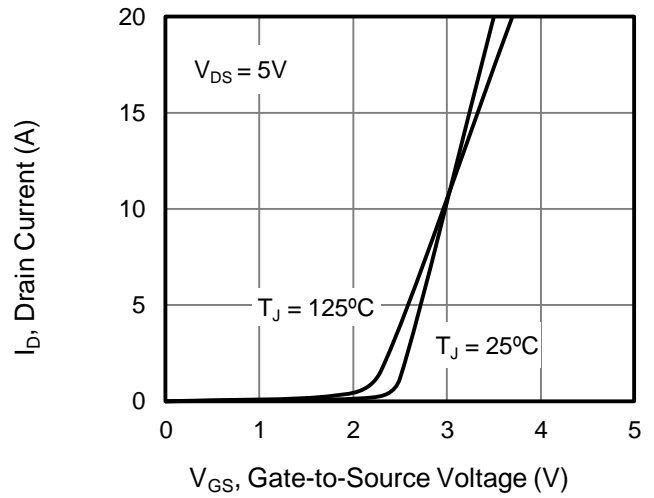


Figure 3. Drain Source On Resistance

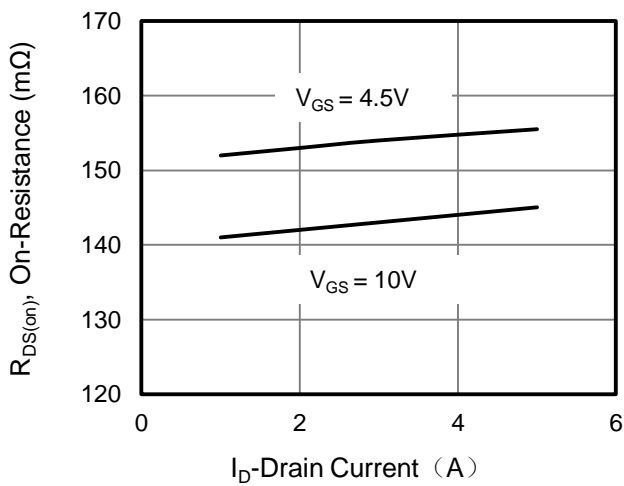


Figure 4. Gate Charge

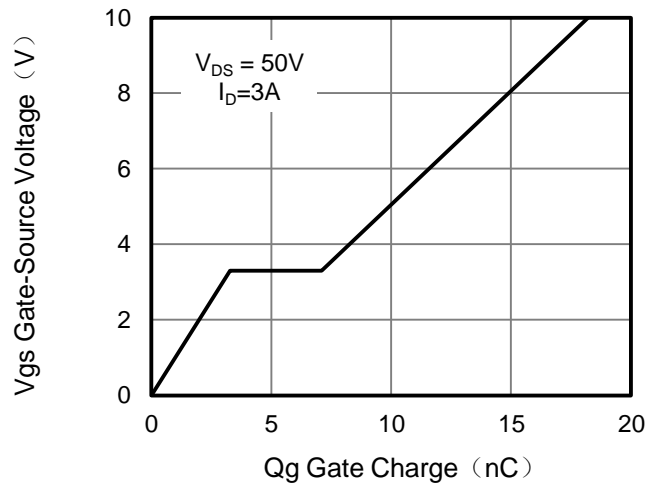


Figure 5. Capacitance vs Vds

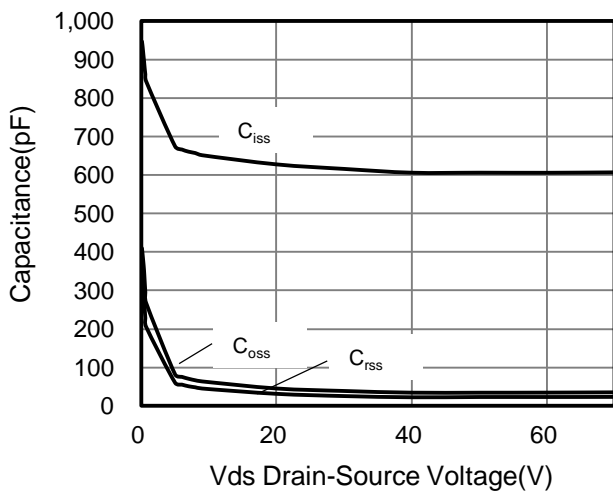
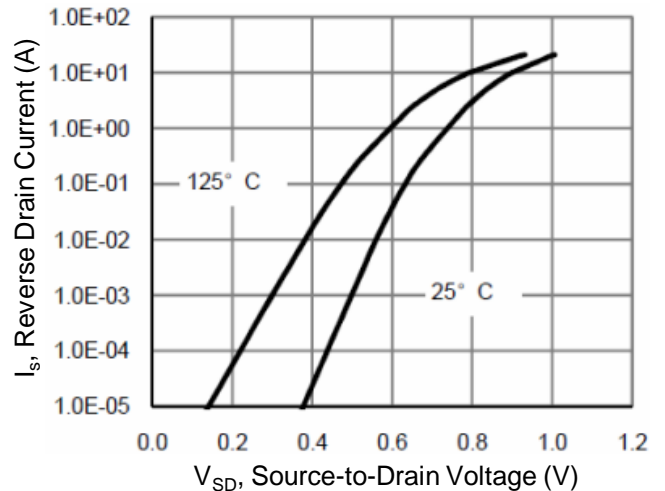


Figure 6. Source-Drain Diode Forward



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

Figure 7. Drain-Source On-Resistance

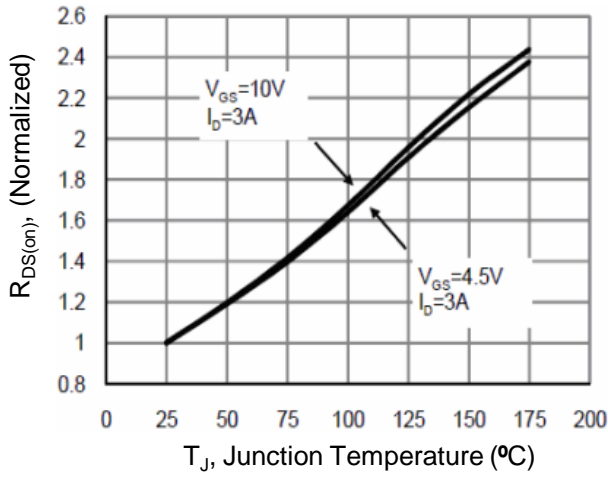


Figure 8. Safe Operation Area

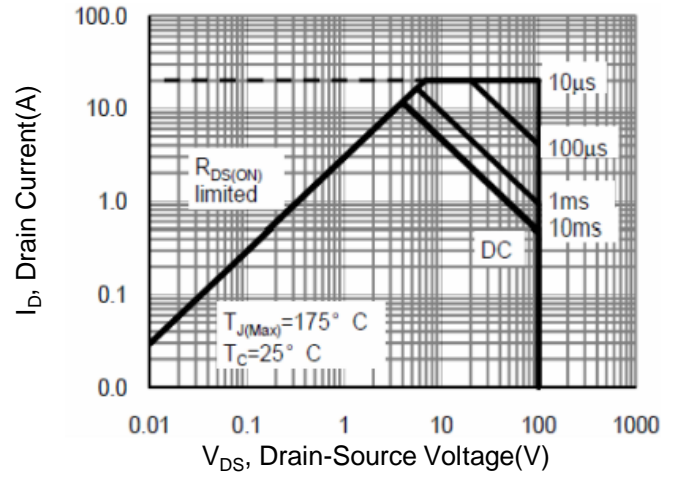
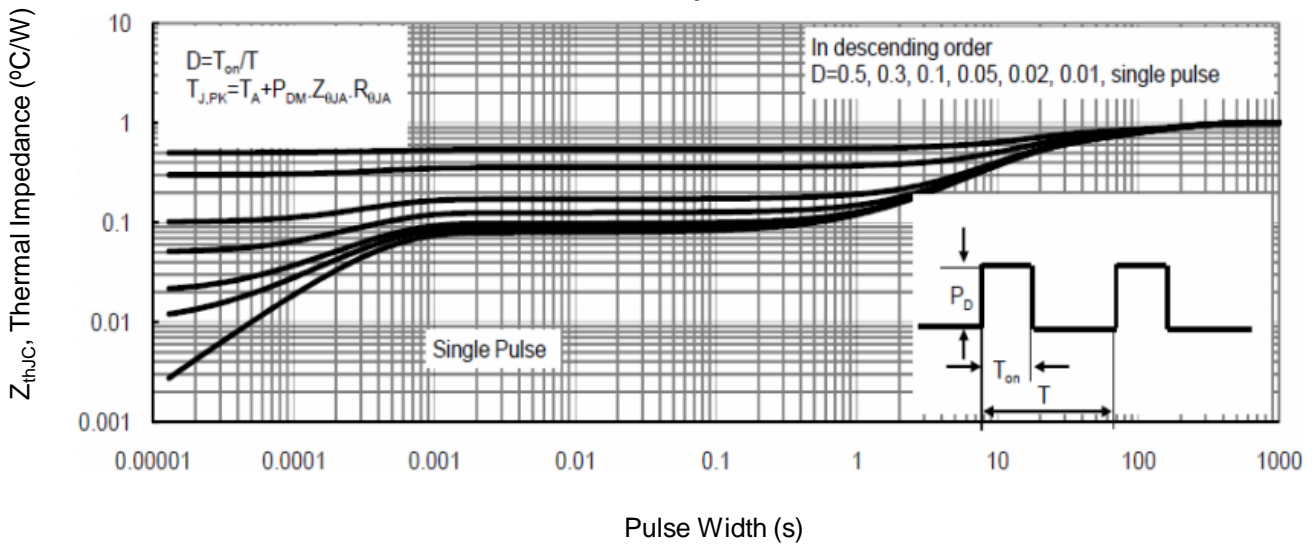
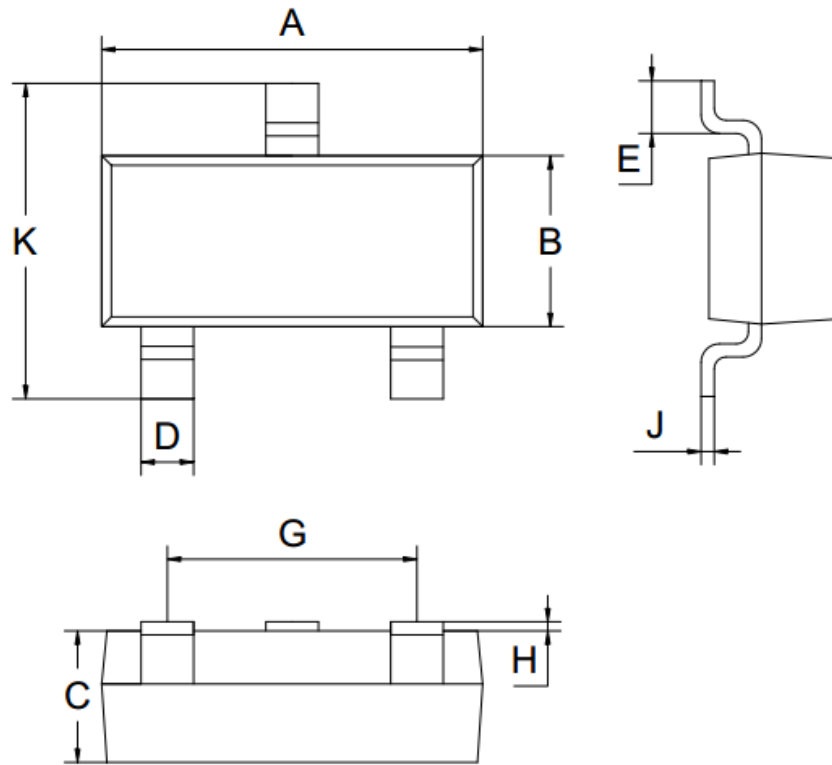


Figure 9. Normalized Maximum Transient Thermal Impedance



SOT-23-3L 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			