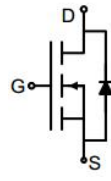
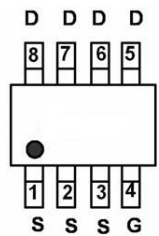



## N-Channel Enhancement Mode Power MOSFET

<p><b>Description</b></p> <p>The G050N03S uses advanced trench technology to provide excellent <math>R_{DS(ON)}</math>, low gate charge. It can be used in a wide variety of applications.</p> <p><b>General Features</b></p> <ul style="list-style-type: none"> <li>● <math>V_{DS}</math> 30V</li> <li>● <math>I_D</math> (at <math>V_{GS} = 10V</math>) 18A</li> <li>● <math>R_{DS(ON)}</math> (at <math>V_{GS} = 10V</math>) &lt; 5m<math>\Omega</math></li> <li>● <math>R_{DS(ON)}</math> (at <math>V_{GS} = 4.5V</math>) &lt; 8.5m<math>\Omega</math></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>pin assignment</p>  <p>SOP-8</p>
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### Ordering Information

Device	Package	Marking	Packaging
G050N03S	SOP-8	G050N03	4000pcs/Reel

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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	$V_{DS}$	30	V
Continuous Drain Current	$I_D$	18	A
Pulsed Drain Current (note1)	$I_{DM}$	72	A
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Power Dissipation	$P_D$	2.1	W
Single pulse avalanche energy (note2)	$E_{AS}$	64	mJ
Operating Junction and Storage Temperature Range	$T_J, T_{stg}$	-55 To 150	$^\circ\text{C}$

### Thermal Resistance

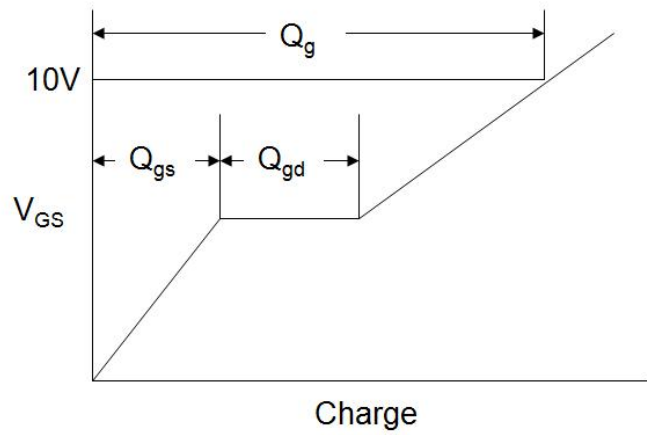
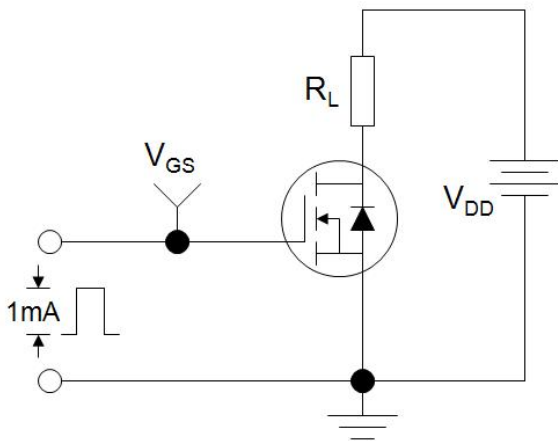
Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Ambient	$R_{thJA}$	59	$^\circ\text{C/W}$

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	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	30	--	--	V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 30V, V_{GS} = 0V$	--	--	1	$\mu A$
Gate-Source Leakage	$I_{GSS}$	$V_{GS} = \pm 20V$	--	--	$\pm 100$	nA
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	1.1	1.7	2.4	V
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 10A$	--	4	5	m $\Omega$
		$V_{GS} = 4.5V, I_D = 10A$	--	6.9	8.5	
Forward Transconductance	$g_{FS}$	$V_{GS} = 5V, I_D = 10A$	--	30	--	S
<b>Dynamic Parameters</b>						
Input Capacitance	$C_{iss}$	$V_{GS} = 0V,$ $V_{DS} = 15V,$ $f = 1.0\text{MHz}$	--	1714	--	pF
Output Capacitance	$C_{oss}$		--	339	--	
Reverse Transfer Capacitance	$C_{rss}$		--	326	--	
Total Gate Charge	$Q_g$	$V_{DD} = 15V,$ $I_D = 10A,$ $V_{GS} = 10V$	--	37	--	nC
Gate-Source Charge	$Q_{gs}$		--	4.8	--	
Gate-Drain Charge	$Q_{gd}$		--	11	--	
Turn-on Delay Time	$t_{d(on)}$	$V_{DD} = 15V,$ $I_D = 10A,$ $R_G = 3\Omega$	--	8.6	--	ns
Turn-on Rise Time	$t_r$		--	8.1	--	
Turn-off Delay Time	$t_{d(off)}$		--	29	--	
Turn-off Fall Time	$t_f$		--	8	--	
<b>Drain-Source Body Diode Characteristics</b>						
Continuous Body Diode Current	$I_S$	$T_C = 25^\circ\text{C}$	--	--	18	A
Body Diode Voltage	$V_{SD}$	$T_J = 25^\circ\text{C}, I_{SD} = 10A, V_{GS} = 0V$	--	--	1.2	V
Reverse Recovery Charge	$Q_{rr}$	$I_F = 10A, V_{GS} = 0V$ $di/dt = 500A/\mu s$	--	40	--	nC
Reverse Recovery Time	$T_{rr}$		--	14	--	ns

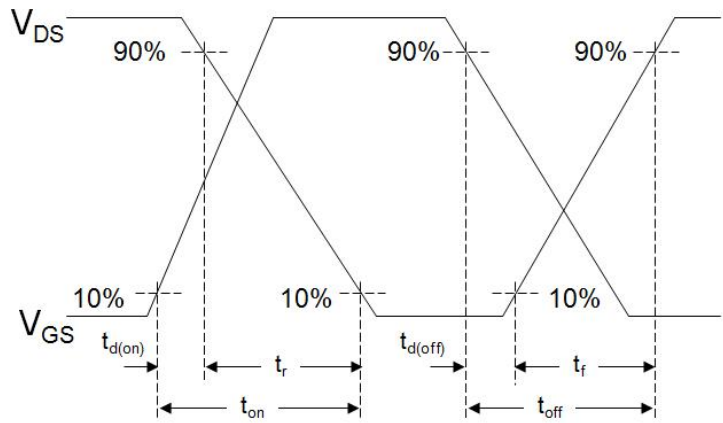
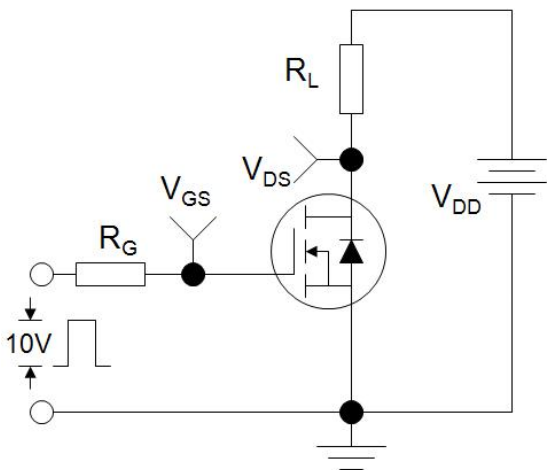
### Notes

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. EAS condition :  $T_J = 25^\circ\text{C}, V_{DD} = 30V, V_{GS} = 10V, L = 0.5\text{mH}, R_G = 25\Omega$
3. Identical low side and high side switch with identical  $R_G$

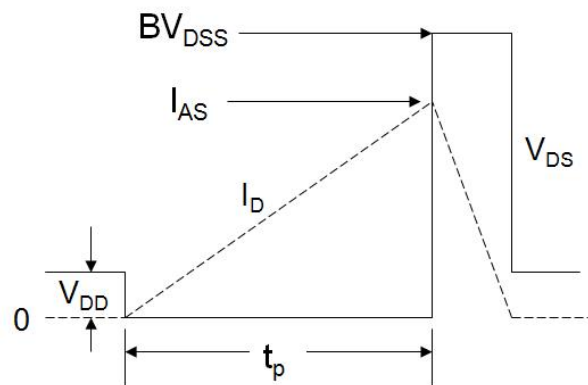
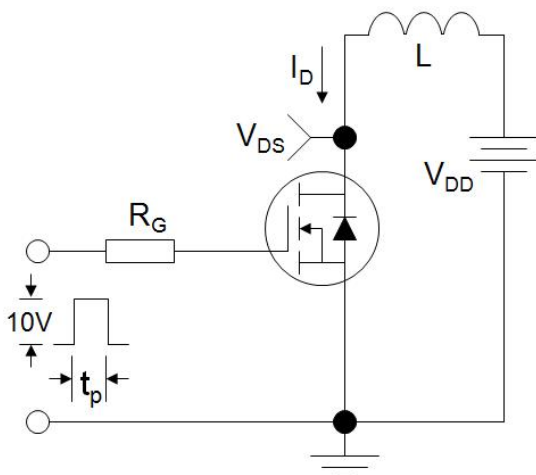
### Gate Charge Test Circuit



### Switch Time Test Circuit

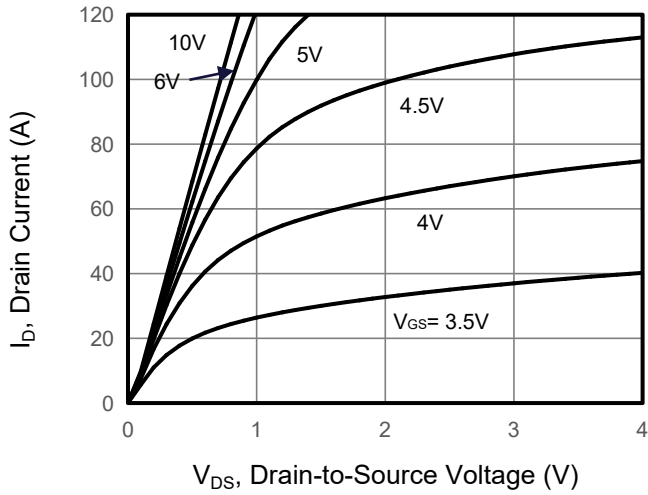


### EAS Test Circuit

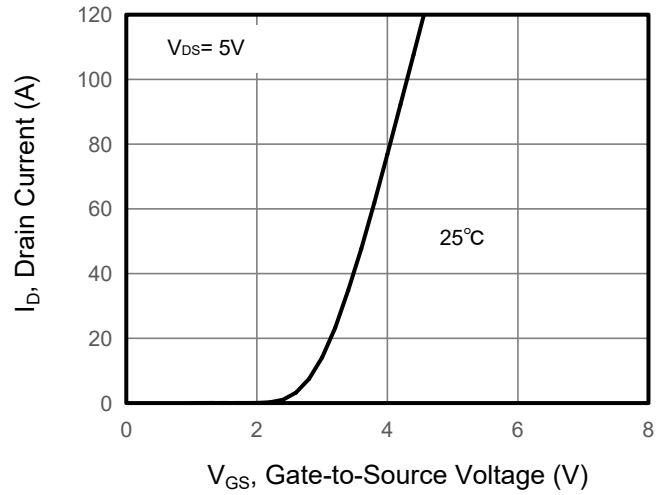


Typical Characteristics  $T_J = 25^\circ\text{C}$ , unless otherwise noted

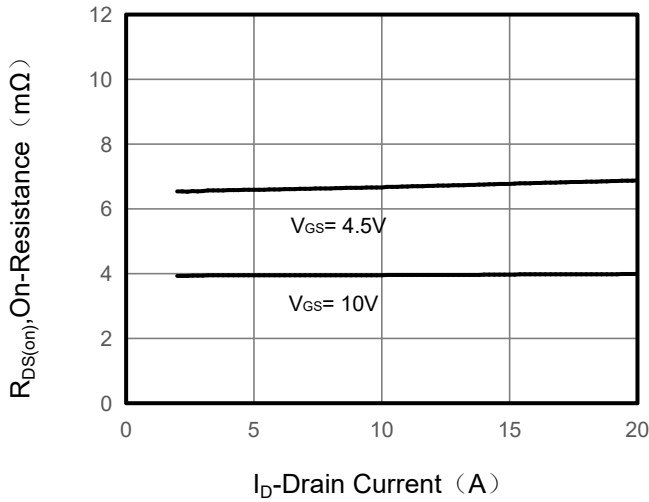
**Figure 1. Output Characteristics**



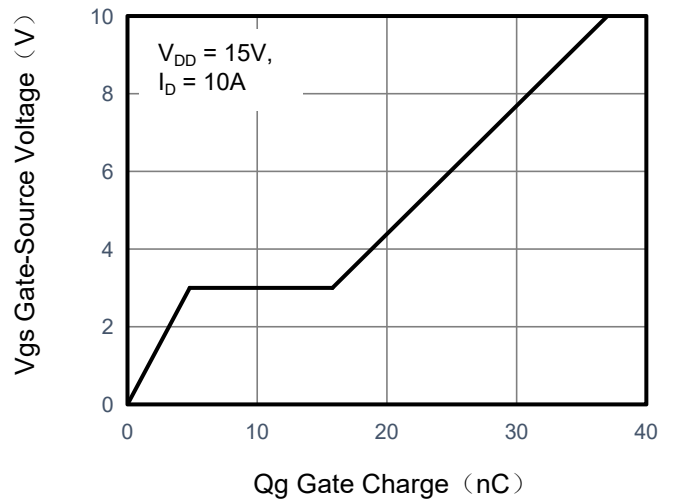
**Figure 2. Transfer Characteristics**



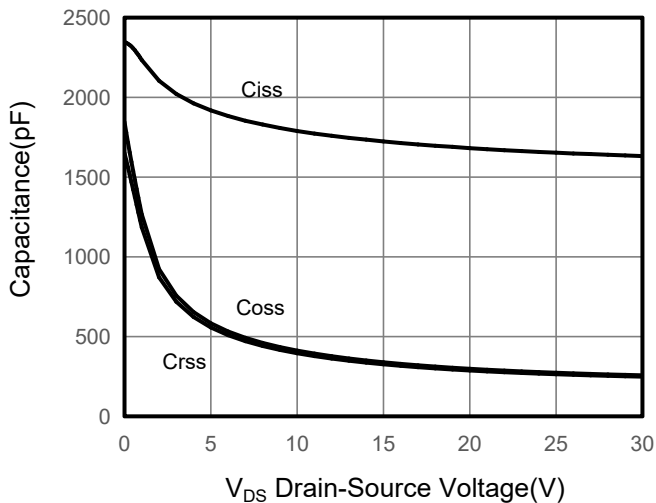
**Figure 3. Drain Source On Resistance**



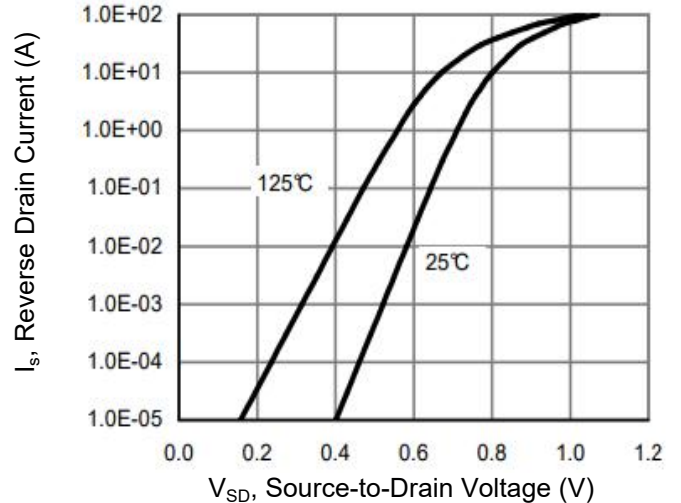
**Figure 4. Gate Charge**



**Figure 5. Capacitance**

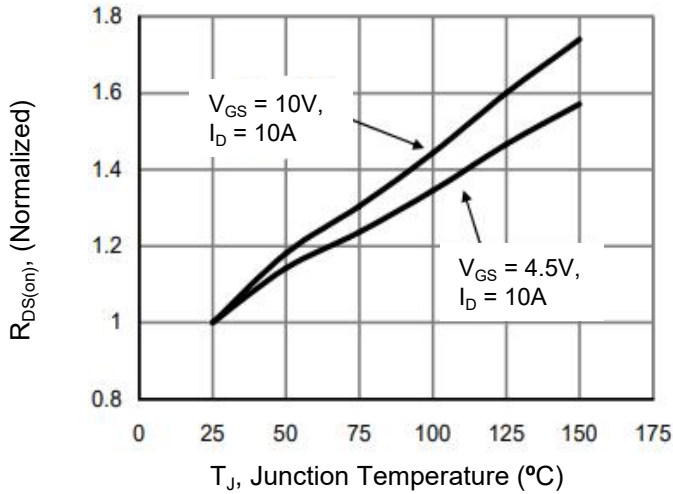


**Figure 6. Source-Drain Diode Forward**

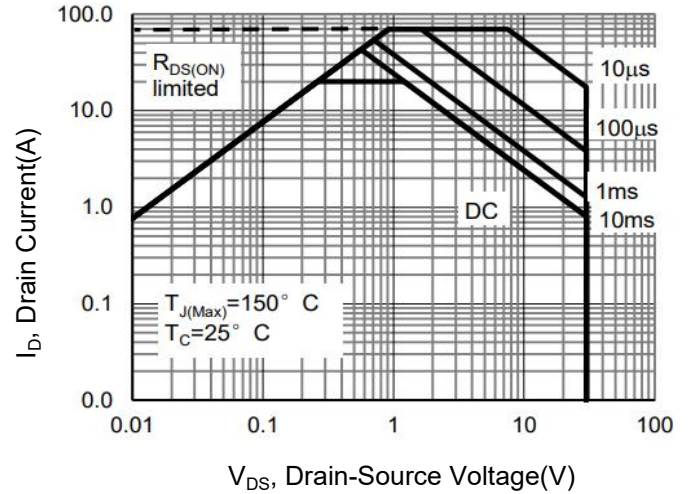


## Typical Characteristics $T_J = 25^\circ\text{C}$ , unless otherwise noted

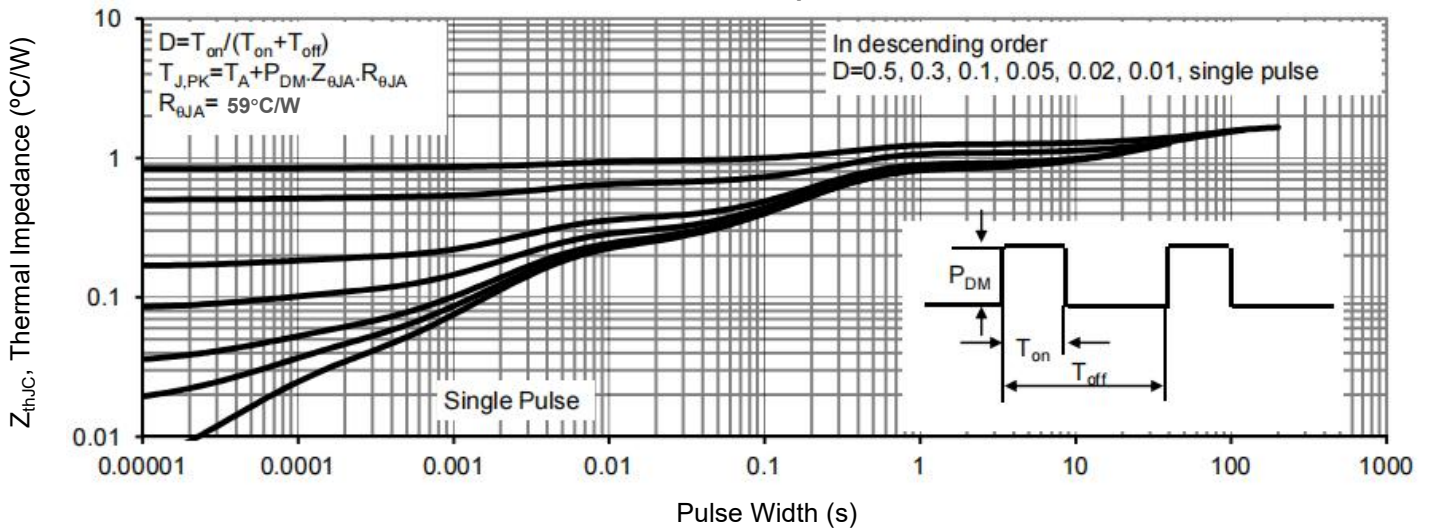
**Figure 7. Drain-Source On-Resistance**



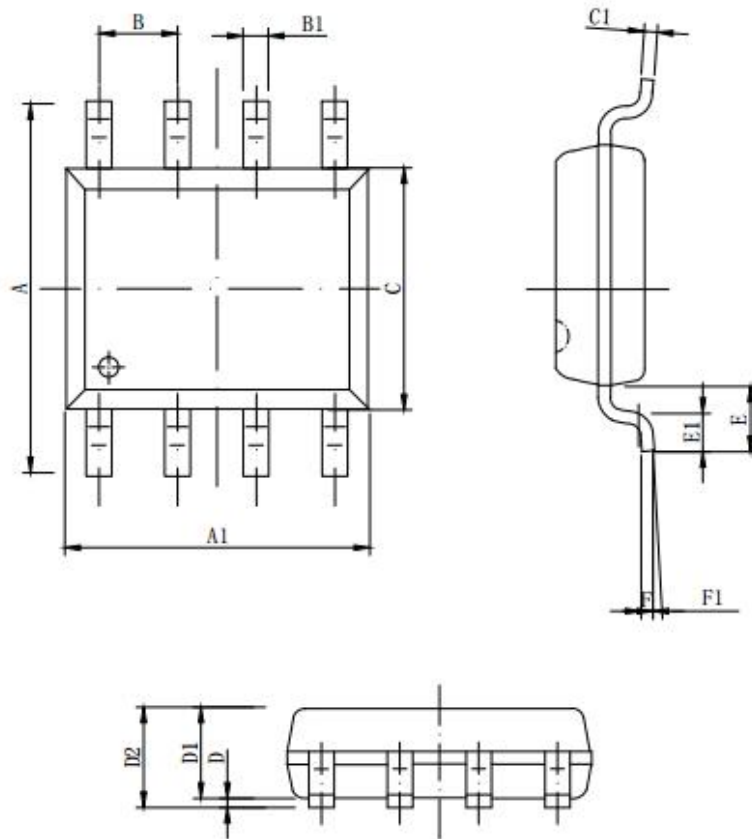
**Figure 8. Safe Operation Area**



**Figure 9. Normalized Maximum Transient Thermal Impedance**



## SOP-8 Package Information



Symbol	Dimensions in Millimeters		
	MIN.	NOM.	MAX.
A	5.800	6.000	6.200
A1	4.800	4.900	5.000
B	1.270BSC		
B1	0.35 <sup>8x</sup>	0.40 <sup>8x</sup>	0.45 <sup>8x</sup>
C	3.780	3.880	3.980
C1	--	0.203	0.253
D	0.050	0.150	0.250
D1	1.350	1.450	1.550
D2	1.500	1.600	1.700
D2	1.500	1.600	1.700
E	1.060REF		
E1	0.400	0.700	0.100
F	0.250BSC		
F1	2°	4°	6°