

N-Channel Enhancement Mode Power MOSFET

Description

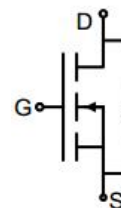
The G020N03D5 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge. It can be used in a wide variety of applications.

General Features

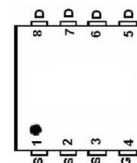
- V_{DS} 30V
- I_D (at $V_{GS} = 10V$) 140A
- $R_{DS(ON)}$ (at $V_{GS} = 10V$) < 2m Ω
- $R_{DS(ON)}$ (at $V_{GS} = 4.5V$) < 3m Ω
- 100% Avalanche Tested
- RoHS Compliant

Application

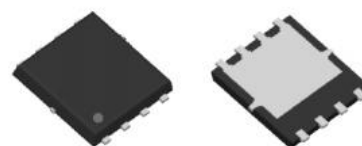
- Power switch
- DC/DC converters



Schematic diagram



pin assignment



DFN5X6-8L

Ordering Information

Device	Package	Marking	Packaging
G020N03D5	DFN5X6-8L	G020N03	5000pcs/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	140	A
Pulsed Drain Current (note1)	I_{DM}	560	A
Gate-Source Voltage	V_{GS}	± 20	V
Power Dissipation	P_D	83	W
Single pulse avalanche energy (note2)	E_{AS}	144	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}	50	$^\circ\text{C/W}$
Maximum Junction-to-Case	R_{thJC}	1.5	$^\circ\text{C/W}$

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	30	--	--	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 30V, V _{GS} = 0V	--	--	1	μA
Gate-Source Leakage	I _{GSS}	V _{GS} = ±20V	--	--	±100	nA
Gate-Source Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250μA	1.0	1.5	2.0	V
Drain-Source On-Resistance	R _{DS(on)}	V _{GS} = 10V, I _D = 50A	--	1.5	2.0	mΩ
		V _{GS} = 4.5V, I _D = 50A	--	2.1	3.0	
Forward Transconductance	g _{FS}	V _{GS} = 5V, I _D = 50A	--	62	--	S
Dynamic Parameters						
Input Capacitance	C _{iss}	V _{GS} = 0V, V _{DS} = 15V, f = 1.0MHz	--	5497	--	pF
Output Capacitance	C _{oss}		--	940	--	
Reverse Transfer Capacitance	C _{rss}		--	899	--	
Total Gate Charge	Q _g	V _{DD} = 15V, I _D = 50A, V _{GS} = 10V	--	110	--	nC
Gate-Source Charge	Q _{gs}		--	14	--	
Gate-Drain Charge	Q _{gd}		--	26	--	
Turn-on Delay Time	t _{d(on)}	V _{DD} = 15V, I _D = 50A, R _G = 2.5Ω	--	24	--	ns
Turn-on Rise Time	t _r		--	23	--	
Turn-off Delay Time	t _{d(off)}		--	87	--	
Turn-off Fall Time	t _f		--	37	--	
Drain-Source Body Diode Characteristics						
Continuous Body Diode Current	I _S	T _C = 25°C	--	--	140	A
Body Diode Voltage	V _{SD}	T _J = 25°C, I _{SD} = 50A, V _{GS} = 0V	--	--	1.2	V
Reverse Recovery Charge	Q _{rr}	I _F = 50A, V _{GS} = 0V di/dt=100A/us	--	114	--	nC
Reverse Recovery Time	T _{rr}		--	57	--	ns

Notes

1. Repetitive Rating: Pulse width limited by maximum junction temperature

2. EAS condition : $T_J = 25^{\circ}\text{C}$, $V_{DD} = 50V$, $V_{GS} = 10V$, $L = 0.5mH$, $R_G = 25\Omega$

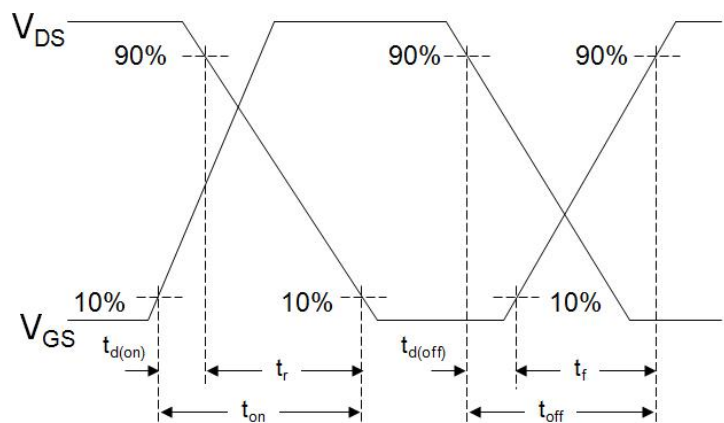
The table shows the minimum avalanche energy, which is 1089mJ when the device is tested until failure

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

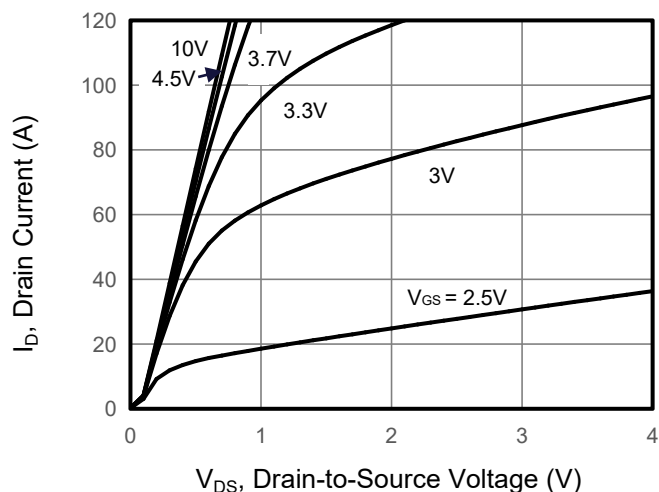


Figure 2. Transfer Characteristics

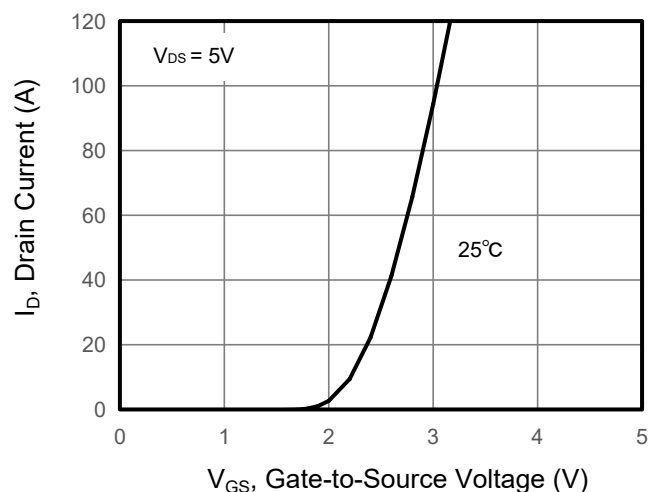


Figure 3. Drain Source On Resistance

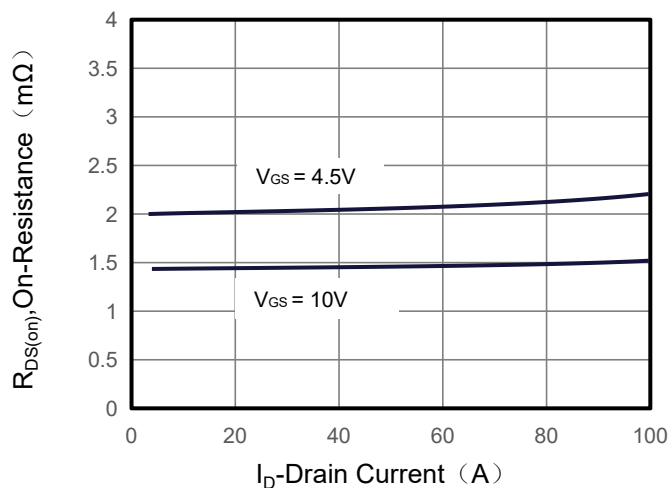


Figure 4. Gate Charge

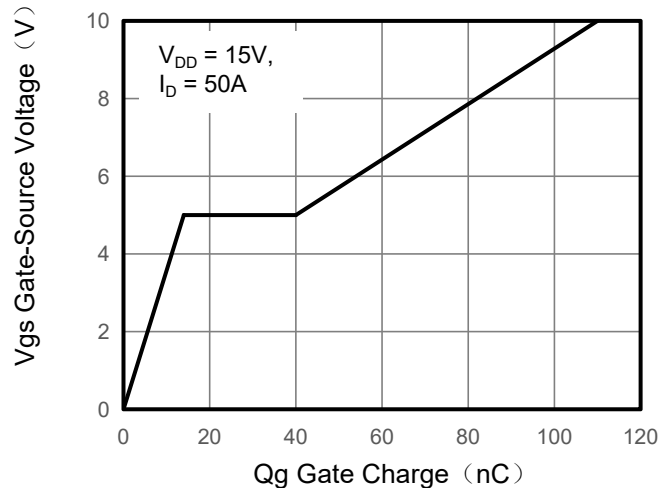


Figure 5. Capacitance

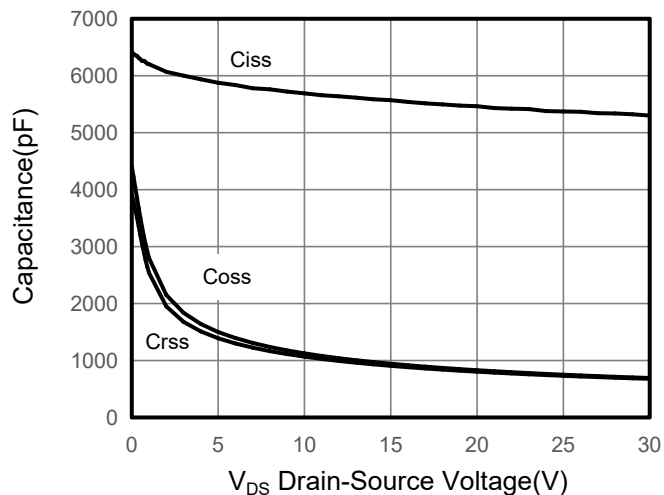
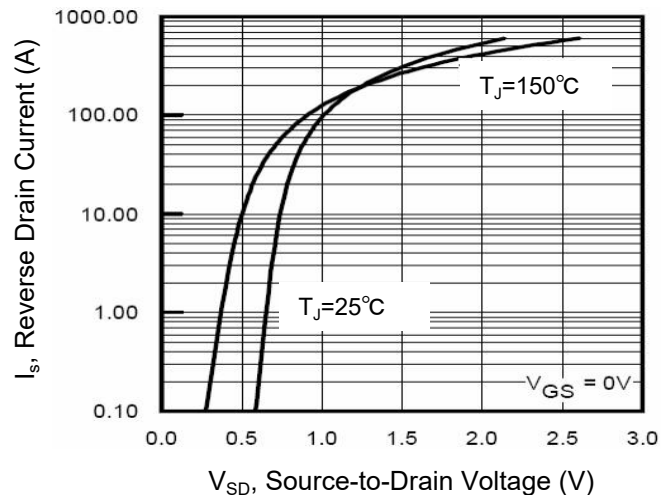


Figure 6. Source-Drain Diode Forward



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

Figure 7. Drain-Source On-Resistance

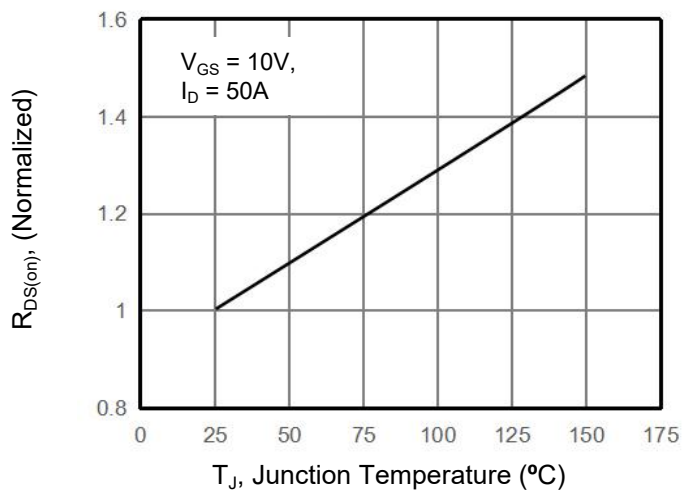


Figure 8. Safe Operation Area

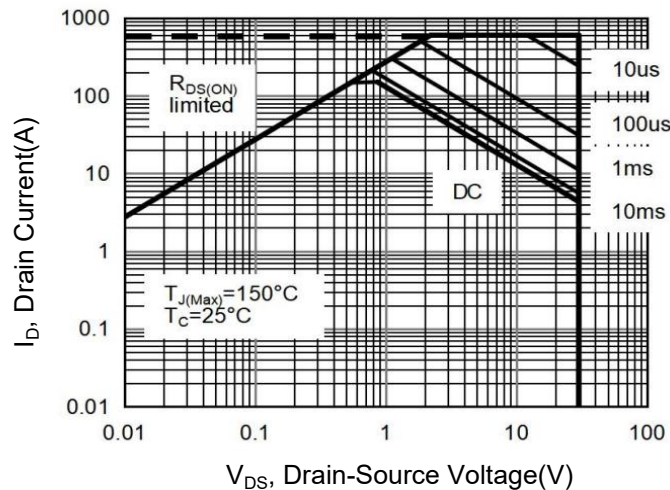
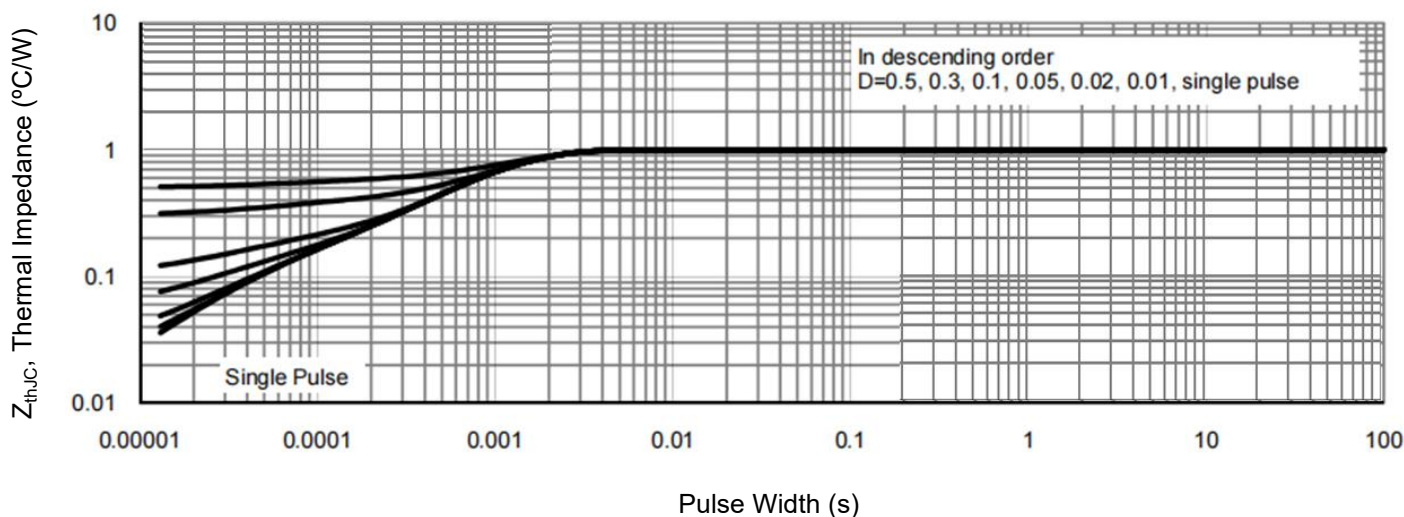
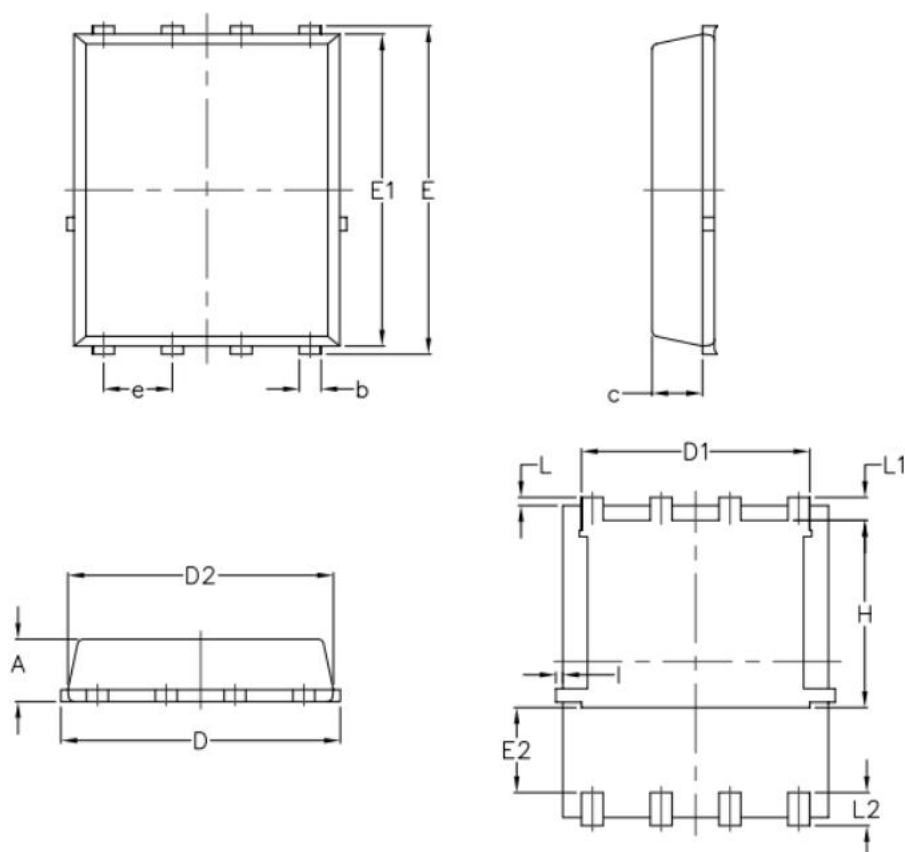


Figure 9. Normalized Maximum Transient Thermal Impedance



DFN5X6-8L Package Information



SYMBOL	COMMON			
	MM		INCH	
	MIN.	MAX.	MIN.	MAX.
A	1.03	1.17	0.0406	0.0461
b	0.34	0.48	0.0134	0.0189
c	0.824	0.970	0.0324	0.0382
D	4.80	5.40	0.1890	0.2126
D1	4.11	4.31	0.1618	0.1697
D2	4.80	5.00	0.1890	0.1969
E	5.95	6.15	0.2343	0.2421
E1	5.65	5.85	0.2224	0.2303
E2	1.40	—	0.0551	—
e	1.27 BSC		0.05 BSC	
L	0.05	0.25	0.0020	0.0098
L1	0.38	0.50	0.0150	0.0197
L2	0.38	0.71	0.0150	0.0280
H	3.30	3.50	0.1299	0.1378
I	—	0.18	—	0.0070