N-Channel Enhancement Mode Power MOSFET

Description

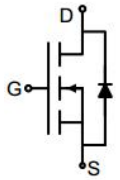
The GT009N04D5 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge. It can be used in a wide variety of applications.

General Features

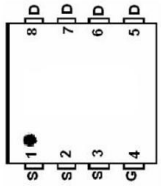
- V_{DS} 45V
- I_D (at V_{GS} = 10V) 250A
- $R_{DS(ON)}$ (at V_{GS} = 10V) < 1.3mΩ
- $R_{DS(ON)}$ (at V_{GS} = 4.5V) < 1.8mΩ
- 100% Avalanche Tested
- RoHS Compliant

Application

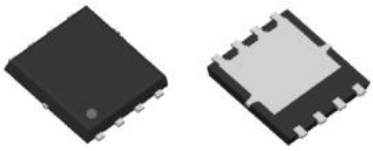
- Power switch
- DC/DC converters



Schematic diagram



pin assignment



DFN5X6-8L

Ordering Information

Device	Package	Marking	Packaging
GT009N04D5	DFN5X6-8L	GT009N04	5000pcs/Reel

Absolute Maximum Ratings T_C = 25ºC, unless otherwise noted

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	45	V
Continuous Drain Current	I_D	250	A
Pulsed Drain Current (note1)	I_{DM}	1000	A
Gate-Source Voltage	V_{GS}	±20	V
Power Dissipation	P_D	139	W
Single pulse avalanche energy （note2）	E_{AS}	240	mJ
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55 To 150	ºC

Thermal Resistance

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Ambient	R_{thJA}	50	ºC/W
Maximum Junction-to-Case	R_{thJC}	0.9	ºC/W

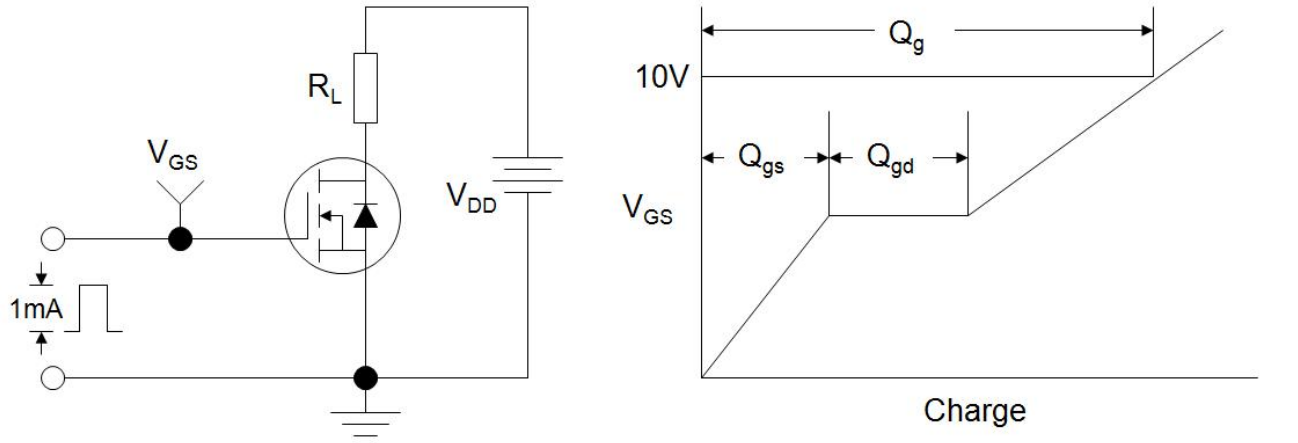
Specifications T_J = 25ºC, unless otherwise noted

Parameter	Symbol	Test Conditions	Value			Unit
			Min.	Typ.	Max.	
Static Parameters						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D = 250μA	45	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 45V, 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	1.6	2.5	V
Drain-Source On-Resistance	$R_{DS(on)}$	V_{GS} = 10V, I_D = 20A	--	1.1	1.3	mΩ
		V_{GS} = 4.5V, I_D = 20A	--	1.5	1.8	
Forward Transconductance	g_{FS}	V_{GS} = 5V, I_D = 20A	--	63	--	S
Dynamic Parameters						
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = 20V, f = 1.0Mhz	--	6864	--	pF
Output Capacitance	C_{oss}		--	1322	--	
Reverse Transfer Capacitance	C_{rss}		--	1115	--	
Total Gate Charge	Q_g	V_{DD} = 20V, I_D = 20A, V_{GS} = 10V	--	86	--	nC
Gate-Source Charge	Q_{gs}		--	19	--	
Gate-Drain Charge	Q_{gd}		--	6	--	
Turn-on Delay Time	$t_{d(on)}$	V_{DD} = 20V, I_D = 20A, R_G = 3Ω	--	17	--	ns
Turn-on Rise Time	t_r		--	5.5	--	
Turn-off Delay Time	$t_{d(off)}$		--	56	--	
Turn-off Fall Time	t_f		--	5	--	
Drain-Source Body Diode Characteristics						
Continuous Body Diode Current	I_S	T_C = 25ºC	--	--	250	A
Body Diode Voltage	V_{SD}	T_J = 25ºC, I_{SD} = 20A, V_{GS} = 0V	--	--	1.2	V
Reverse Recovery Charge	Qrr	I_F = 20A, V_{GS} = 0V di/dt=400A/us	--	60	--	nC
Reverse Recovery Time	Trr		--	22	--	ns

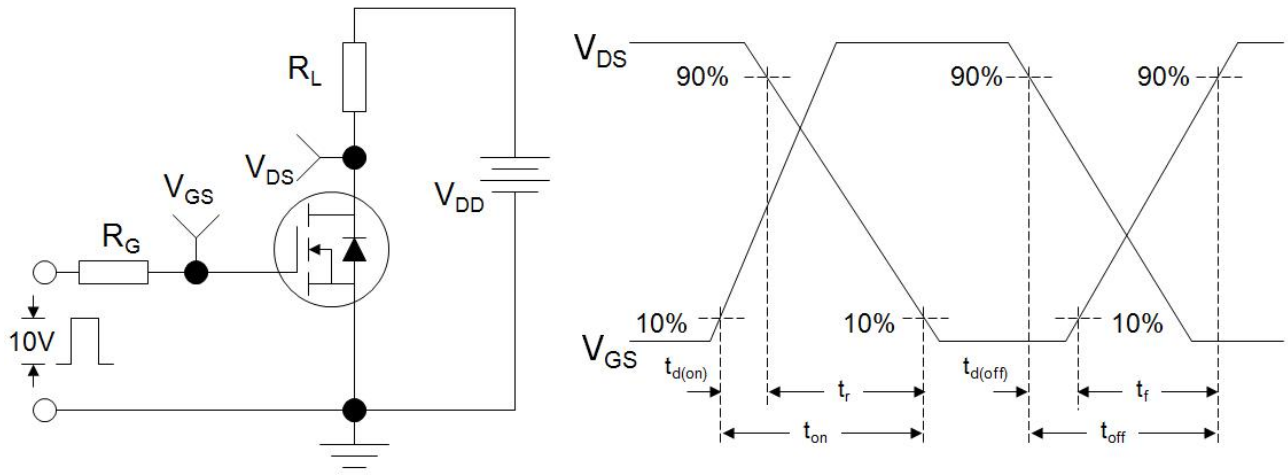
Notes

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. EAS condition : Tj=25℃ ,VDD=45V,VGS=10V,L=0.5mH,Rg=25Ω
3. Identical low side and high side switch with identical R_G

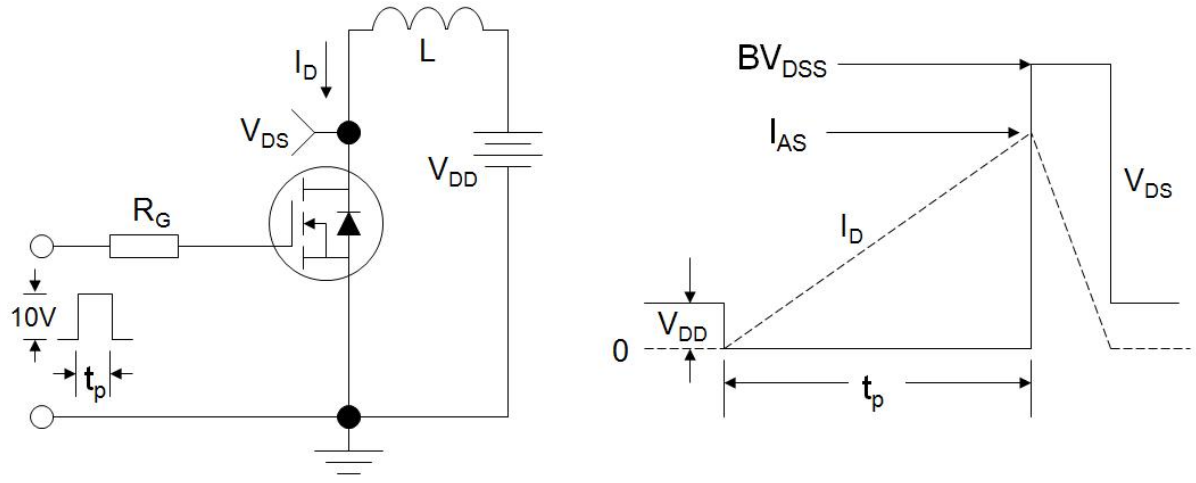
Gate Charge Test Circuit



Switch Time Test Circuit



EAS Test Circuit



Typical Characteristics T_J = 25ºC, unless otherwise noted

Figure 1. Output Characteristics

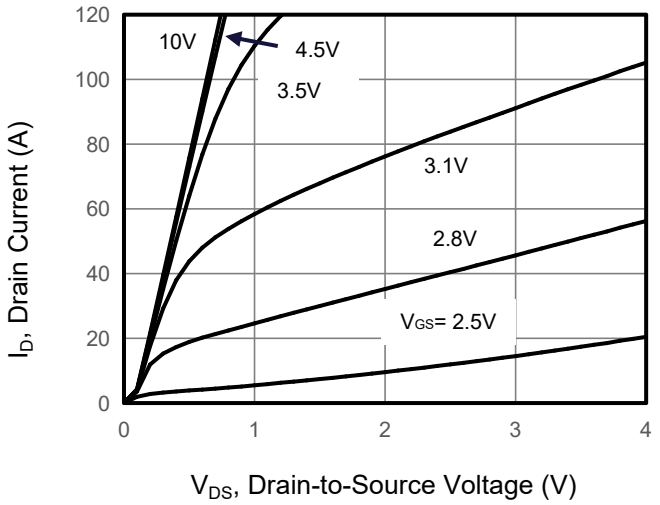


Figure 2. Transfer Characteristics

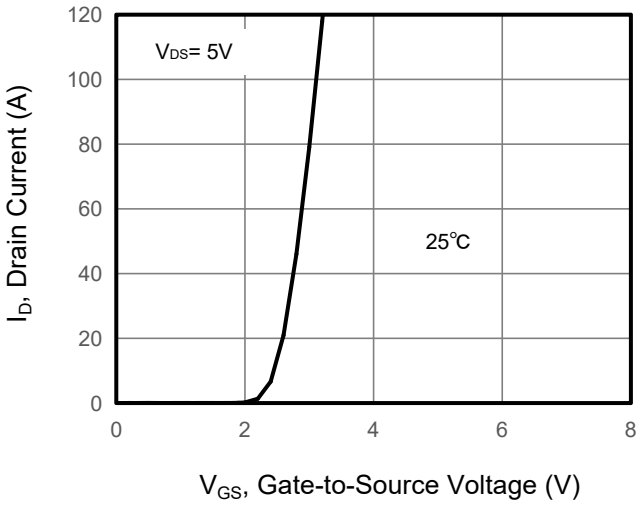


Figure 3. Drain Source On Resistance

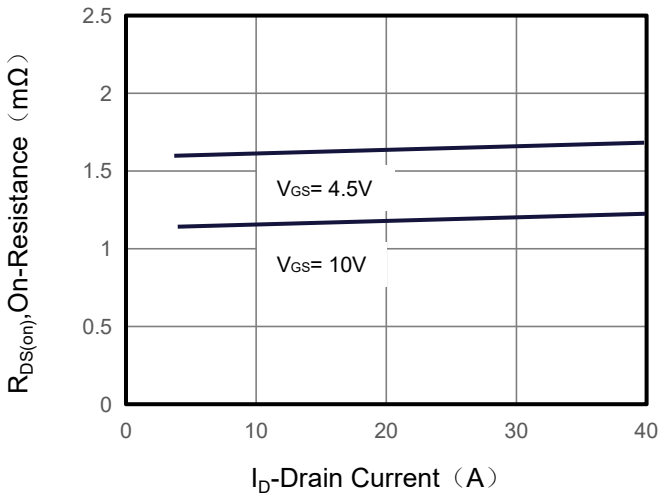


Figure 4. Gate Charge

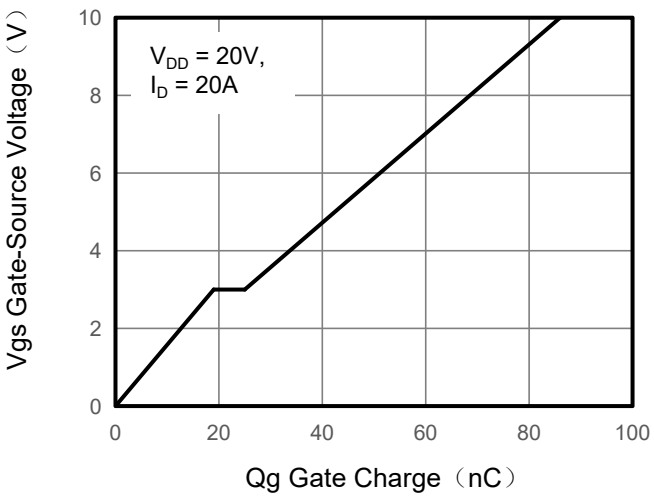


Figure 5. Capacitance

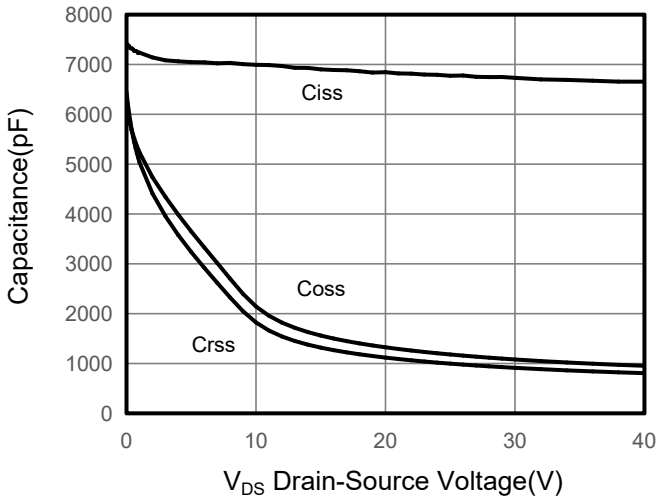
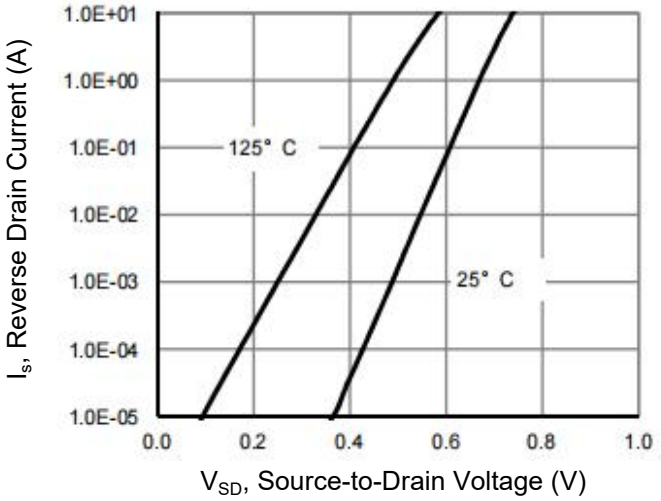


Figure 6. Source-Drain Diode Forward



Typical Characteristics T_J = 25ºC, unless otherwise noted

Figure 7. Drain-Source On-Resistance

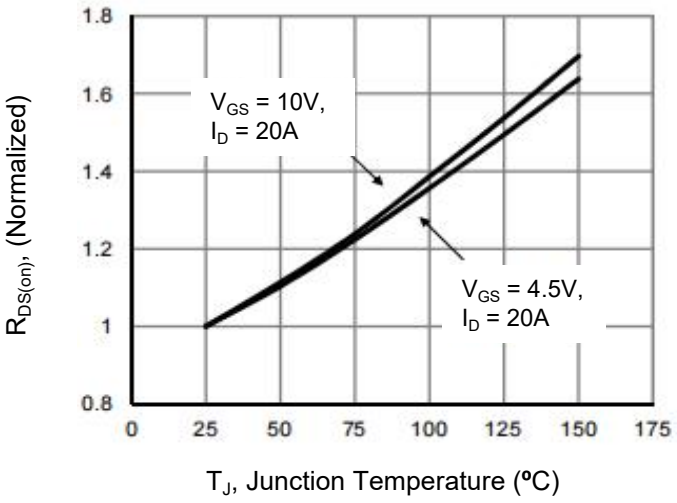


Figure 8. Safe Operation Area

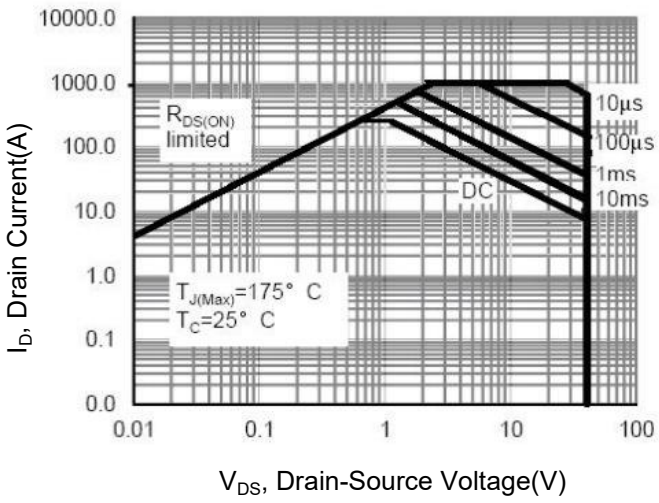
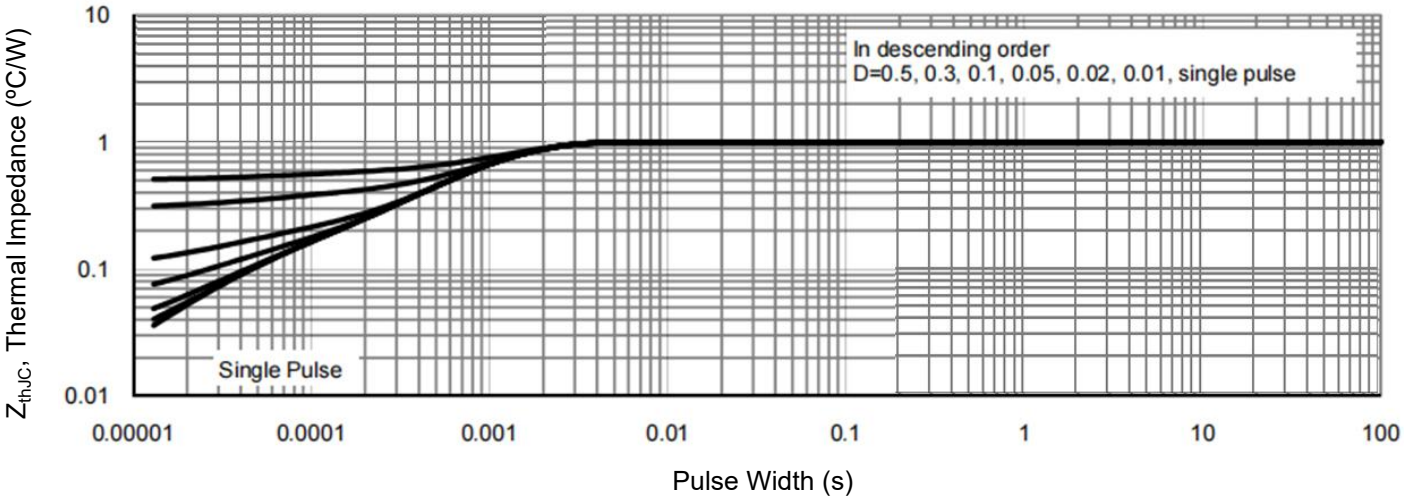
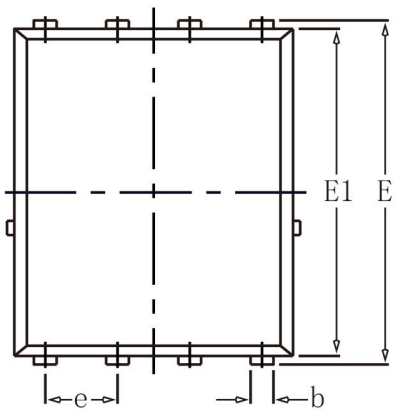
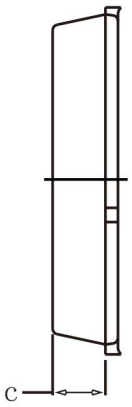


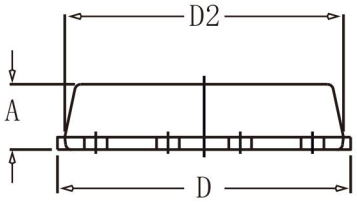
Figure 9. Normalized Maximum Transient Thermal Impedance

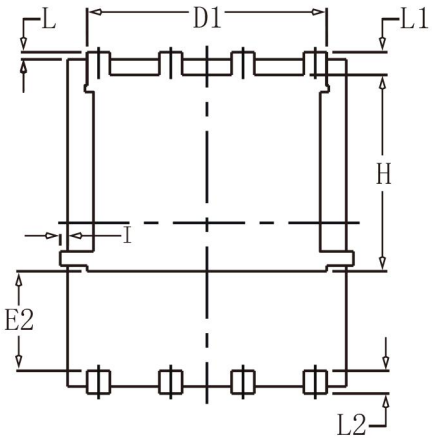


DFN5X6-8L Package Information









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	5.59	6.15	0.2343	0.2421
E1	5.65	5.85	0.2224	0.2303
E2	1.60	–	0.0630	–
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	0.50	0.0150	0.0197
H	3.30	3.50	0.1299	0.1378
I	–	0.18	–	0.0070