

N-Channel Enhancement Mode Power MOSFET

Description

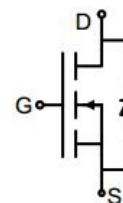
The GT013N04D5CH uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge. It can be used in a wide variety of applications.

General Features

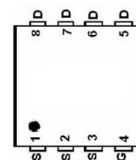
- V_{DS} 40V
- I_D (at $V_{GS} = 10V$) 270A
- $R_{DS(ON)}$ (at $V_{GS} = 10V$) < 1m Ω
- 100% Avalanche Tested
- RoHS Compliant

Application

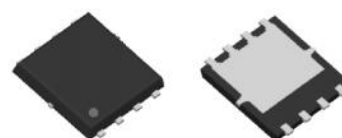
- Power switch
- DC/DC converters



Schematic diagram



pin assignment



DFN5X6-8L

Ordering Information

Device	Package	Marking	Packaging
GT013N04D5CH	DFN5*6-8L	GT013N04H	5000psc/Reel

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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	40	V
Continuous Drain Current	$T_C = 25^\circ\text{C}$	270	A
	$T_C = 100^\circ\text{C}$	170	
Pulsed Drain Current (note1)	I_{DM}	1040	A
Gate-Source Voltage	V_{GS}	± 20	V
Power Dissipation	P_D	138	W
Single pulse avalanche energy (note2)	E_{AS}	380	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}	0.9	$^\circ\text{C/W}$

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	40	--	--	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 40V, 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	2.0	2.7	3.5	V
Drain-Source On-Resistance	R _{DS(on)}	V _{GS} = 10V, I _D = 50A	--	0.82	1.0	mΩ
Forward Transconductance	g _{FS}	V _{GS} = 5V, I _D = 50A	--	53	--	S
Dynamic Parameters						
Input Capacitance	C _{iss}	V _{GS} = 0V, V _{DS} = 20V, f = 0.5MHz	--	5300	--	pF
Output Capacitance	C _{oss}		--	3700	--	
Reverse Transfer Capacitance	C _{rss}		--	130	--	
Total Gate Charge	Q _g	V _{DD} = 20V, I _D = 50A, V _{GS} = 10V	--	84	--	nC
Gate-Source Charge	Q _{gs}		--	28	--	
Gate-Drain Charge	Q _{gd}		--	17	--	
Turn-on Delay Time	t _{d(on)}	V _{DD} = 20V, I _D = 50A, R _G = 1.6Ω	--	13	--	ns
Turn-on Rise Time	t _r		--	7	--	
Turn-off Delay Time	t _{d(off)}		--	53	--	
Turn-off Fall Time	t _f		--	9	--	
Drain-Source Body Diode Characteristics						
Continuous Body Diode Current	I _S	T _C = 25°C	--	--	270	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	--	115	--	nC
Reverse Recovery Time	T _{rr}		--	35	--	ns

Notes

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. EAS condition : $T_J = 25^{\circ}\text{C}, V_{DD} = 40V, V_{GS} = 10V, L = 0.5mH, R_G = 25\Omega$

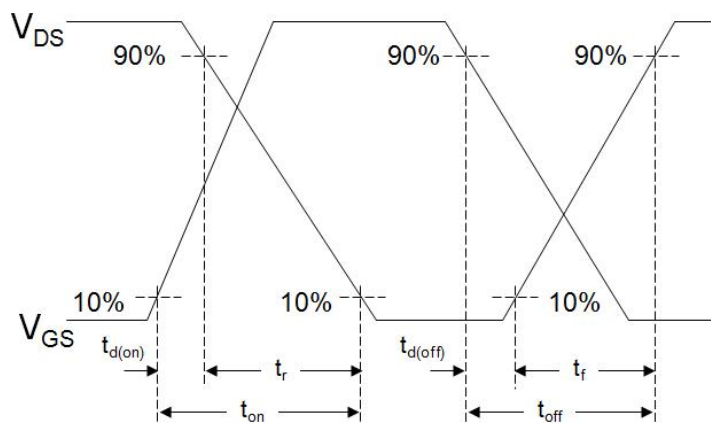
The table shows the minimum avalanche energy, which is 1056mJ when the device is tested until failure

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

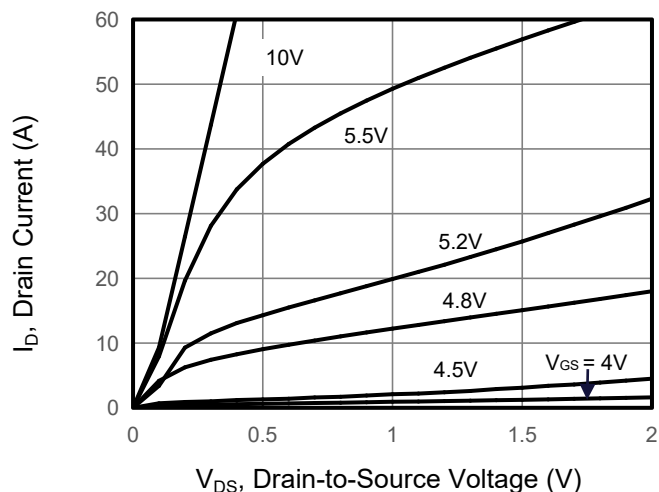


Figure 2. Transfer Characteristics

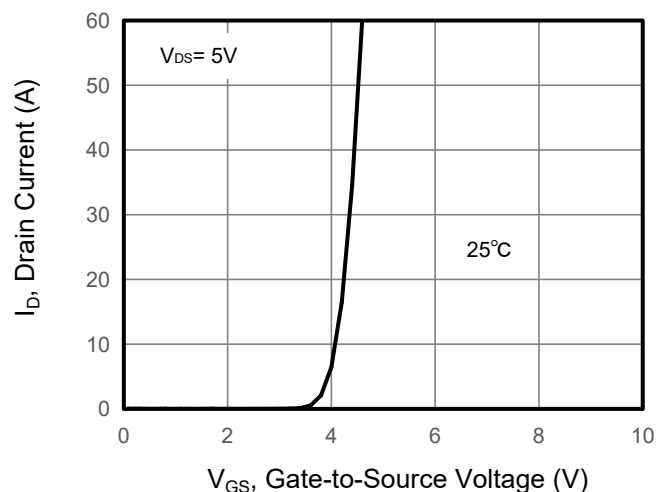


Figure 3. Drain Source On Resistance

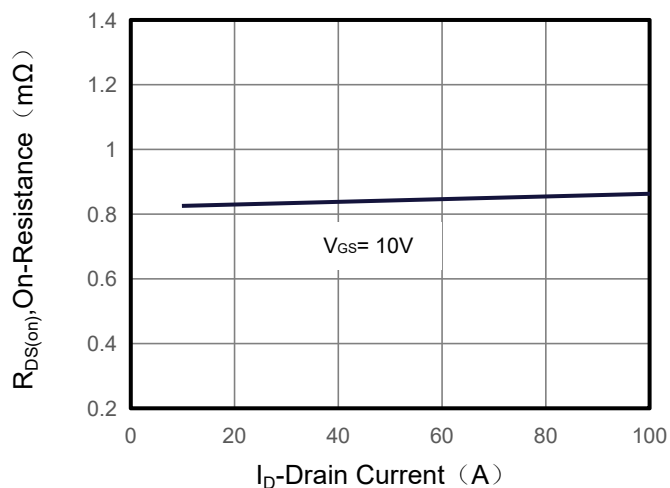


Figure 4. Gate Charge

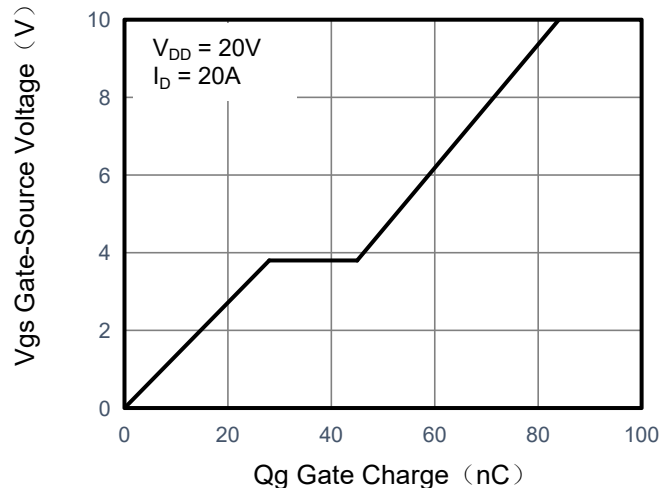


Figure 5. Capacitance

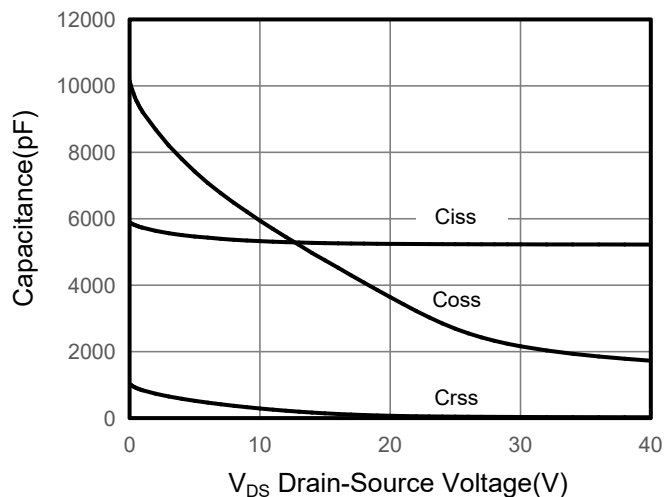
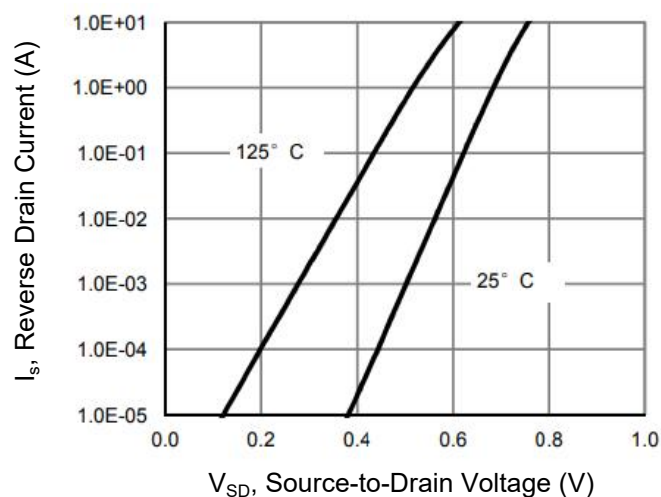


Figure 6. Source-Drain Diode Forward



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

Figure 7. Drain-Source On-Resistance

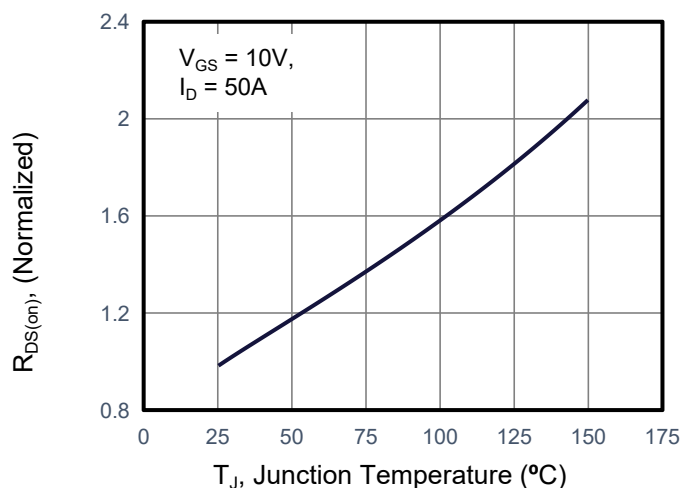


Figure 8. Safe Operation Area

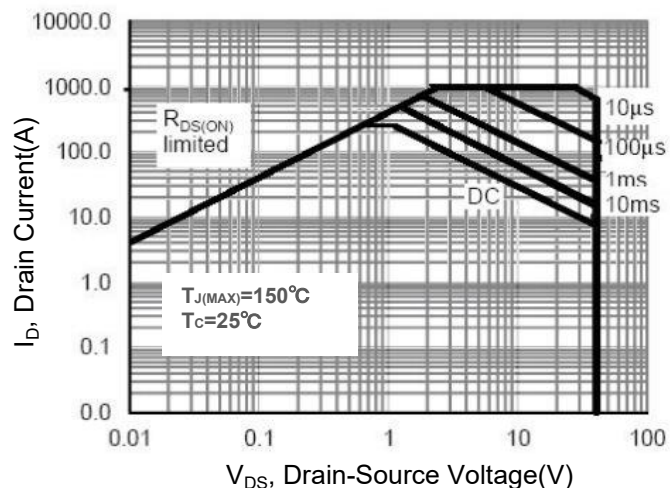


Figure 9. Maximum Continuous Drain Current vs Case Temperature

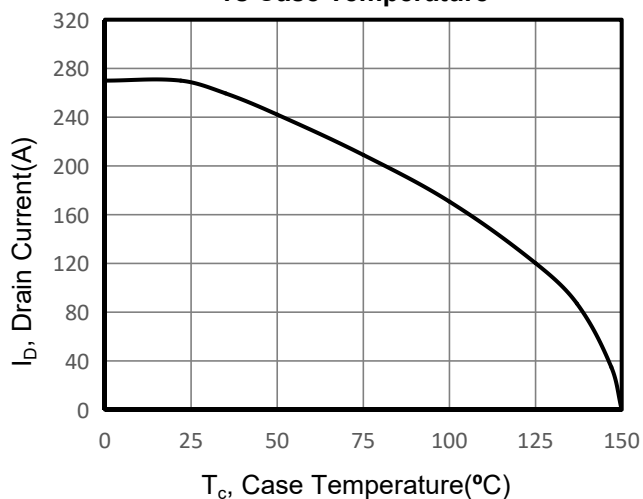
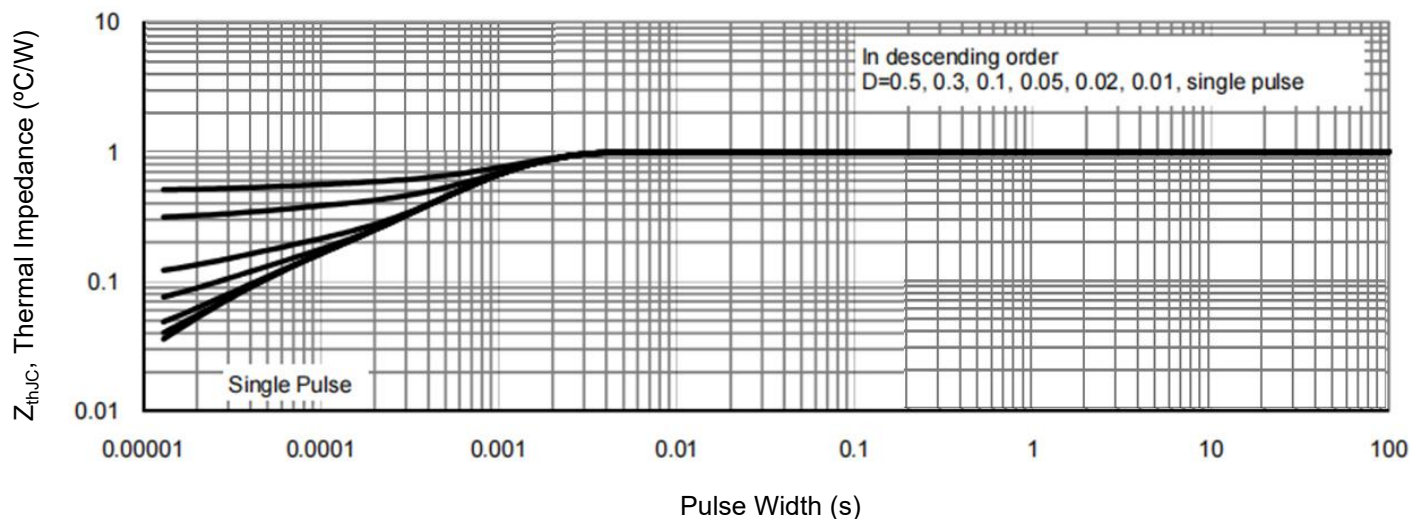
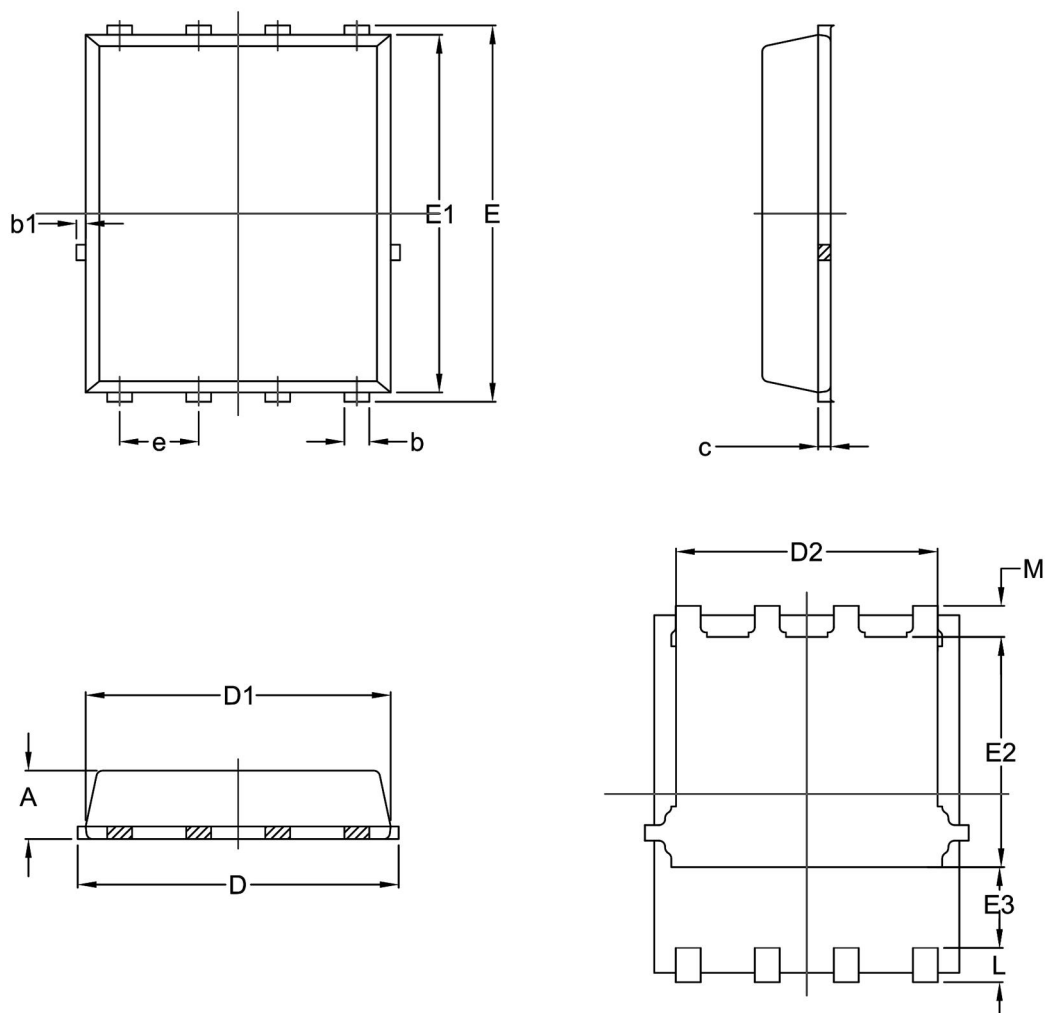


Figure 10. Normalized Maximum Transient Thermal Impedance



DFN5X6-8L Package Information



DIM	MILLIMETERS		
	MIN	NOM	MAX
A	1.00	1.10	1.20
b	0.30	0.40	0.50
b1	0.02	0.15	0.22
c	0.15	0.20	0.35
D	4.95	5.15	5.35
D1	4.80	4.90	5.00
D2	4.00	4.20	4.40
E	5.95	6.05	6.25
E1	5.65	5.75	5.85
E2	3.50	3.70	3.90
E3	1.10	/	/
e	1.27		
L	0.40	0.55	0.70
M	0.35	0.50	0.65