

N-Channel Enhancement Mode Power MOSFET

Description

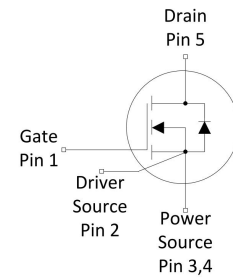
The GC180N65D8 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge. It can be used in a wide variety of applications.

General Features

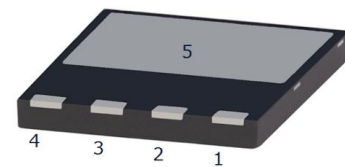
- V_{DS} 650V
- I_D (at $V_{GS} = 10V$) 20A
- $R_{DS(ON)}$ (at $V_{GS} = 10V$) < 190m Ω
- 100% Avalanche Tested
- RoHS Compliant

Application

- Power switch
- DC/DC converters



Schematic diagram



DFN8*8-4L

Ordering Information

Device	Package	Marking	Packaging
GC180N65D8	DFN8*8-4L	GC180N65	3000pcs/Reel

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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	650	V
Continuous Drain Current	I_D	20	A
Pulsed Drain Current (note1)	I_{DM}	60	A
Gate-Source Voltage	V_{GS}	± 30	V
Power Dissipation	P_D	151	W
Single pulse avalanche energy (note2)	E_{AS}	245	mJ
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55 To 150	$^\circ C$

Thermal Resistance

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Ambient	R_{thJA}	62	$^\circ C/W$
Maximum Junction-to-Case	R_{thJC}	0.83	$^\circ C/W$

Specifications $T_J = 25^\circ\text{C}$, unless otherwise noted						
Parameter	Symbol	Test Conditions	Value			Unit
			Min.	Typ.	Max.	
Static Parameters						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	650	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 650V, V_{GS} = 0V$	--	--	1	μA
Gate-Source Leakage	I_{GSS}	$V_{GS} = \pm 30V$	--	--	± 100	nA
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	2.0	3.0	4.0	V
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 10A$	--	156	190	m Ω
Forward Transconductance	g_{FS}	$V_{GS} = 5V, I_D = 10A$	--	17	--	S
Dynamic Parameters						
Input Capacitance	C_{iss}	$V_{GS} = 0V,$ $V_{DS} = 400V,$ $f = 1.0\text{MHz}$	--	1700	--	pF
Output Capacitance	C_{oss}		--	46	--	
Reverse Transfer Capacitance	C_{rss}		--	2	--	
Total Gate Charge	Q_g	$V_{DD} = 400V,$ $I_D = 10A,$ $V_{GS} = 10V$	--	42	--	nC
Gate-Source Charge	Q_{gs}		--	12	--	
Gate-Drain Charge	Q_{gd}		--	18	--	
Turn-on Delay Time	$t_{d(on)}$	$V_{DD} = 400V,$ $I_D = 10A,$ $R_G = 25\Omega$	--	31	--	ns
Turn-on Rise Time	t_r		--	114	--	
Turn-off Delay Time	$t_{d(off)}$		--	272	--	
Turn-off Fall Time	t_f		--	87	--	
Drain-Source Body Diode Characteristics						
Continuous Body Diode Current	I_S	$T_C = 25^\circ\text{C}$	--	--	20	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}	$I_F = 10A, V_{GS} = 0V$ $di/dt = 100A/\mu s$	--	7	--	nC
Reverse Recovery Time	T_{rr}		--	445	--	ns

Notes

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. EAS condition : $T_J = 25^\circ\text{C}, V_{DD} = 50V, V_{GS} = 10V, L = 10\text{mH}, R_G = 25\Omega$
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

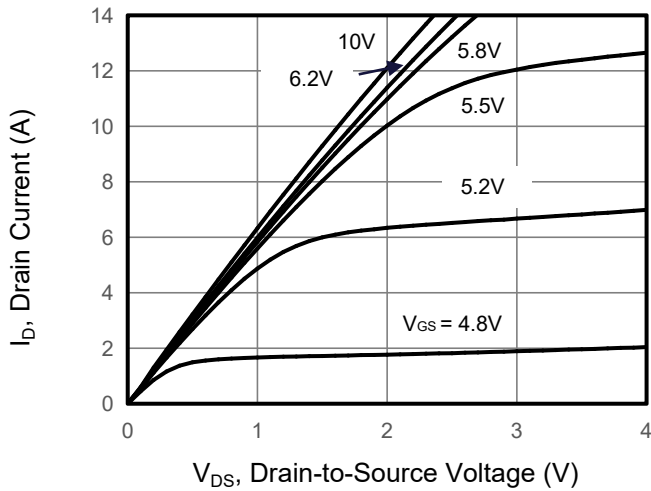


Figure 2. Transfer Characteristics

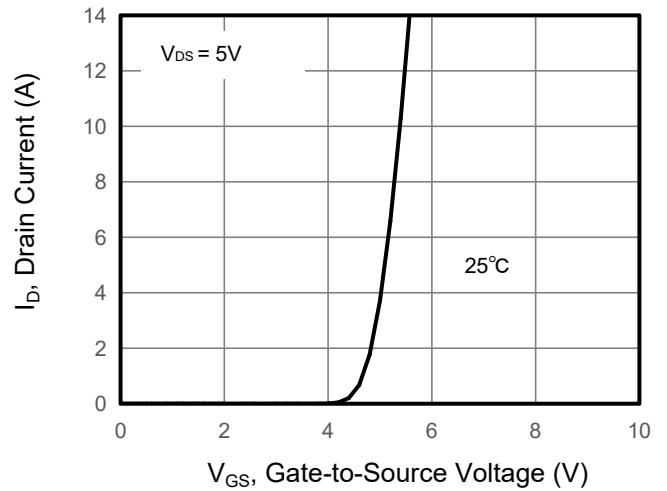


Figure 3. Drain Source On Resistance

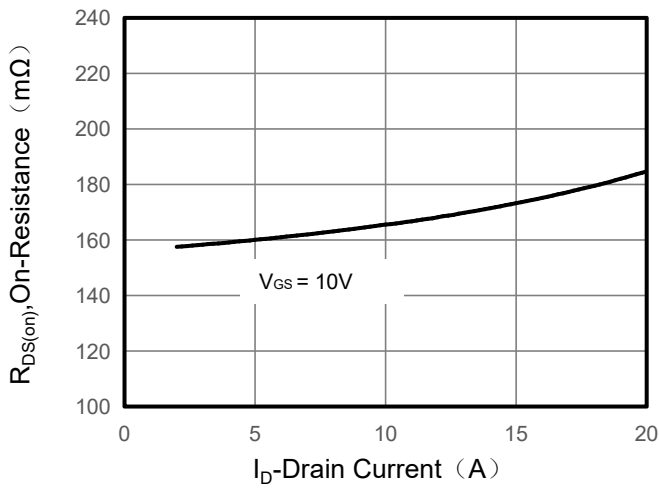


Figure 4. Gate Charge

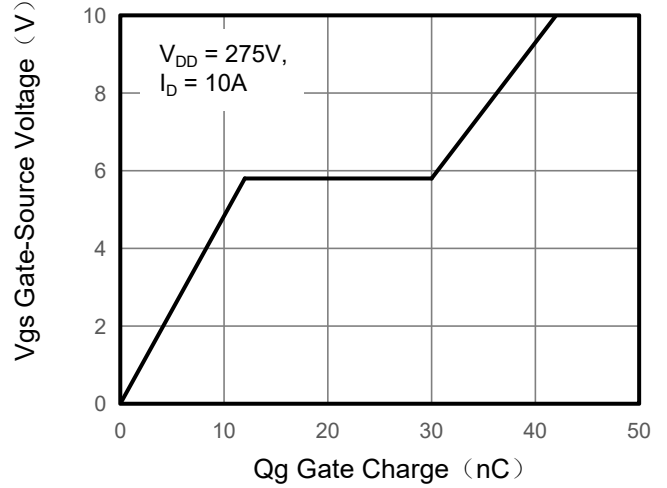


Figure 5. Capacitance

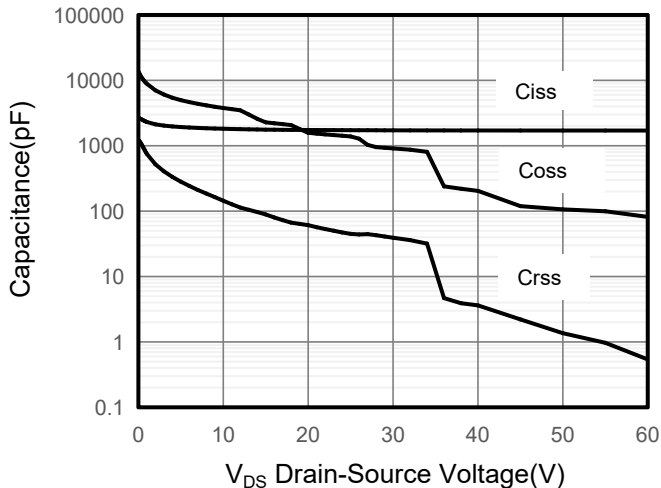
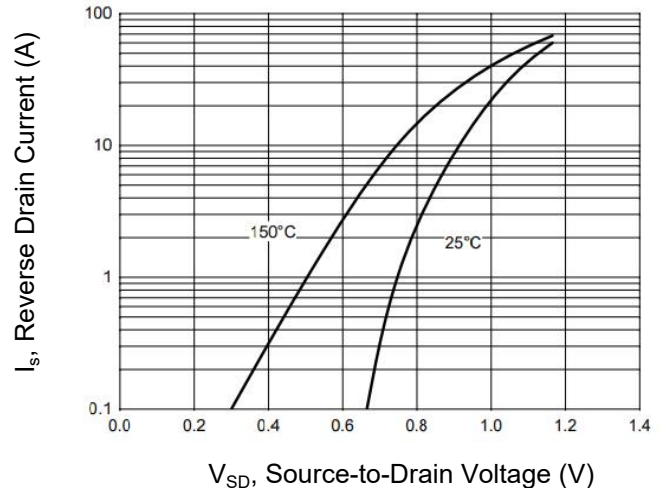


Figure 6. Source-Drain Diode Forward



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

Figure 7. Drain-Source On-Resistance

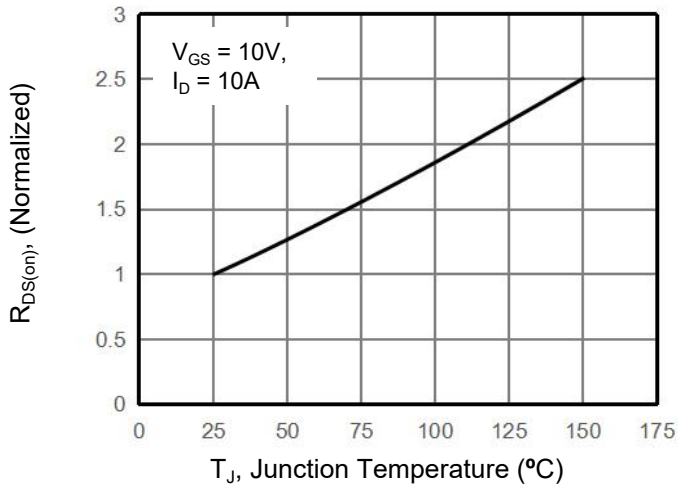


Figure 8. Safe Operation Area

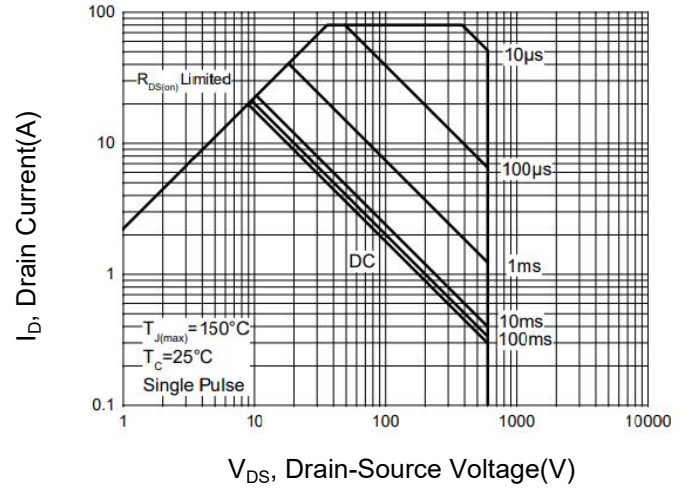
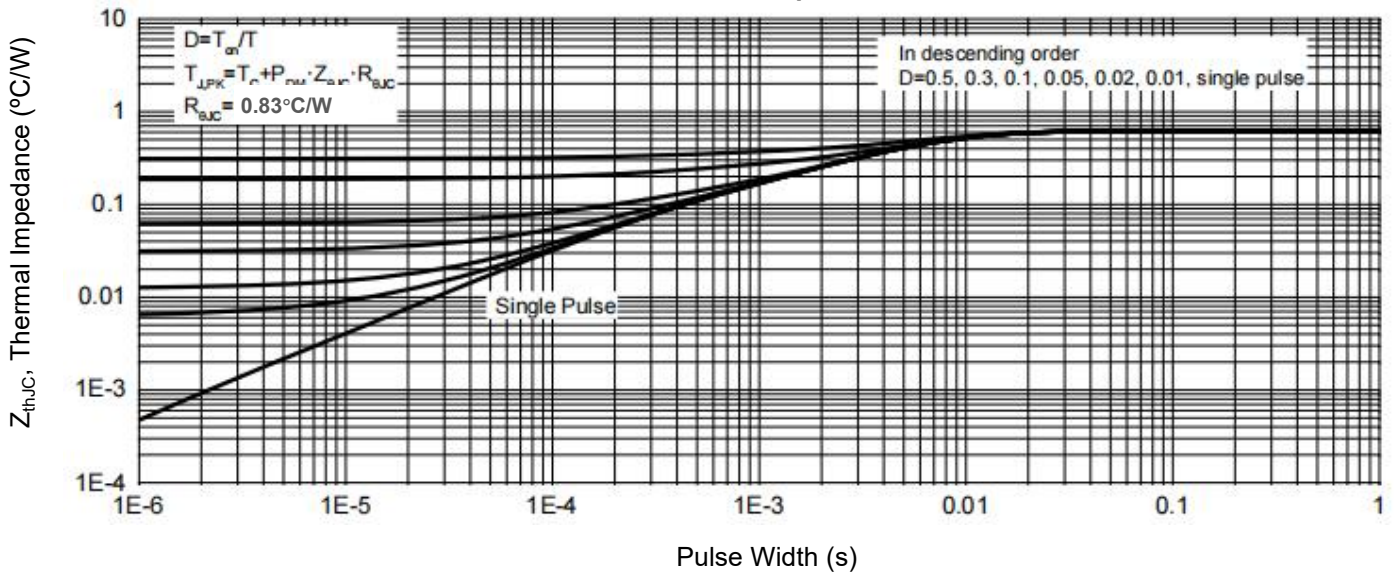
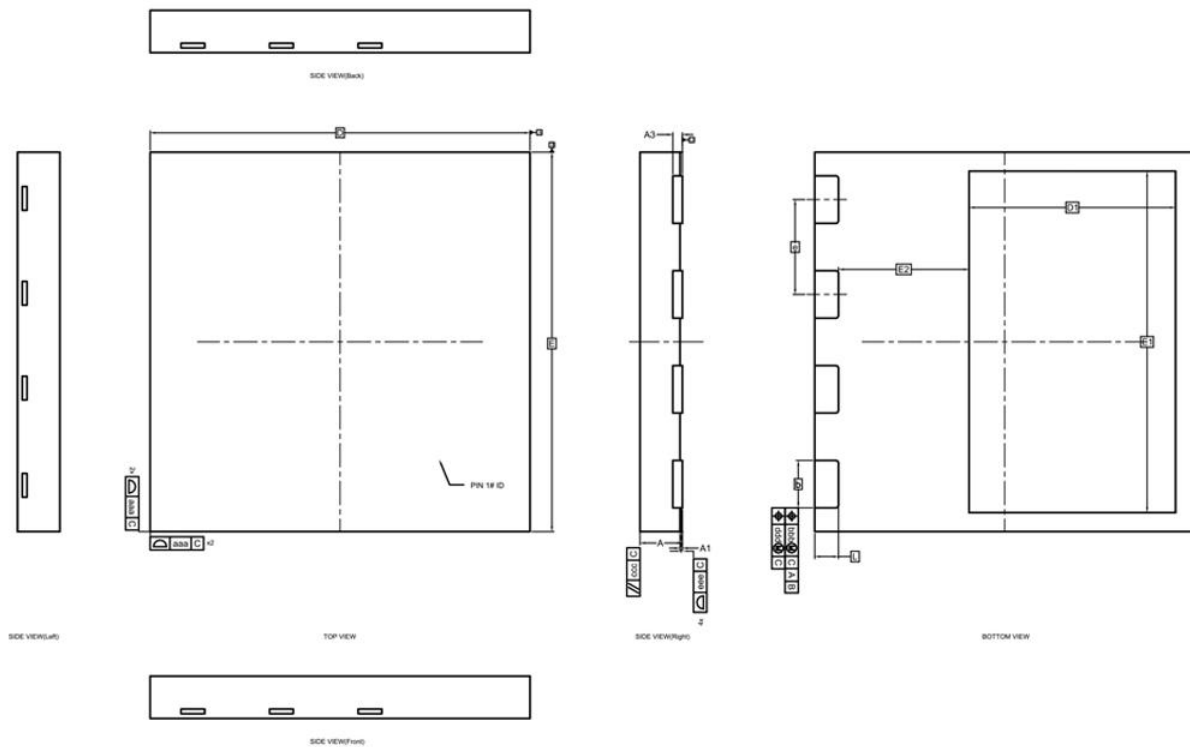


Figure 9. Normalized Maximum Transient Thermal Impedance



DFN8*8-4L Package Information



DIM SYMBOL	MIN.	NOM.	MAX.
A	0.75	0.85	0.95
	0.80	0.90	1.00
A1	0	0.02	0.05
A3	-	0.203REF	-
D	8.00BSC		
E	8.00BSC		
D1	4.25	4.35	4.45
E1	7.10	7.20	7.30
E2	2.65	2.75	2.85
e	2.00BSC		
b	0.90	1.00	1.10
L	0.40	0.50	0.60
aaa	0.15		
bbb	0.10		
ccc	0.10		
ddd	0.05		
eee	0.08		

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