N-Channel Enhancement Mode Power MOSFET

Description

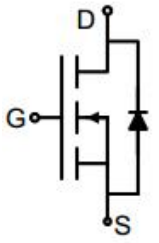
The GC030N65QF uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge. It can be used in a wide variety of applications.

General Features

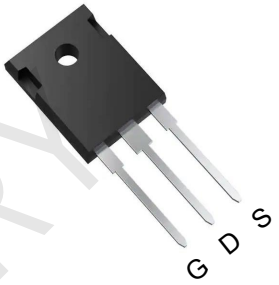
- V_{DS} 650V
- I_D (at V_{GS} = 10V) 80A
- $R_{DS(ON)}$ (at V_{GS} = 10V) < 30mΩ
- 100% Avalanche Tested
- Improved dv/dt Capability
- Ultra-fast body diode

Application

- Solar inverters
- LCD/LED/PDP TV
- Telecom/Server Power supplies
- AC-DC Power Supply



Schematic diagram



TO-247

Ordering Information

Device	Package	Marking	Packaging
GC030N65QF	TO-247	GC030N65F	30pcs/Tube

Absolute Maximum Ratings T_C = 25ºC, unless otherwise noted

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	650	V
Continuous Drain Current	I_D	80	A
Pulsed Drain Current (note1)	I_{DM}	240	A
Gate-Source Voltage	V_{GS}	±30	V
Power Dissipation	P_D	625	W
Single pulse avalanche energy （note2）	E_{AS}	3850	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}	40	ºC/W
Maximum Junction-to-Case	R_{thJC}	0.2	ºC/W

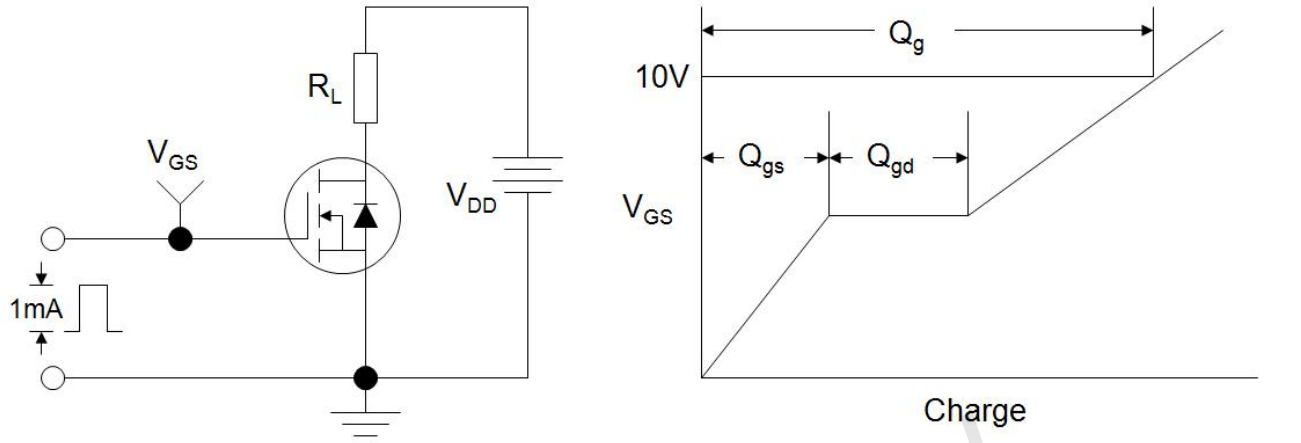
Specifications T_J = 25ºC, unless otherwise noted

Parameter	Symbol	Test Conditions	Value			Unit
			Min.	Typ.	Max.	
Static Parameters						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D = 250μA	650	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 650V, V_{GS} = 0V	--	--	10	μA
Gate-Source Leakage	I_{GSS}	V_{GS} = ±30V	--	--	±100	nA
Gate-Source Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	3.0	4.0	5.0	V
Drain-Source On-Resistance	$R_{DS(on)}$	V_{GS} = 10V, I_D = 40A	--	24	30	mΩ
Forward Transconductance	g_{FS}	V_{GS} = 5V, I_D = 40A	--	43	--	S
Dynamic Parameters						
Input Capacitance	C_{iss}	V_{GS} = 0V,V_{DS} = 400V, f = 1MHz	--	9500	--	pF
Output Capacitance	C_{oss}		--	150	--	
Reverse Transfer Capacitance	C_{rss}	V_{GS} = 0V,V_{DS} = 400V, f = 200KHz	--	8	--	
Total Gate Charge	Q_g	V_{DD} = 400V, I_D = 40A, V_{GS} = 10V	--	240	--	nC
Gate-Source Charge	Q_{gs}		--	20	--	
Gate-Drain Charge	Q_{gd}		--	55	--	
Turn-on Delay Time	$t_{d(on)}$	V_{DD} = 400V, I_D = 40A, R_G = 4.7Ω	--	42	--	ns
Turn-on Rise Time	t_r		--	24	--	
Turn-off Delay Time	$t_{d(off)}$		--	294	--	
Turn-off Fall Time	t_f		--	11	--	
Drain-Source Body Diode Characteristics						
Continuous Body Diode Current	I_S	T_C = 25ºC	--	--	80	A
Body Diode Voltage	V_{SD}	T_J = 25ºC, I_{SD} = 40A, V_{GS} = 0V	--	--	1.2	V
Reverse Recovery Charge	Qrr	I_F = 40A, V_{GS} = 0V di/dt=100A/us	--	2.9	--	μC
Reverse Recovery Time	Trr		--	242	--	ns

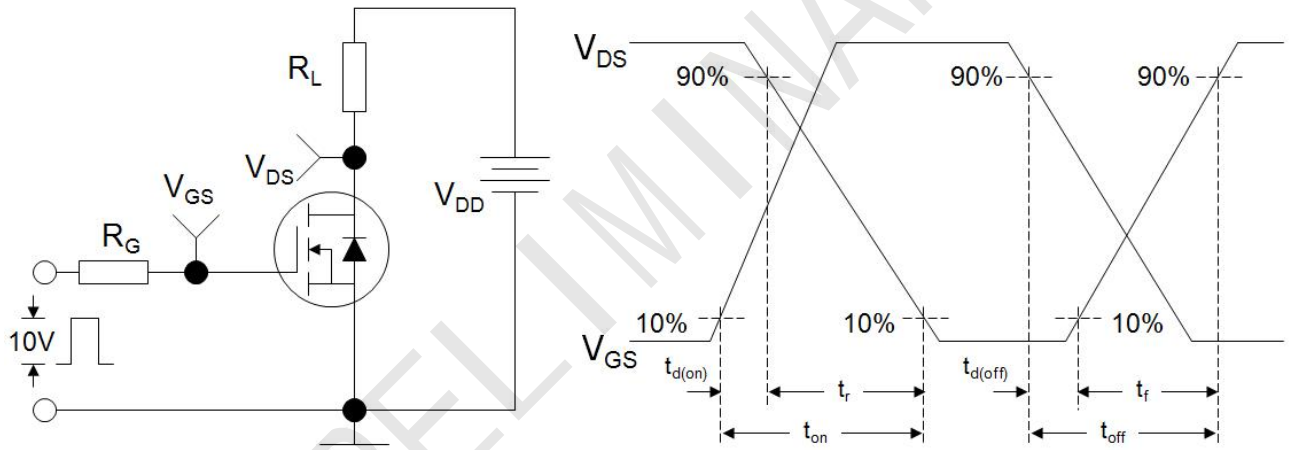
Notes

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. EAS condition : Tj=25℃ ,VDD=50V,VGS=10V,L=10mH,Rg=25Ω
3. Identical low side and high side switch with identical R_G

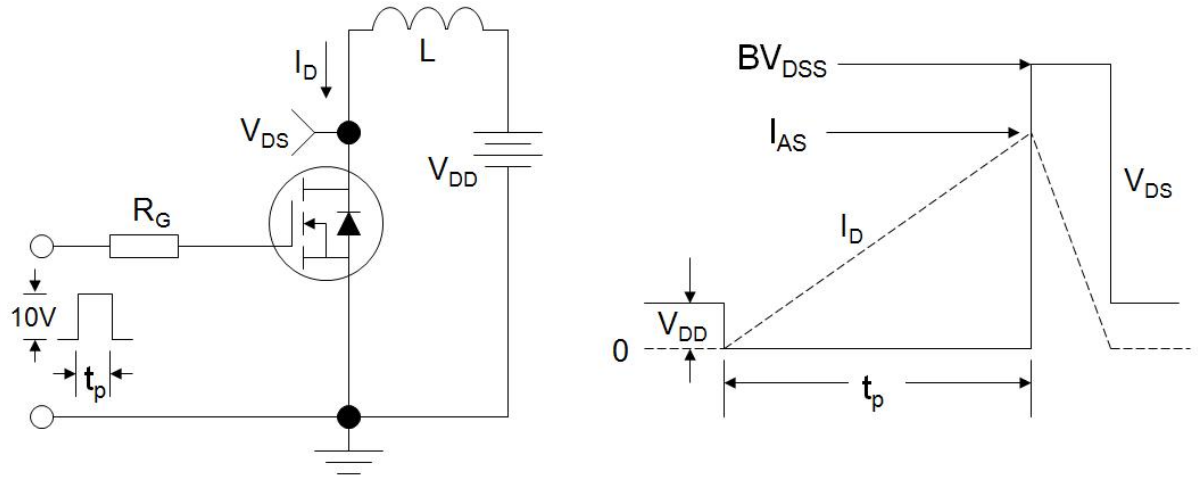
Gate Charge Test Circuit



Switch Time Test Circuit



EAS Test Circuit



Typical Characteristics T_J = 25ºC, unless otherwise noted

Figure 1. Output Characteristics

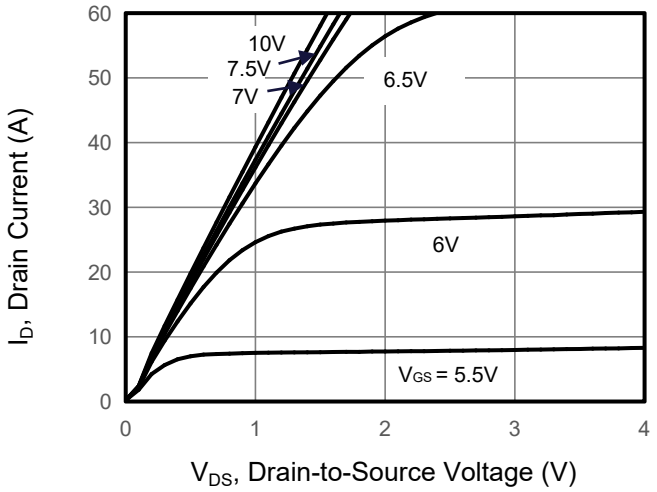


Figure 2. Transfer Characteristics

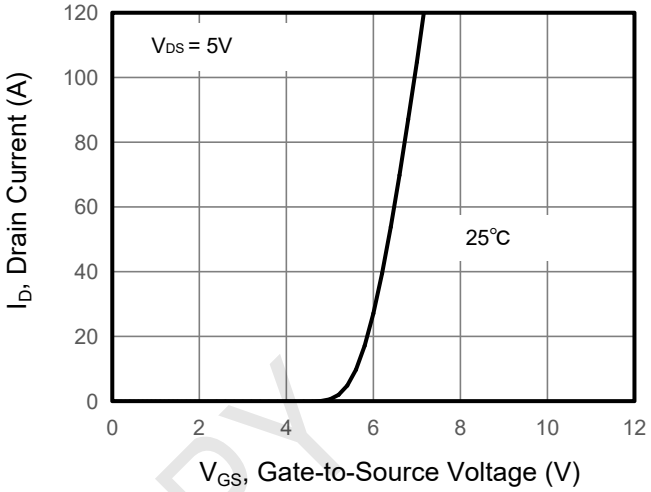


Figure 3. Drain Source On Resistance

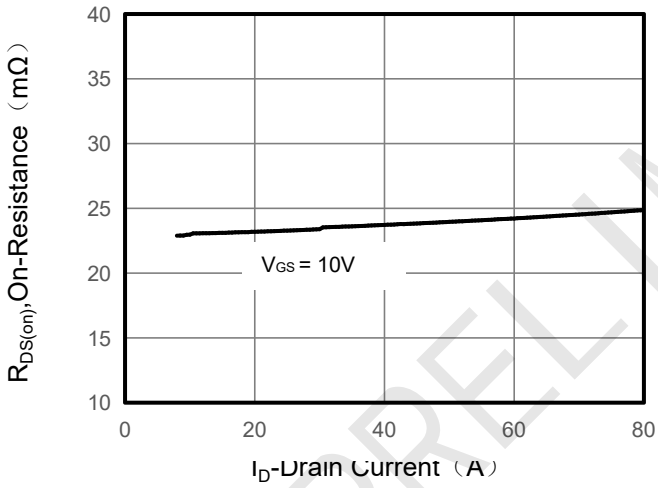


Figure 4. Gate Charge

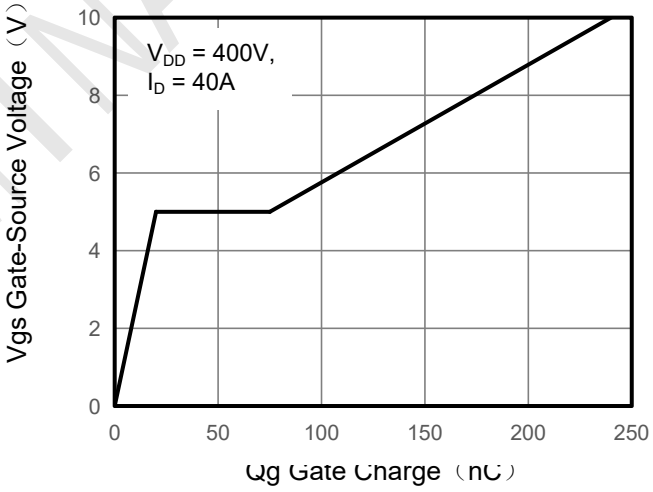


Figure 5. Capacitance

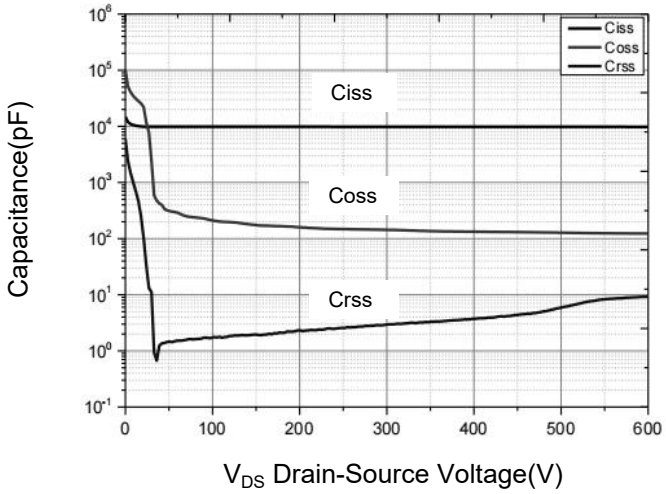
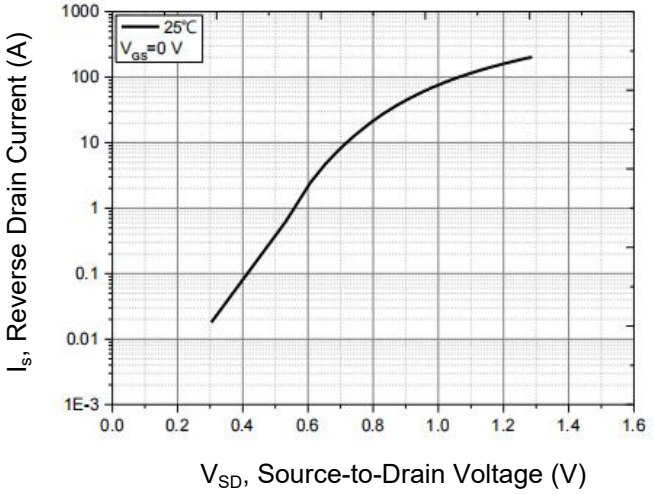


Figure 6. Source-Drain Diode Forward



Typical Characteristics T_J = 25ºC, unless otherwise noted

Figure 7. Drain-Source On-Resistance

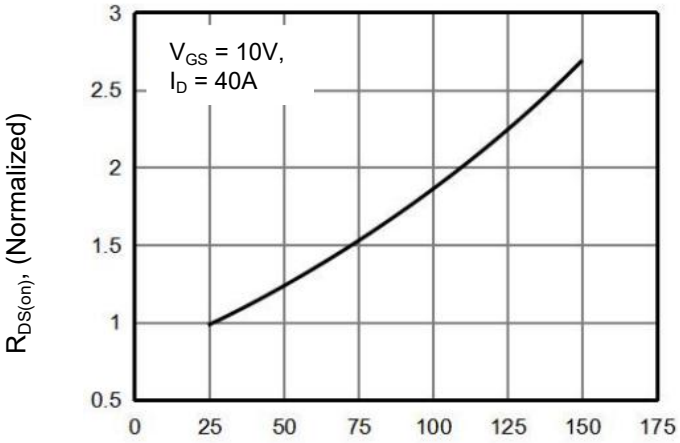


Figure 8. Safe Operation Area

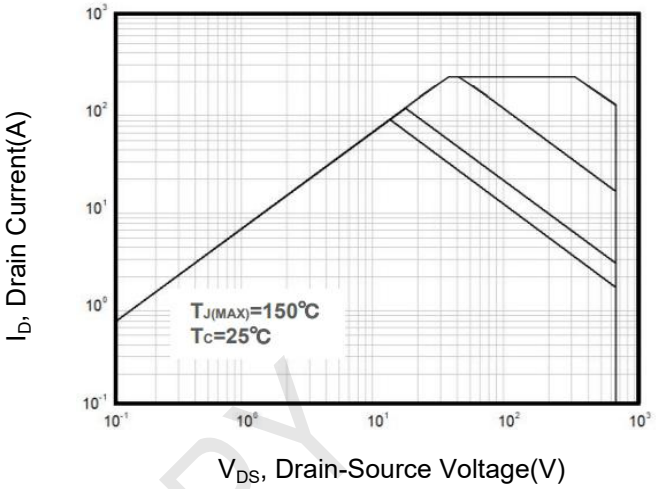
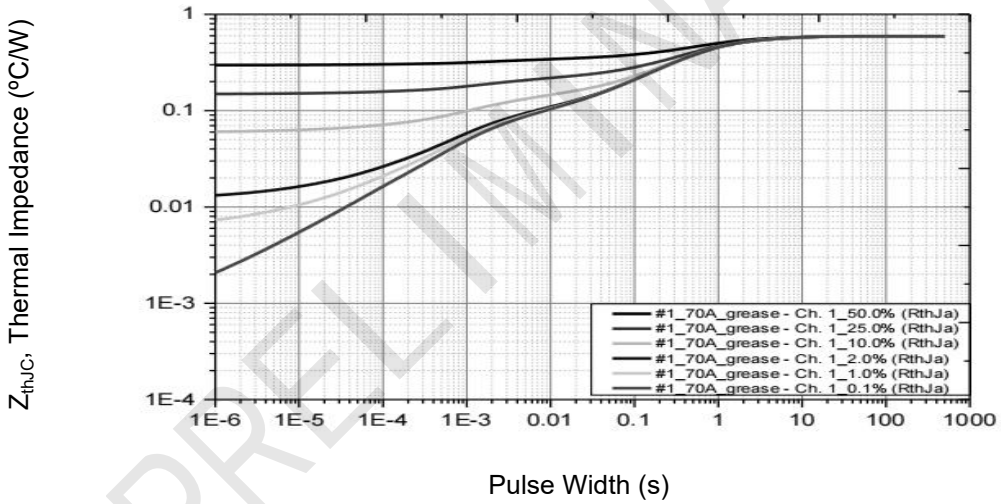
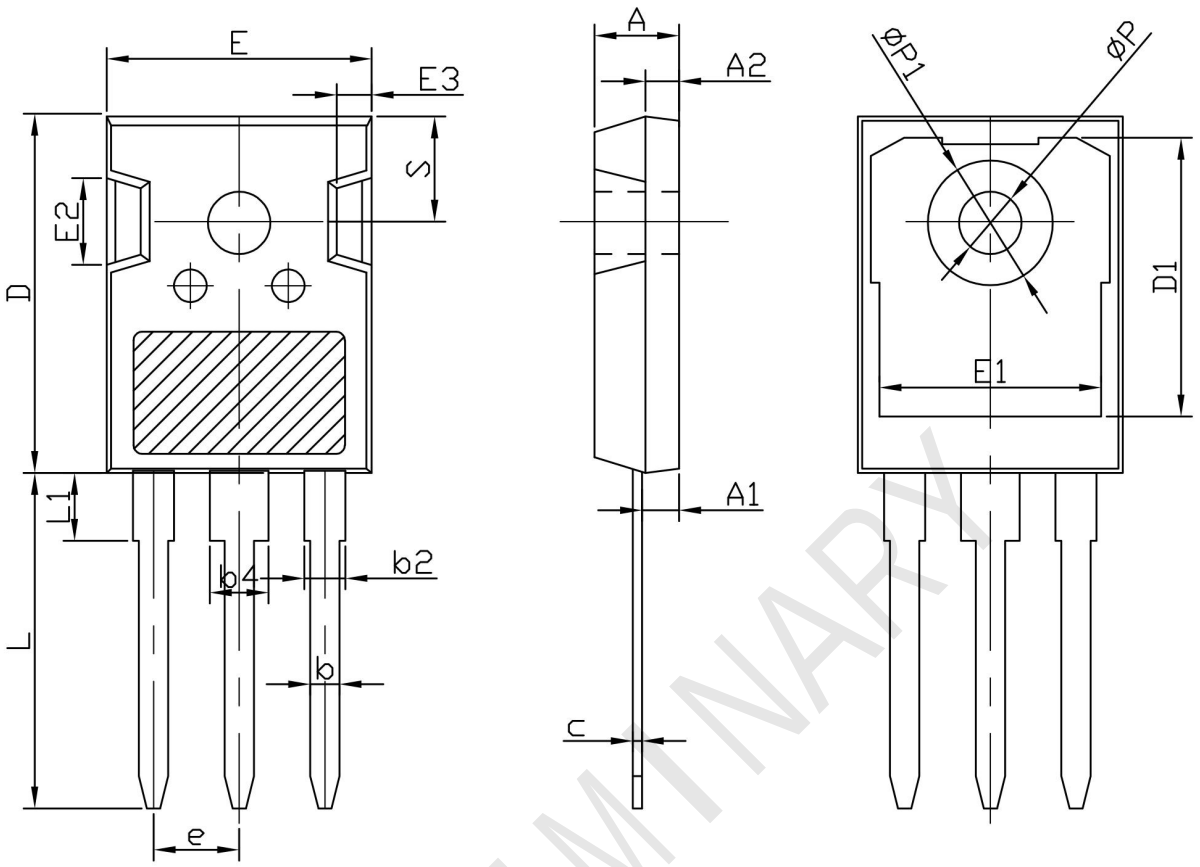


Figure 9. Normalized Maximum Transient Thermal Impedance



TO-247 Package Information



SYMBOL	mm		
	MIN	NOM	MAX
A	4.80	5.00	5.20
A1	2.21	2.41	2.59
A2	1.85	2.00	2.15
b	1.11	1.21	1.36
b2	1.91	2.01	2.21
b4	2.91	3.01	3.21
c	0.51	0.61	0.75
D	20.70	21.00	21.30
D1	16.25	16.55	16.85
E	15.50	15.80	16.10
E1	13.00	13.30	13.60
E2	4.80	5.00	5.20
E3	2.30	2.50	2.70
e	5.44BSC		
L	19.62	19.92	20.22
L1	–	–	4.30
ΦP	3.40	3.60	3.80
ΦP1	–	–	7.30
S	6.15BSC		