

N-Channel Enhancement Mode Power MOSFET

Description

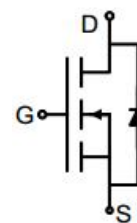
The GT130N20Q uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge. It can be used in a wide variety of applications.

General Features

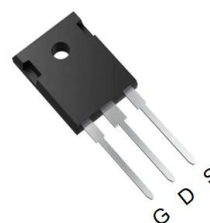
- V_{DS} 200V
- I_D (at $V_{GS} = 10V$) 92A
- $R_{DS(ON)}$ (at $V_{GS} = 10V$) < 12m Ω
- 100% Avalanche Tested
- RoHS Compliant

Application

- Power switch
- DC/DC converters



Schematic diagram



TO-247

Ordering Information

Device	Package	Marking	Packaging
GT130N20Q	TO-247	GT130N20	30pcs/Tube

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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	200	V
Continuous Drain Current	I_D	92	A
		58	
Pulsed Drain Current (note1)	I_{DM}	368	A
Gate-Source Voltage	V_{GS}	± 20	V
Power Dissipation	P_D	260	W
Single pulse avalanche energy (note2)	E_{AS}	462	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}	0.48	$^\circ\text{C/W}$

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 = 250μA	200	--	--	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 200V, 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	3.2	4.0	V
Drain-Source On-Resistance	R _{DS(on)}	V _{GS} = 10V, I _D = 30A	--	9.8	12	mΩ
Forward Transconductance	g _{FS}	V _{GS} = 5V, I _D = 30A	--	139	--	S
Dynamic Parameters						
Input Capacitance	C _{iss}	V _{GS} = 0V, V _{DS} = 100V, f = 0.8MHz	--	5900	--	pF
Output Capacitance	C _{oss}		--	350	--	
Reverse Transfer Capacitance	C _{rss}		--	25	--	
Total Gate Charge	Q _g	V _{DD} = 100V, I _D = 30A, V _{GS} = 10V	--	77	--	nC
Gate-Source Charge	Q _{gs}		--	30	--	
Gate-Drain Charge	Q _{gd}		--	10	--	
Turn-on Delay Time	t _{d(on)}	V _{DD} = 100V, I _D = 30A, R _G = 1.6Ω	--	16	--	ns
Turn-on Rise Time	t _r		--	12	--	
Turn-off Delay Time	t _{d(off)}		--	29	--	
Turn-off Fall Time	t _f		--	10	--	
Drain-Source Body Diode Characteristics						
Continuous Body Diode Current	I _S	T _C = 25°C	--	--	92	A
Body Diode Voltage	V _{SD}	T _J = 25°C, I _{SD} = 30A, V _{GS} = 0V	--	--	1.2	V
Reverse Recovery Charge	Q _{rr}	I _F = 30A, V _{GS} = 0V di/dt=500A/us	--	743	--	nC
Reverse Recovery Time	T _{rr}		--	170	--	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 1260mJ 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

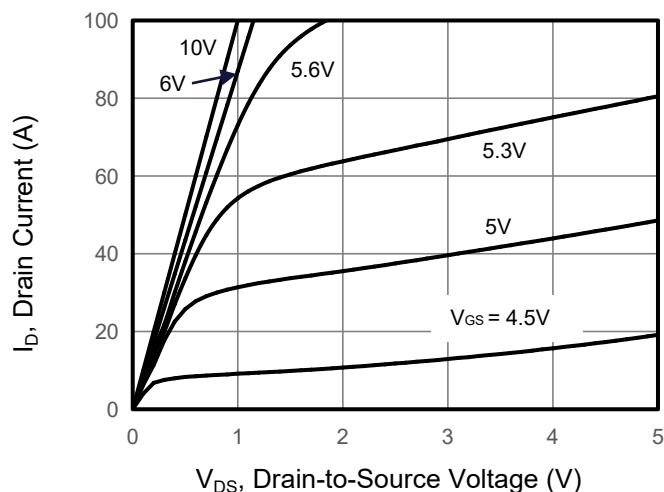


Figure 2. Transfer Characteristics

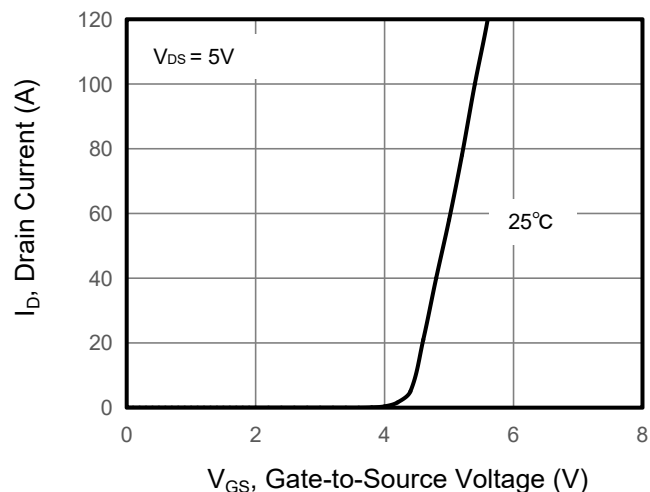


Figure 3. Drain Source On Resistance

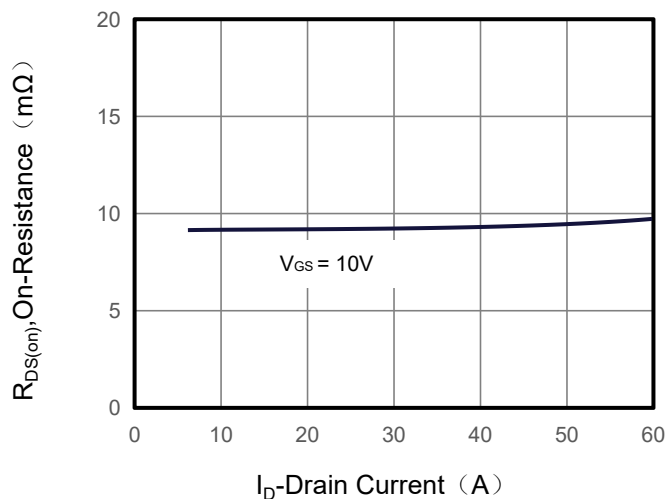


Figure 4. Gate Charge

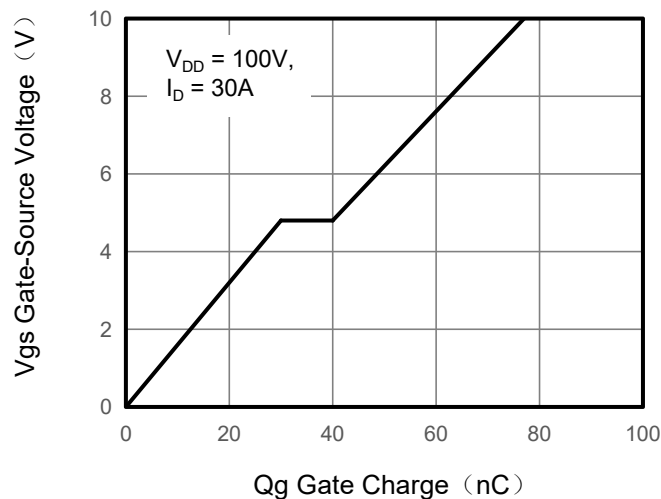


Figure 5. Capacitance

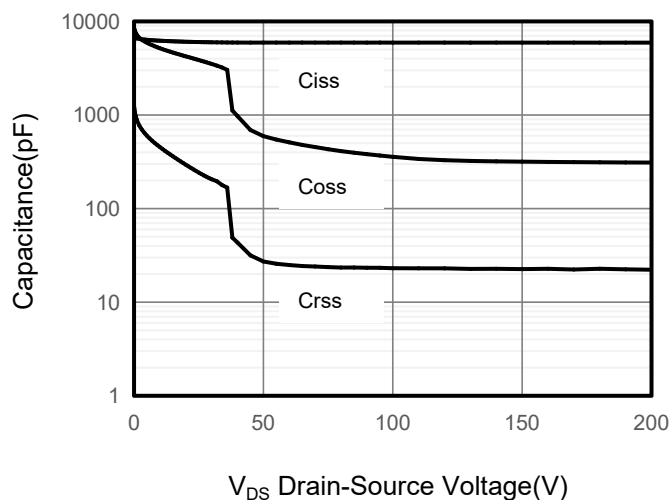
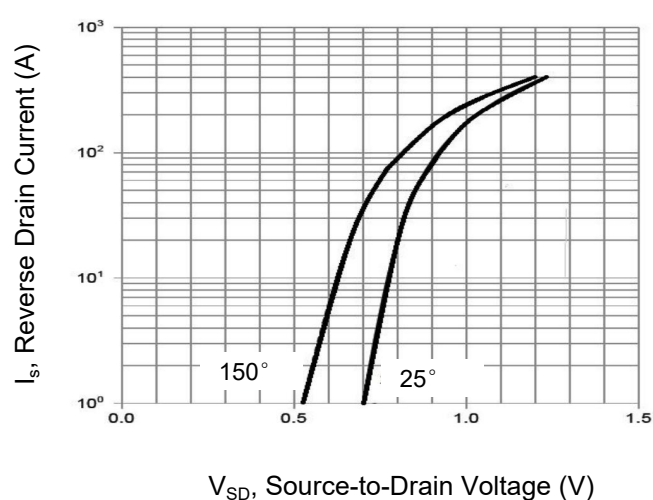


Figure 6. Source-Drain Diode Forward



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

Figure 7. Drain-Source On-Resistance

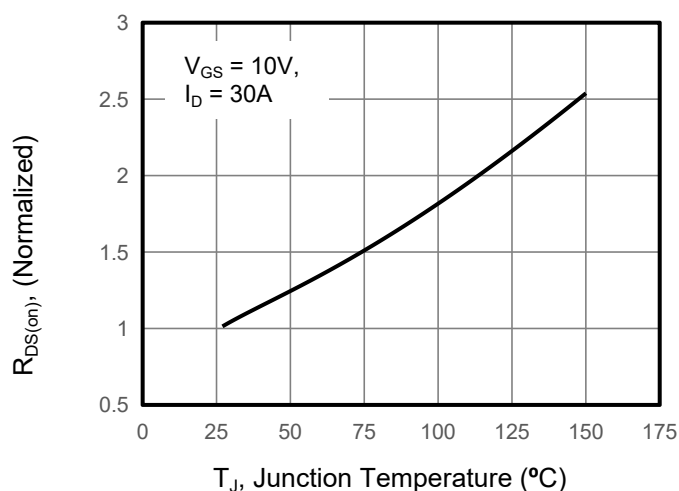


Figure 8. Safe Operation Area

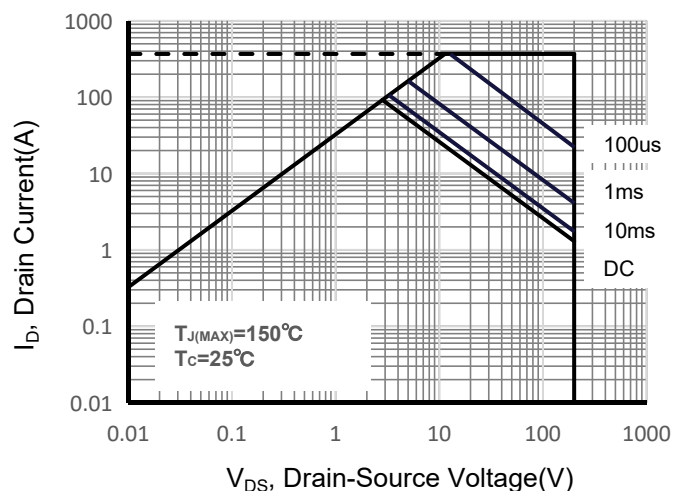


Figure 9. Maximum Continuous Drain Current vs Case Temperature

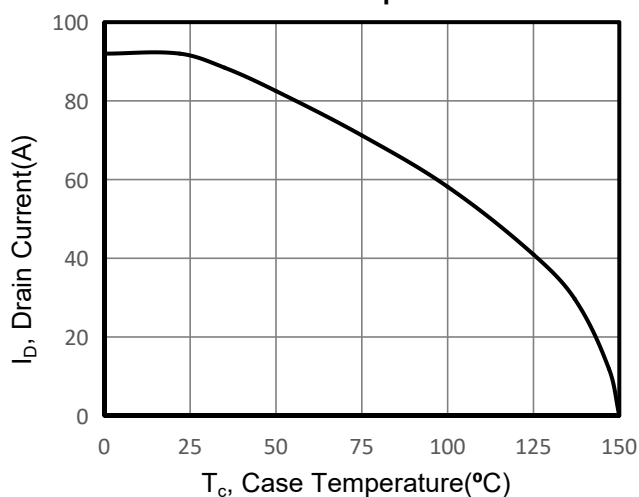
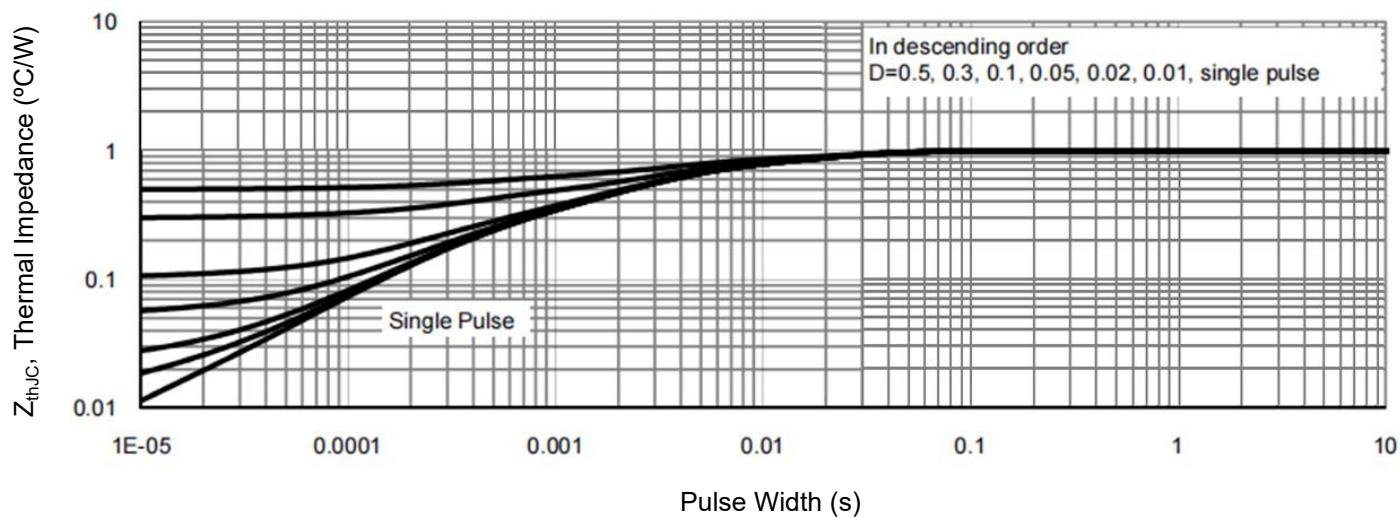
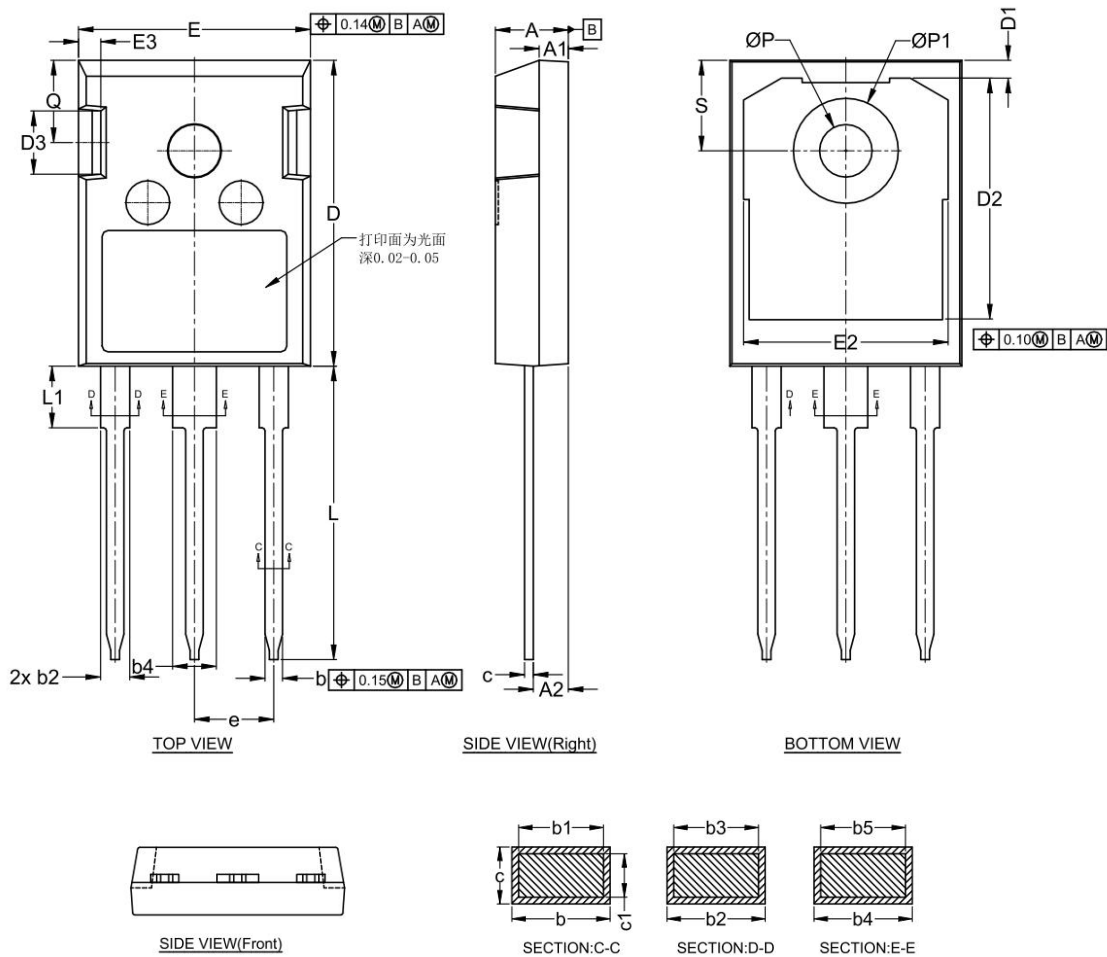


Figure 10. Normalized Maximum Transient Thermal Impedance



TO-247 Package Information



DIM SYMBOL	MIN.	NOM.	MAX.	DIM SYMBOL	MIN.	NOM.	MAX.
A	4.900	5.000	5.100	D1	1.022	1.222	1.400
A1	1.940	2.040	2.140	D2	16.348	16.548	16.748
A2	2.300	2.400	2.500	D3	4.232	4.332	4.432
b	1.139	1.239	1.330	E	15.800	15.900	16.000
b1	1.099	1.199	1.299	E2	13.821	14.021	14.221
b2	1.939	2.039	2.139	E3	1.430	1.530	1.630
b3	1.899	1.999	2.099	e	5.436 BSC.		
b4	2.940	3.040	3.140	L	19.900	20.100	20.300
b5	2.900	3.000	3.100	L1	4.024	4.224	4.424
c	0.550	0.640	0.700	ØP	3.500	3.600	3.700
c1	0.500	0.600	0.700	ØP1	7.088	7.188	7.288
D	20.850	20.950	21.050	Q	5.435	5.635	5.835
D1	1.022	1.222	1.400	S	6.040	6.200	6.300