

N-Channel Enhancement Mode Power MOSFET

Description

The GT009N04TL 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

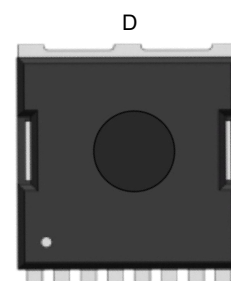
- V_{DS} 40V
- I_D (at $V_{GS} = 10V$) 340A
- $R_{DS(ON)}$ (at $V_{GS} = 10V$) < 0.95m Ω
- 100% Avalanche Tested
- RoHS Compliant

Application

- Power switch
- DC/DC converters



Schematic diagram



G₁ S₂ S₃ S₄ S₅ S₆ S₇ S₈

TOLL

Ordering Information

Device	Package	Marking	Packaging
GT009N04TL	TOLL	GT009N04	2000pcs/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	I_D	340	A
Pulsed Drain Current (note1)	I_{DM}	1360	A
Gate-Source Voltage	V_{GS}	± 20	V
Power Dissipation	P_D	156	W
Single pulse avalanche energy (note2)	E_{AS}	625	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}	91	$^\circ\text{C/W}$
Maximum Junction-to-Case	R_{thJC}	0.8	$^\circ\text{C/W}$

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	2.5	3.0	V
Drain-Source On-Resistance	R _{DS(on)}	V _{GS} = 10V, I _D = 30A	--	0.81	0.95	mΩ
Forward Transconductance	g _{FS}	V _{GS} = 5V, I _D = 30A	--	67	--	S
Dynamic Parameters						
Input Capacitance	C _{iss}	V _{GS} = 0V, V _{DS} = 20V, f = 0.7MHz	--	7318	--	pF
Output Capacitance	C _{oss}		--	2263	--	
Reverse Transfer Capacitance	C _{rss}		--	312	--	
Total Gate Charge	Q _g	V _{DD} = 20V, I _D = 30A, V _{GS} = 10V	--	120	--	nC
Gate-Source Charge	Q _{gs}		--	39	--	
Gate-Drain Charge	Q _{gd}		--	26	--	
Turn-on Delay Time	t _{d(on)}	V _{DD} = 20V, I _D = 30A, R _G = 5Ω	--	19	--	ns
Turn-on Rise Time	t _r		--	26	--	
Turn-off Delay Time	t _{d(off)}		--	85	--	
Turn-off Fall Time	t _f		--	45	--	
Drain-Source Body Diode Characteristics						
Continuous Body Diode Current	I _S	T _C = 25°C	--	--	340	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	--	333	--	nC
Reverse Recovery Time	T _{rr}		--	141	--	ns

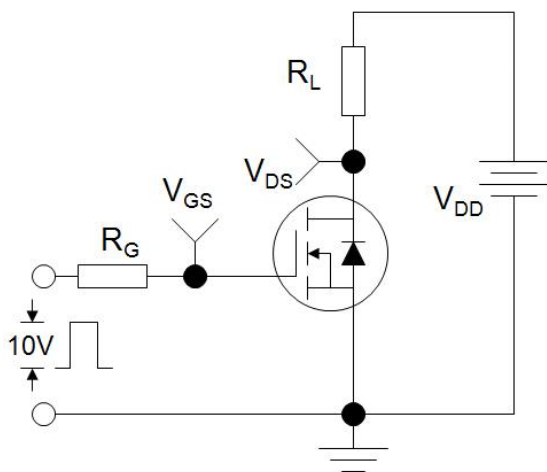
Notes

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

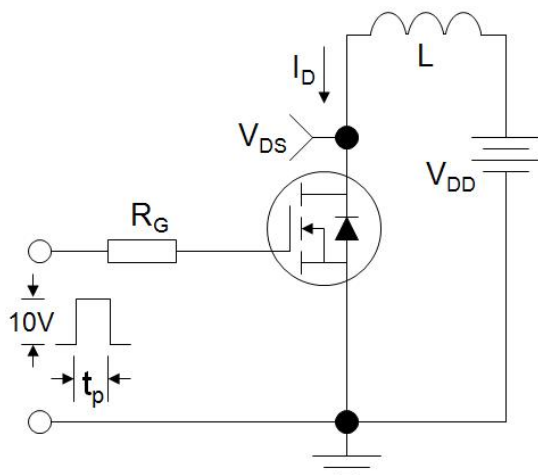
Gate Charge Test Circuit



Switch Time Test Circuit



EAS Test Circuit



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

Figure 1. Output Characteristics

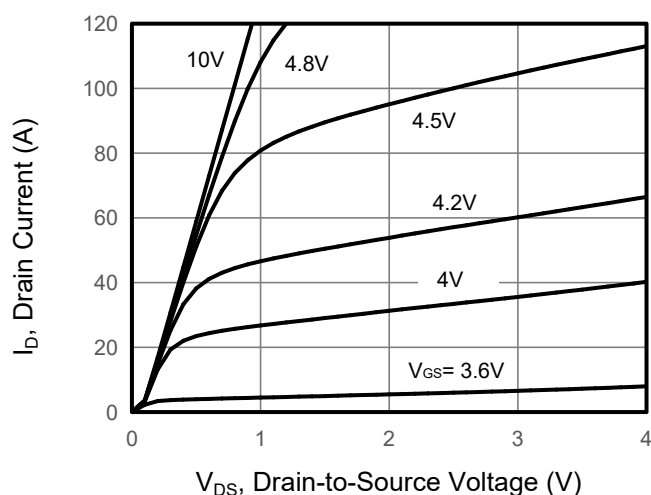


Figure 2. Transfer Characteristics

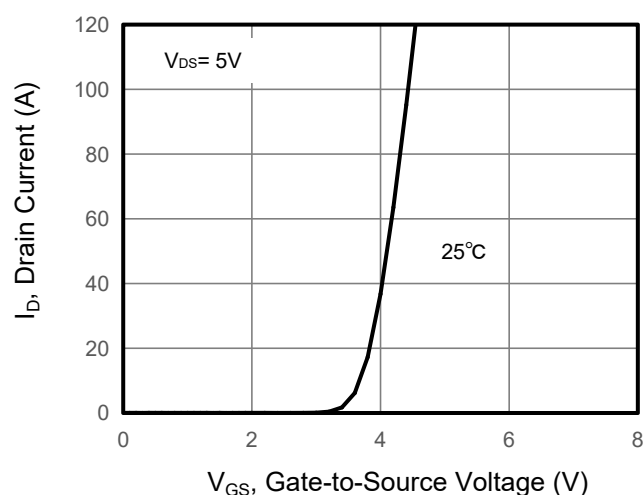


Figure 3. Drain Source On Resistance

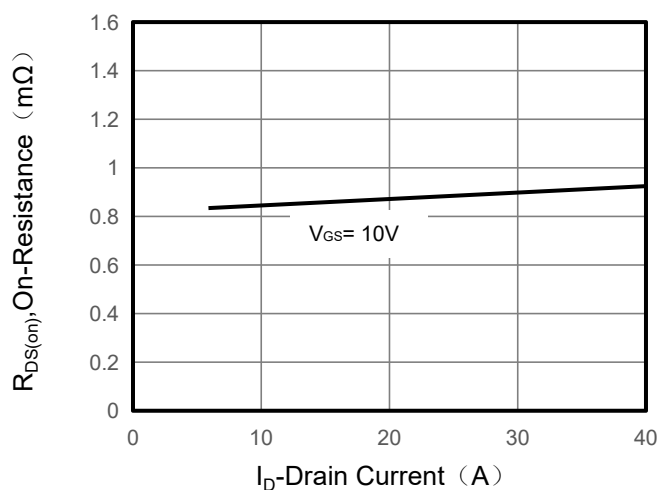


Figure 4. Gate Charge

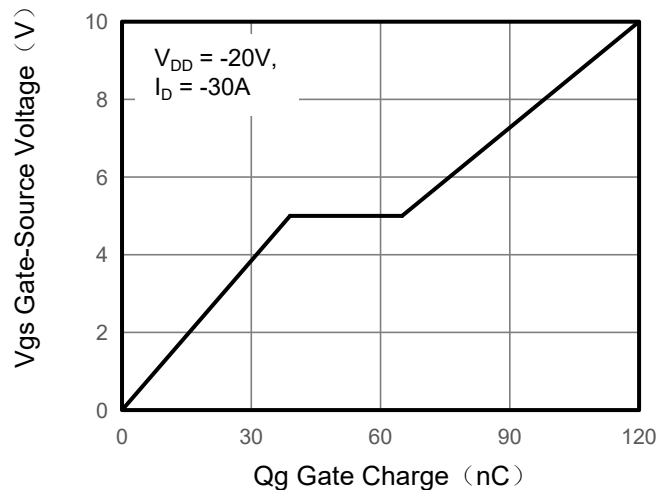


Figure 5. Capacitance

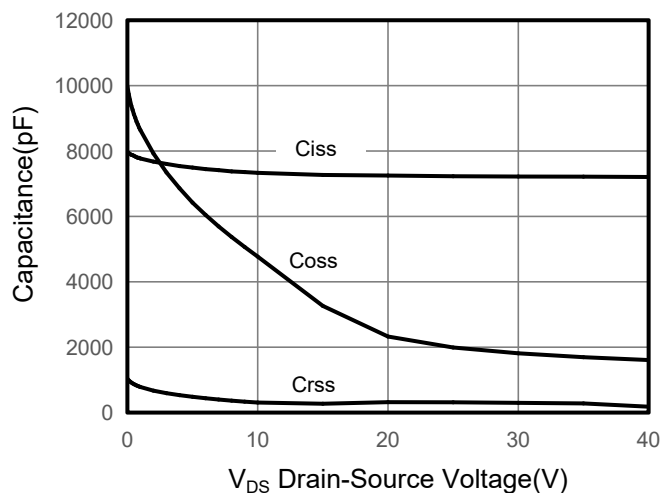
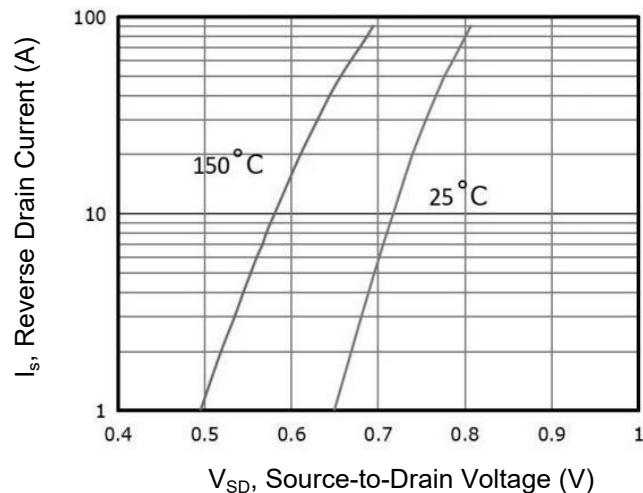


Figure 6. Source-Drain Diode Forward



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

Figure 7. Drain-Source On-Resistance

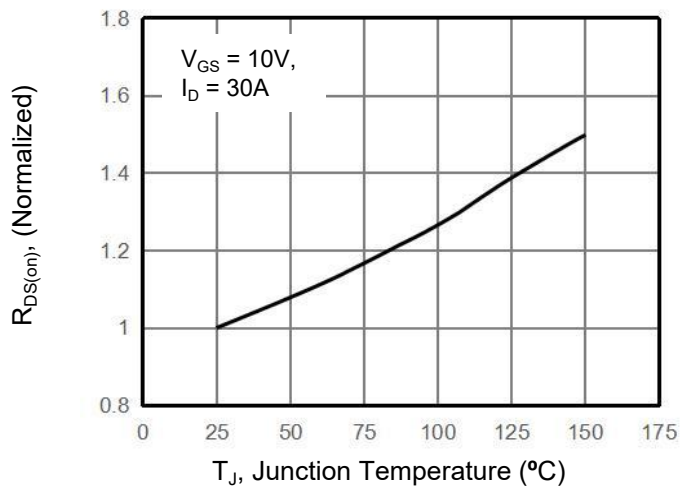


Figure 8. Safe Operation Area

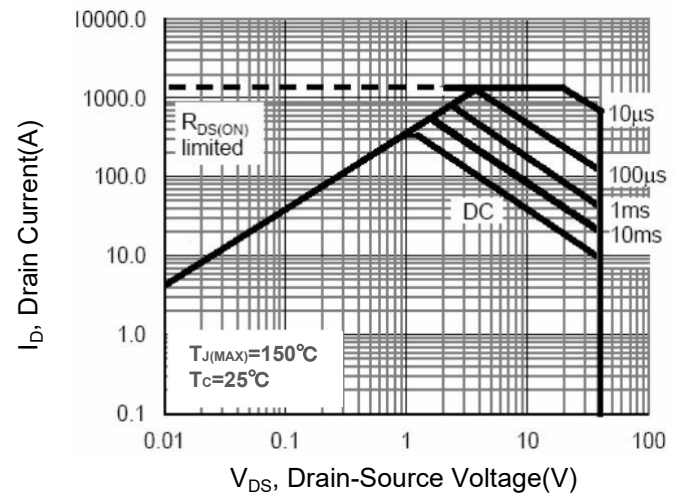
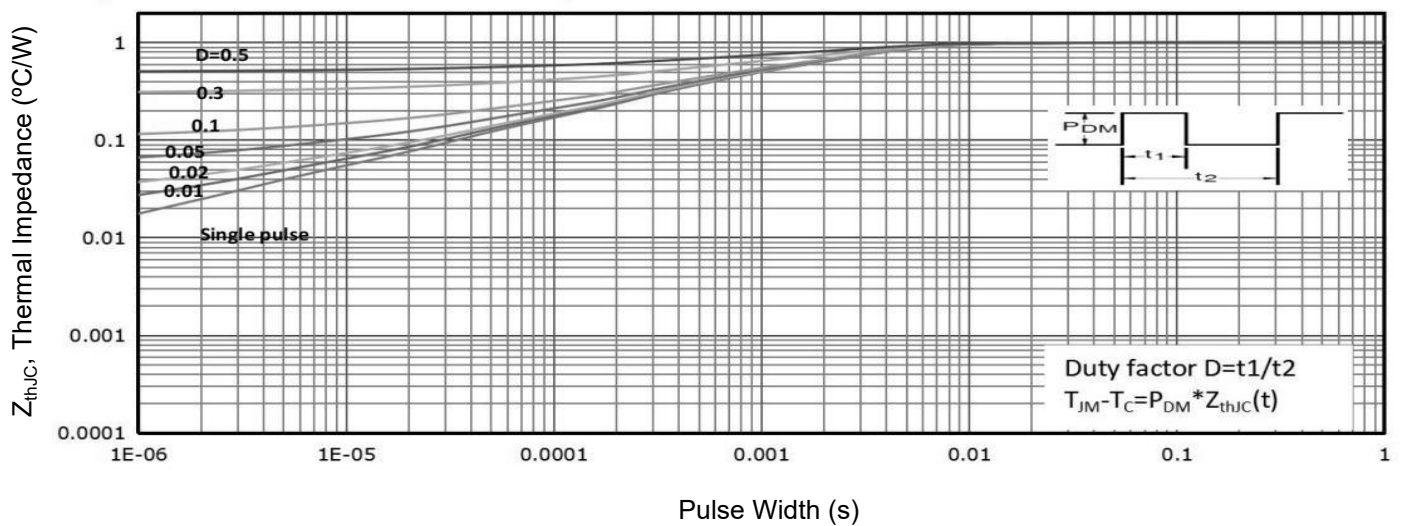
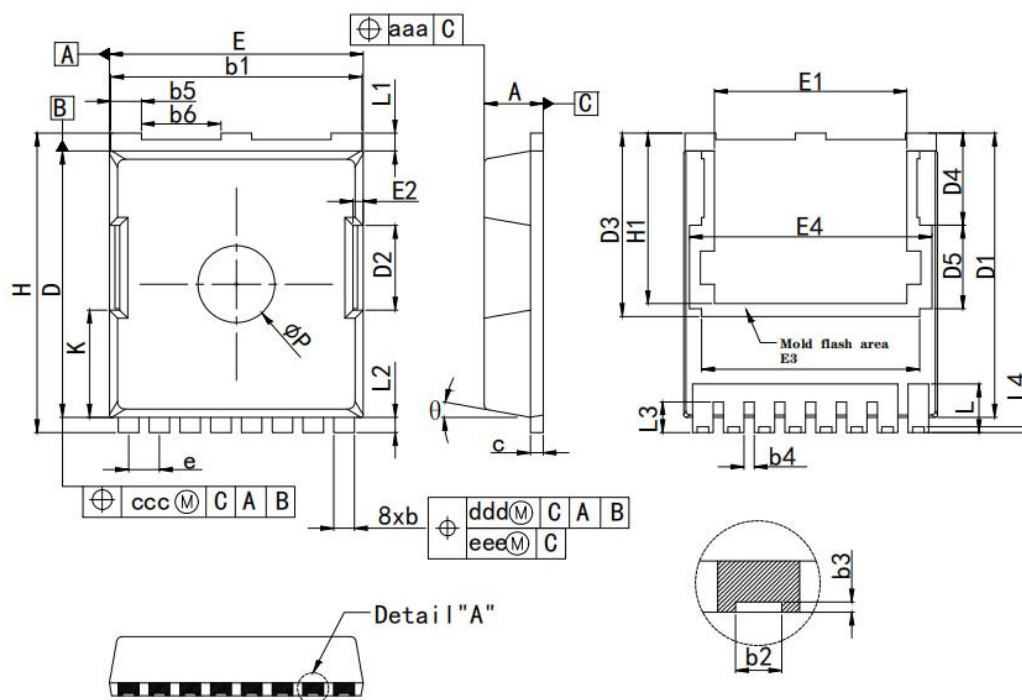


Figure 9. Normalized Maximum Transient Thermal Impedance



TOLL Package Information



SYMBOL	COMMON		
	MILLIMETER		
	MIN	NOMINAL	MAX
A	2.20	2.30	2.40
b	0.70	0.80	0.90
b1	9.70	9.80	9.90
b2	0.36	0.45	0.55
b3	0.05	0.100	/
b4	0.30	0.40	0.50
b5	1.10	1.20	1.30
b6	3.00	3.10	3.20
c	0.40	0.50	0.60
D	10.28	10.38	10.55
D1	10.98	11.08	11.18
D2	3.20	3.30	3.40
D3		7.15	
D4		3.59	
D5		3.26	
e	1.10	1.20	1.30
E	9.80	9.90	10.00
E1	7.40	7.50	7.60
E2	0.30	0.40	0.50
E3		8.50	
E4		9.46	
H	11.50	11.68	11.85
H1	0.55	0.65	0.75
K	4.08	4.18	4.28
L	1.60	1.90	2.10
L1	0.50	0.70	0.90
L2	0.50	0.60	0.70
L3	1.00	1.20	1.30
L4	0.13	0.23	0.33
P	2.85	3.00	3.15
θ		10" REF	
aaa		0.20	
ccc		0.20	
ddd		0.25	
eee		0.20	