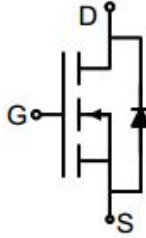
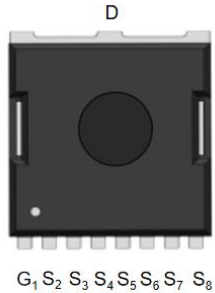


N-Channel Enhancement Mode Power MOSFET

<p>Description</p> <p>The GT014N04TL uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge. It can be used in a wide variety of applications.</p> <p>General Features</p> <ul style="list-style-type: none"> ● V_{DS} 40V ● I_D (at $V_{GS} = 10V$) 275A ● $R_{DS(ON)}$ (at $V_{GS} = 10V$) < 1.2mΩ ● $R_{DS(ON)}$ (at $V_{GS} = 4.5V$) < 1.7mΩ ● 100% Avalanche Tested ● RoHS Compliant <p>Application</p> <ul style="list-style-type: none"> ● Power switch ● DC/DC converters 	 <p>Schematic diagram</p>  <p>TOLL-8L</p>
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Ordering Information

Device	Package	Marking	Packaging
GT014N04TL	TOLL-8L	GT014N04	2000pcs/Reel

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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	40	V
Continuous Drain Current	I_D	275	A
Pulsed Drain Current (note1)	I_{DM}	1100	A
Gate-Source Voltage	V_{GS}	± 20	V
Power Dissipation	P_D	139	W
Single pulse avalanche energy (note2)	E_{AS}	361	mJ
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55 To 150	$^\circ C$

Thermal Resistance

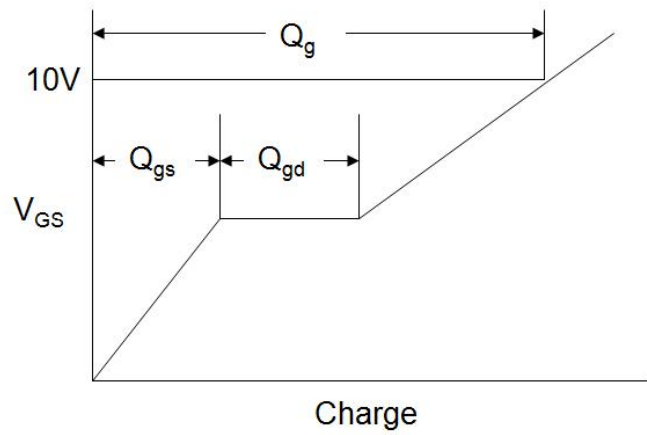
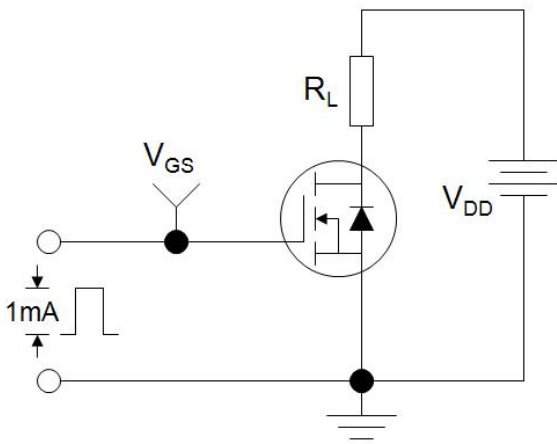
Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Ambient	R_{thJA}	50	$^\circ C/W$
Maximum Junction-to-Case	R_{thJC}	0.9	$^\circ C/W$

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	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	40	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 40V, V_{GS} = 0V$	--	--	1	μA
Gate-Source Leakage	I_{GSS}	$V_{GS} = \pm 20V$	--	--	± 100	nA
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	1.2	1.7	2.5	V
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 20A$	--	0.98	1.2	m Ω
		$V_{GS} = 4.5V, I_D = 20A$	--	1.35	1.7	
Forward Transconductance	g_{FS}	$V_{GS} = 5V, I_D = 20A$	--	54	--	S
Dynamic Parameters						
Input Capacitance	C_{iss}	$V_{GS} = 0V,$ $V_{DS} = 20V,$ $f = 0.5\text{MHz}$	--	6100	--	pF
Output Capacitance	C_{oss}		--	1856	--	
Reverse Transfer Capacitance	C_{rss}		--	74	--	
Total Gate Charge	Q_g	$V_{DD} = 20V,$ $I_D = 20A,$ $V_{GS} = 10V$	--	94	--	nC
Gate-Source Charge	Q_{gs}		--	31	--	
Gate-Drain Charge	Q_{gd}		--	20	--	
Turn-on Delay Time	$t_{d(on)}$	$V_{DD} = 20V,$ $I_D = 20A,$ $R_G = 1.6\Omega$	--	15	--	ns
Turn-on Rise Time	t_r		--	8	--	
Turn-off Delay Time	$t_{d(off)}$		--	60	--	
Turn-off Fall Time	t_f		--	10	--	
Drain-Source Body Diode Characteristics						
Continuous Body Diode Current	I_S	$T_C = 25^\circ\text{C}$	--	--	275	A
Body Diode Voltage	V_{SD}	$T_J = 25^\circ\text{C}, I_{SD} = 20A, V_{GS} = 0V$	--	--	1.2	V
Reverse Recovery Charge	Q_{rr}	$I_F = 20A, V_{GS} = 0V$ $di/dt=100A/us$	--	129	--	nC
Reverse Recovery Time	T_{rr}		--	39	--	ns

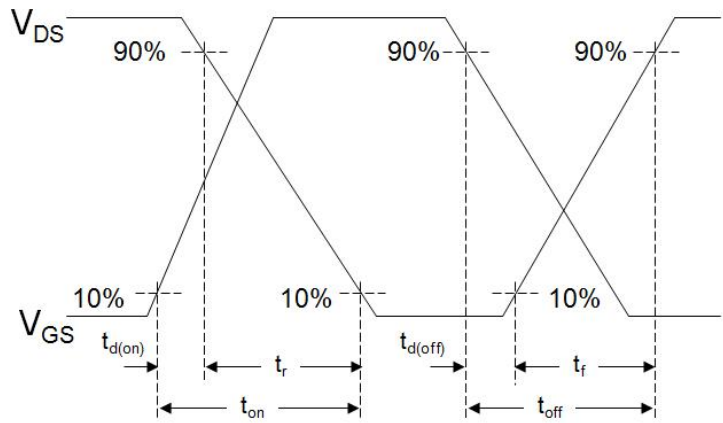
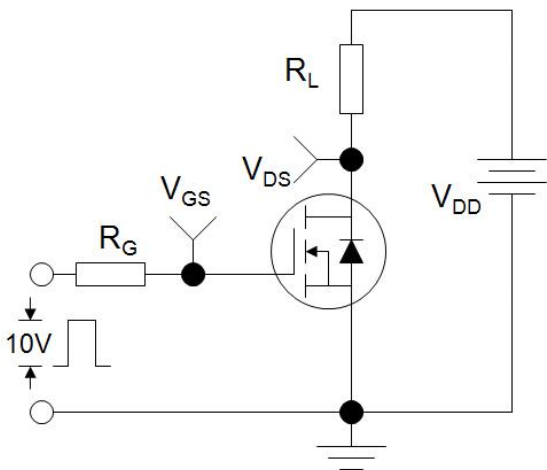
Notes

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. EAS condition : $T_J=25^\circ\text{C}$, $V_{DD}=50V, V_{GS}=10V, L=0.5\text{mH}, R_G=25\Omega$
The table shows the minimum avalanche energy, which is 900mJ when the device is tested until failure
3. Identical low side and high side switch with identical R_G

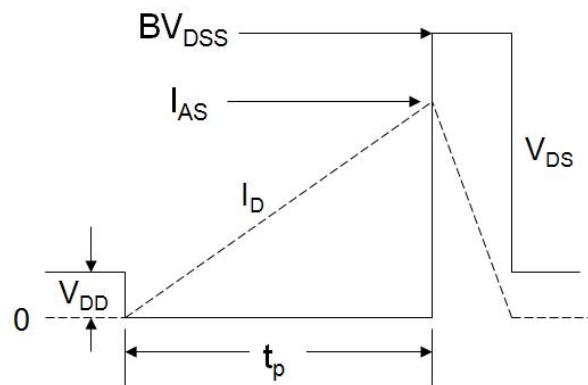
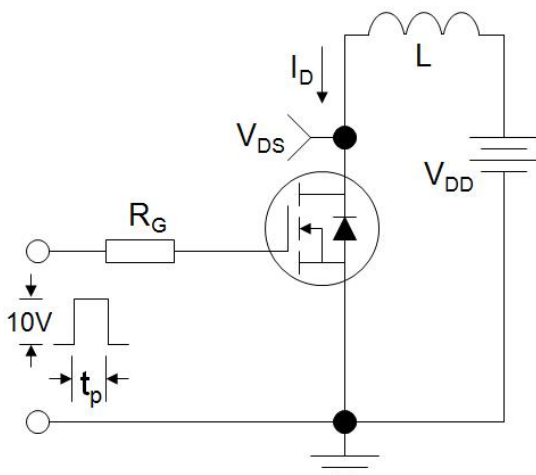
Gate Charge Test Circuit



Switch Time Test Circuit



EAS Test Circuit



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

Figure 1. Output Characteristics

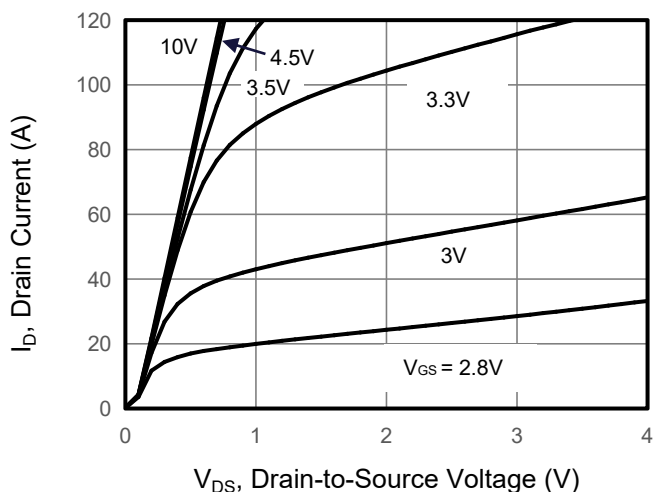


Figure 2. Transfer Characteristics

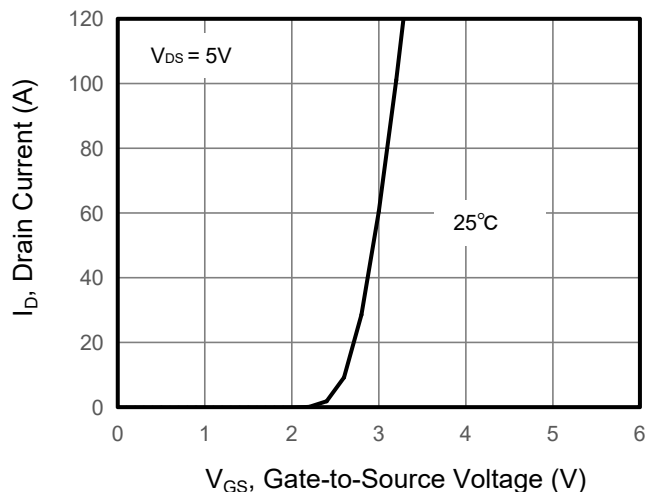


Figure 3. Drain Source On Resistance

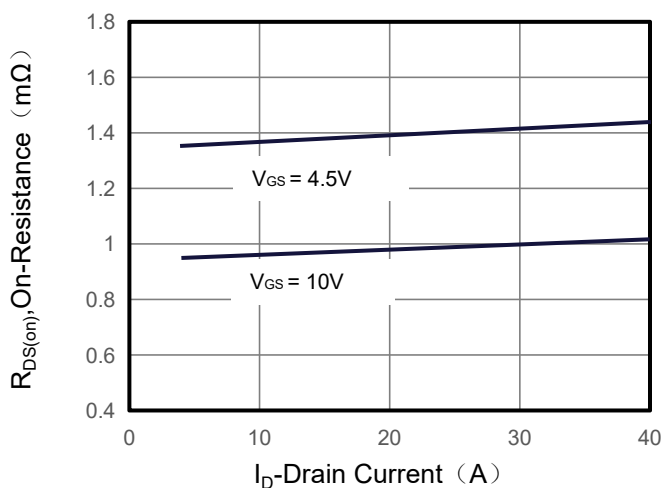


Figure 4. Gate Charge

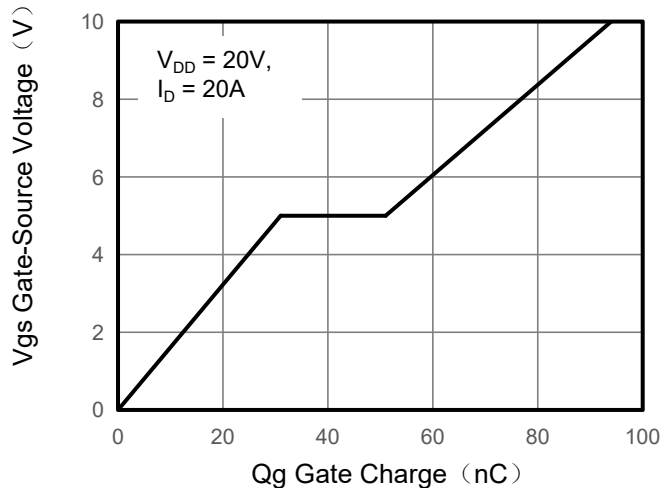


Figure 5. Capacitance

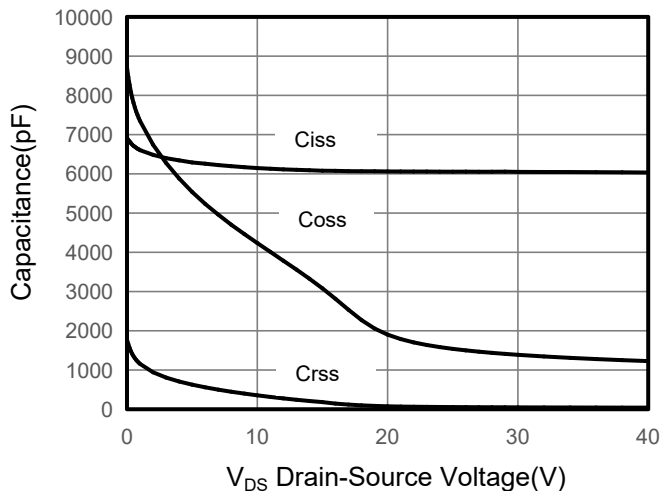
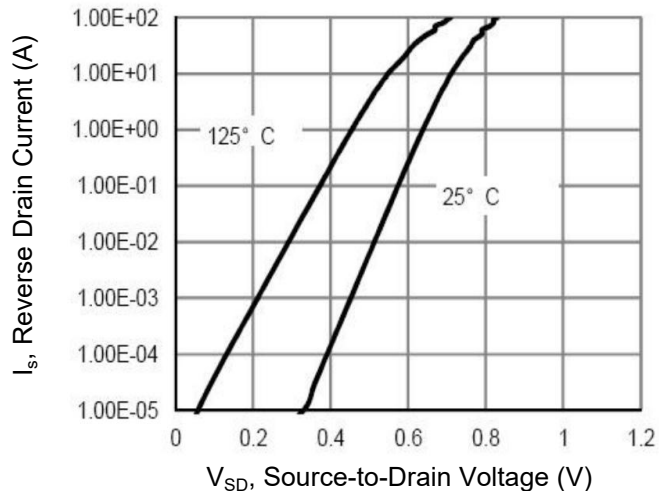


Figure 6. Source-Drain Diode Forward



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

Figure 7. Drain-Source On-Resistance

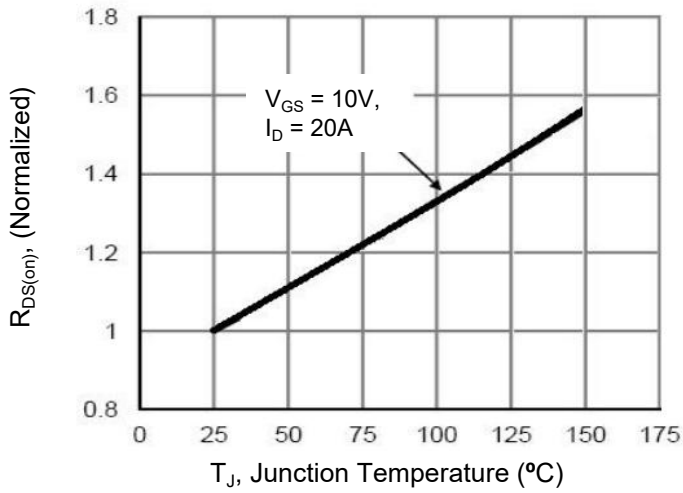


Figure 8. Safe Operation Area

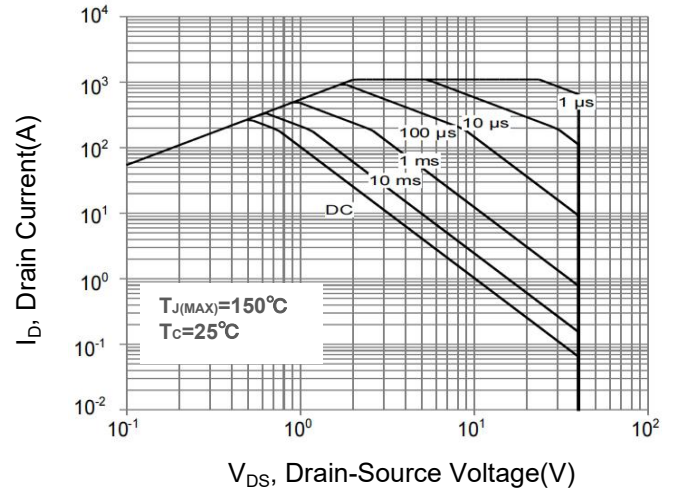
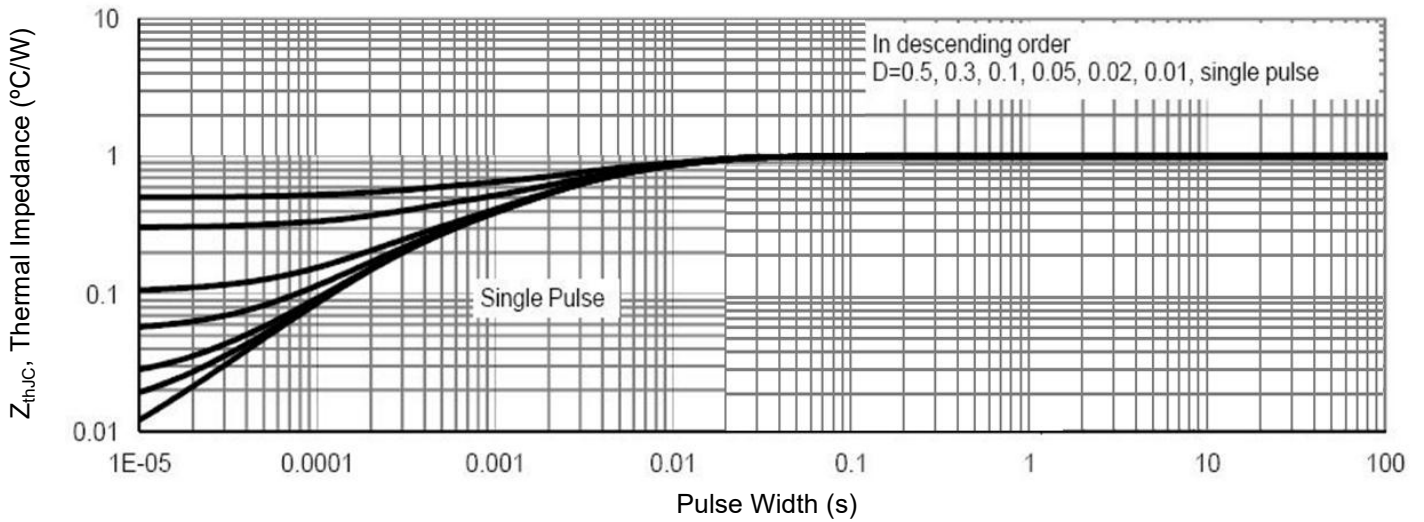
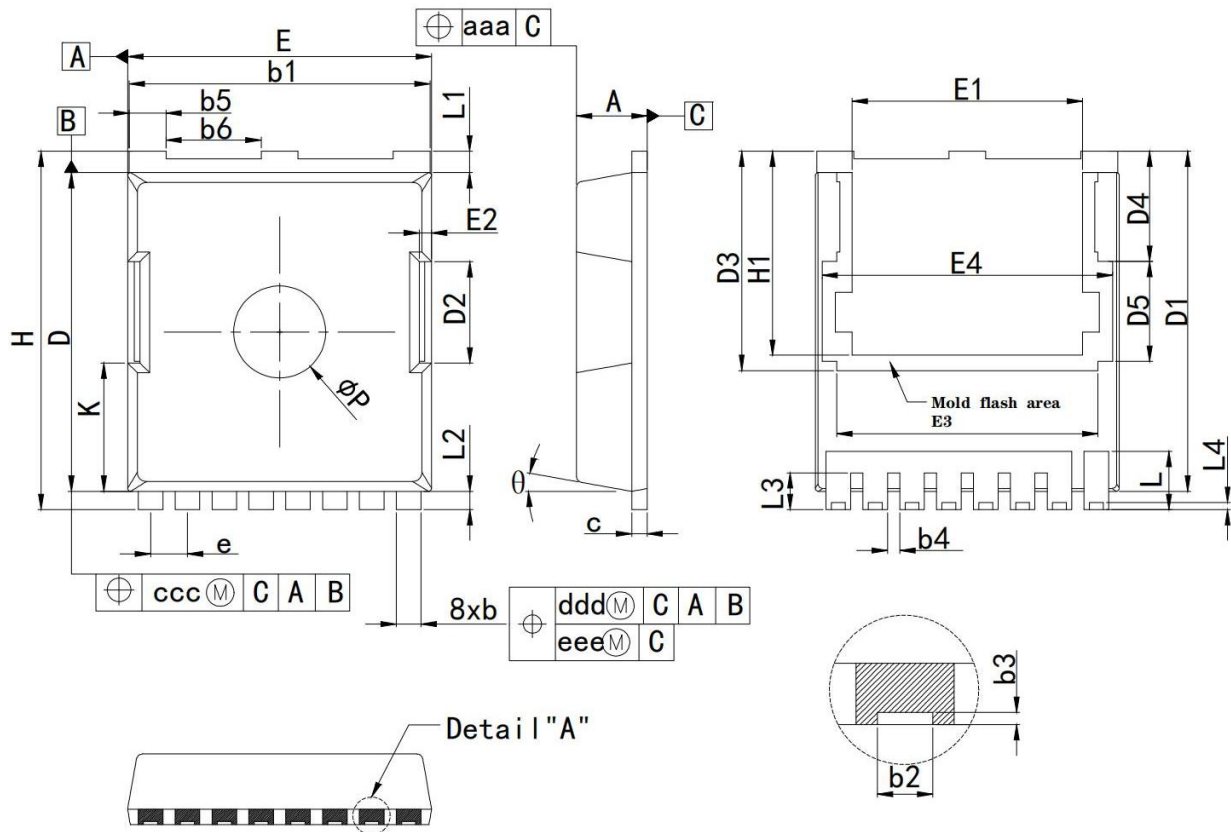


Figure 9. Normalized Maximum Transient Thermal Impedance



TOLL-8L 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	6.55	6.65	6.75
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	