

N-Channel Enhancement Mode Power MOSFET

Description

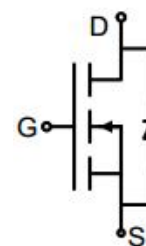
The GT020N10TL uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge. It can be used in a wide variety of applications.

General Features

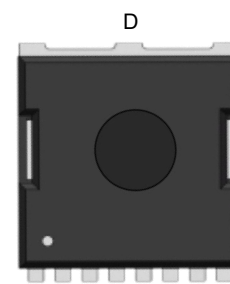
- V_{DS} 100V
- I_D (at $V_{GS} = 10V$) 300A
- $R_{DS(ON)}$ (at $V_{GS} = 10V$) < 1.9m Ω
- 100% Avalanche Tested
- RoHS Compliant
- Epoxy Meets UL 94 V-0 Flammability Rating

Application

- Power switch
- DC/DC converters



Schematic diagram

G₁ S₂ S₃ S₄ S₅ S₆ S₇ S₈

TOLL-8L

Ordering Information

Device	Package	Marking	Packaging
GT020N10TL	TOLL-8L	GT020N10	2000pcs/Reel

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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	100	V
Continuous Drain Current	$T_C = 25^\circ\text{C}$	300	A
	$T_C = 100^\circ\text{C}$	190	
Pulsed Drain Current (note1)	I_{DM}	1200	A
Gate-Source Voltage	V_{GS}	± 20	V
Power Dissipation	P_D	330	W
Single pulse avalanche energy (note2)	E_{AS}	812	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}	40	$^\circ\text{C/W}$
Thermal Resistance, Junction-to-Case	R_{thJC}	0.38	$^\circ\text{C/W}$

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	100	--	--	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 100V, 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	2.3	2.8	3.7	V
Drain-Source On-Resistance	R _{DS(on)}	V _{GS} = 10V, I _D = 100A	--	1.65	1.9	mΩ
Forward Transconductance	g _{FS}	V _{GS} = 5V, I _D = 100A	--	94	--	S
Dynamic Parameters						
Input Capacitance	C _{iss}	V _{GS} = 0V, V _{DS} = 50V, f = 0.7MHz	--	10600	--	pF
Output Capacitance	C _{oss}		--	1370	--	
Reverse Transfer Capacitance	C _{rss}		--	110	--	
Total Gate Charge	Q _g	V _{DD} = 50V, I _D = 100A, V _{GS} = 10V	--	160	--	nC
Gate-Source Charge	Q _{gs}		--	53	--	
Gate-Drain Charge	Q _{gd}		--	60	--	
Turn-on Delay Time	t _{d(on)}	V _{DD} = 50V, I _D = 100A, R _G = 6Ω	--	57	--	ns
Turn-on Rise Time	t _r		--	124	--	
Turn-off Delay Time	t _{d(off)}		--	116	--	
Turn-off Fall Time	t _f		--	47	--	
Drain-Source Body Diode Characteristics						
Continuous Body Diode Current	I _S	T _C = 25°C	--	--	300	A
Body Diode Voltage	V _{SD}	T _J = 25°C, I _{SD} = 100A, V _{GS} = 0V	--	--	1.2	V
Reverse Recovery Charge	Q _{rr}	I _F = 100A, V _{GS} = 0V di/dt=100A/us	--	139	--	nC
Reverse Recovery Time	T _{rr}		--	64	--	ns

Notes

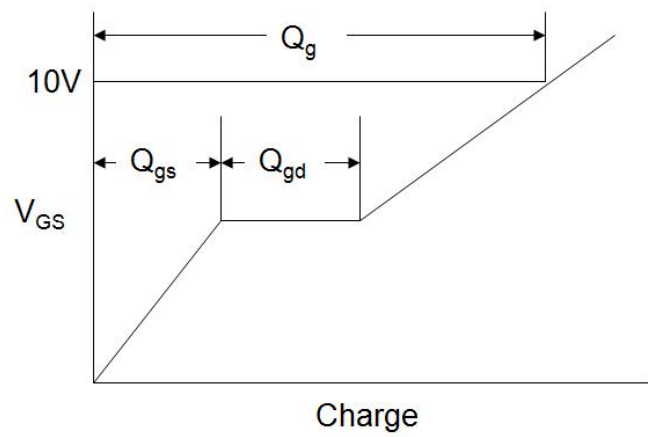
1. Repetitive Rating: Pulse width limited by maximum junction temperature

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 2256mJ when the device is tested until failure

3. Identical low side and high side switch with identical R_G

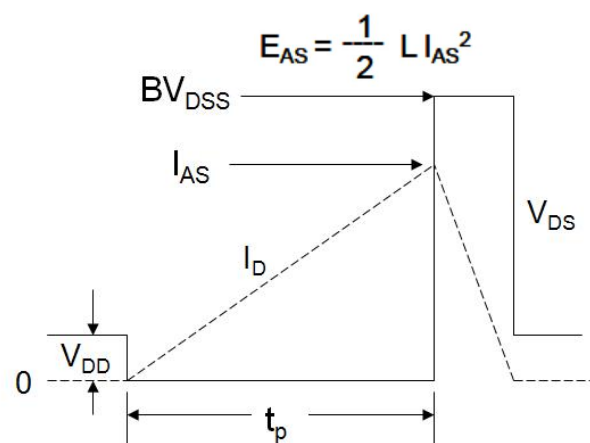
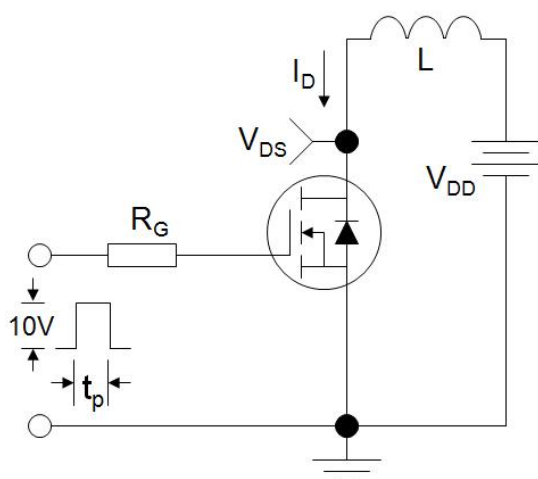
Gate Charge Test Circuit



Switch Time Test Circuit



EAS Test Circuit



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

Figure 1. Output Characteristics

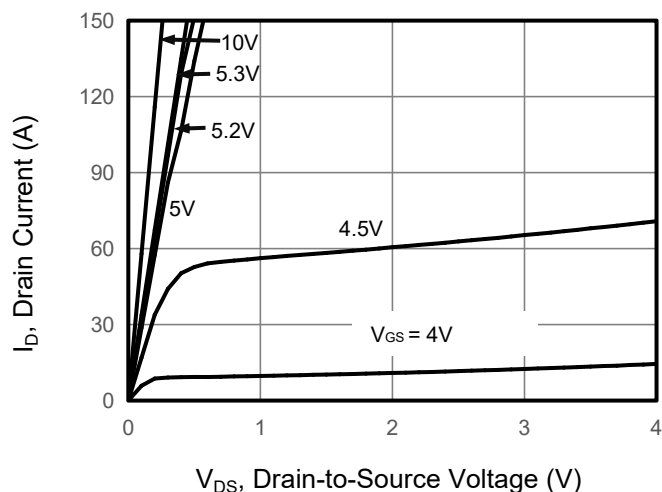


Figure 2. Transfer Characteristics

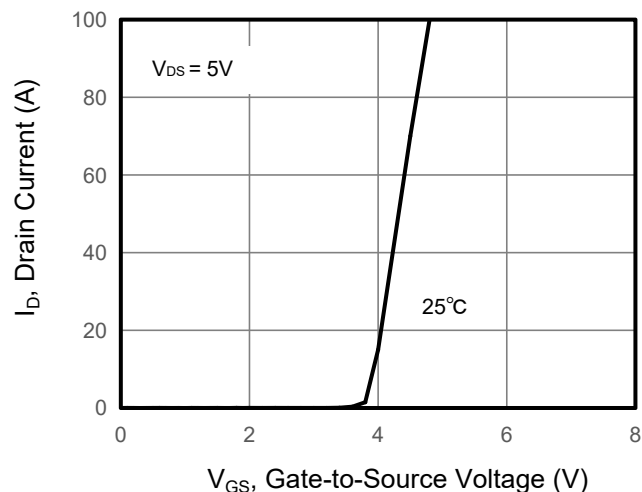


Figure 3. Drain Source On Resistance

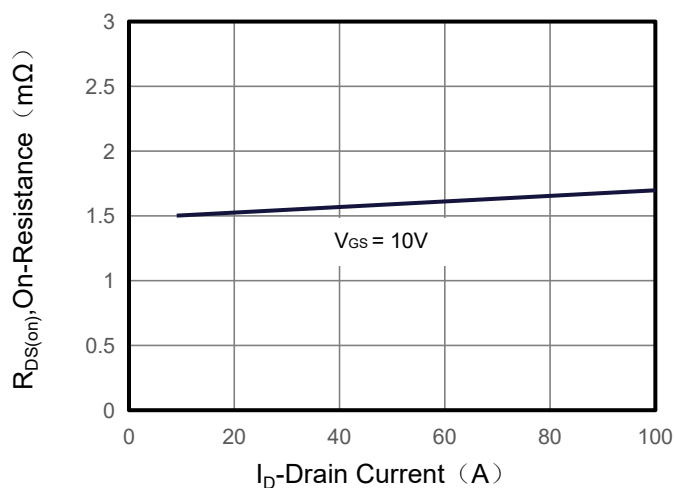


Figure 4. Gate Charge

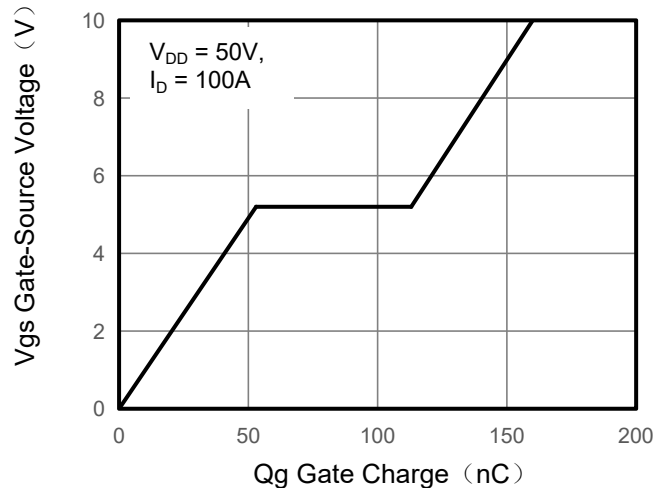


Figure 5. Capacitance

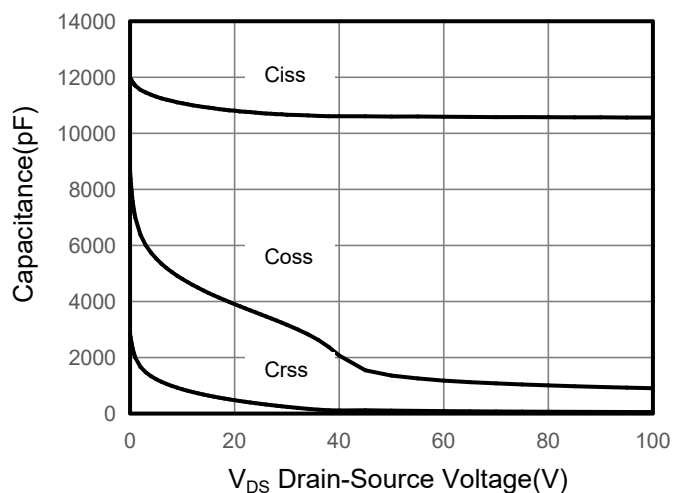
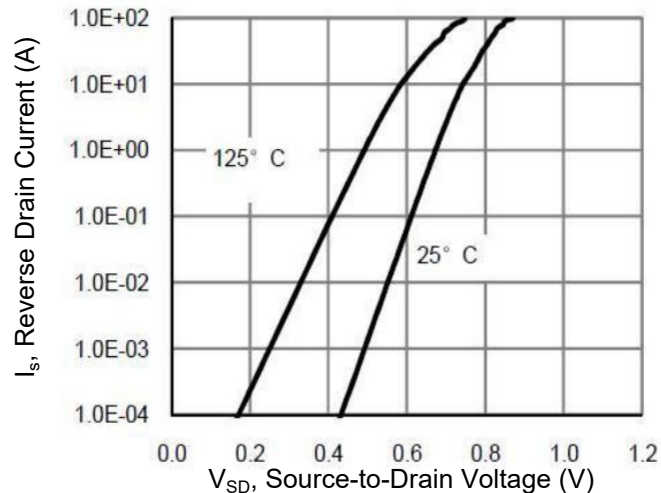


Figure 6. Source-Drain Diode Forward



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

Figure 7. Drain-Source On-Resistance

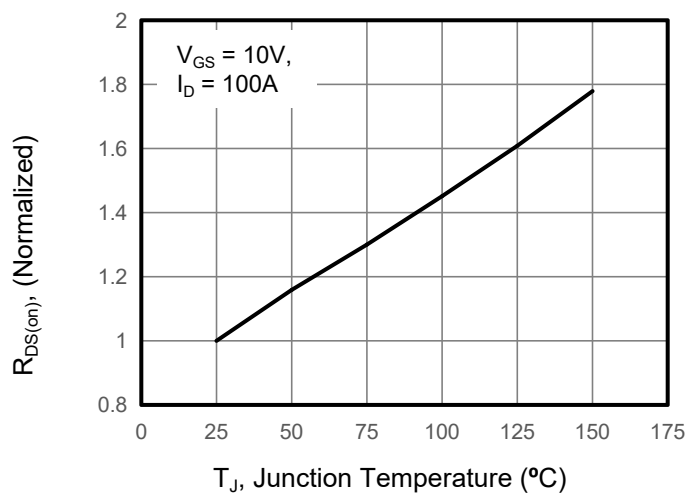


Figure 8. Safe Operation Area

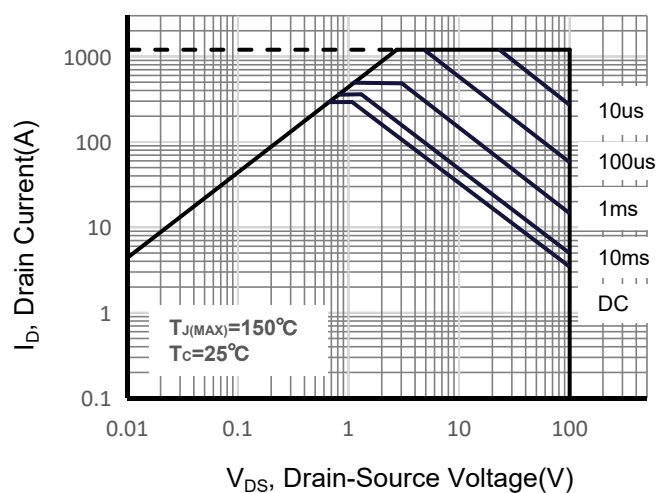


Figure 9. Maximum Continuous Drain Current vs Case Temperature

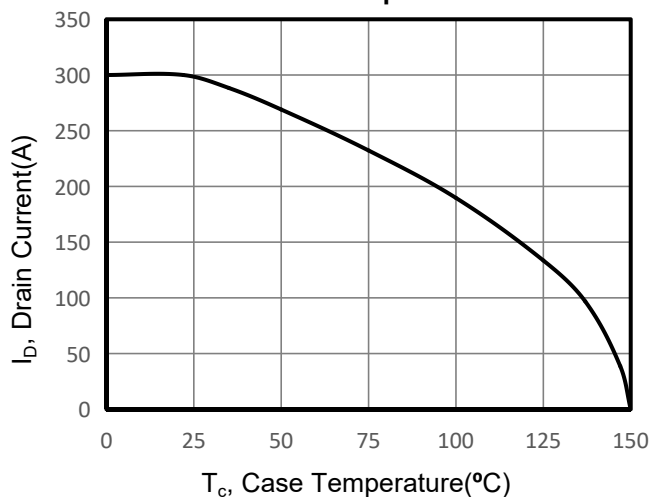
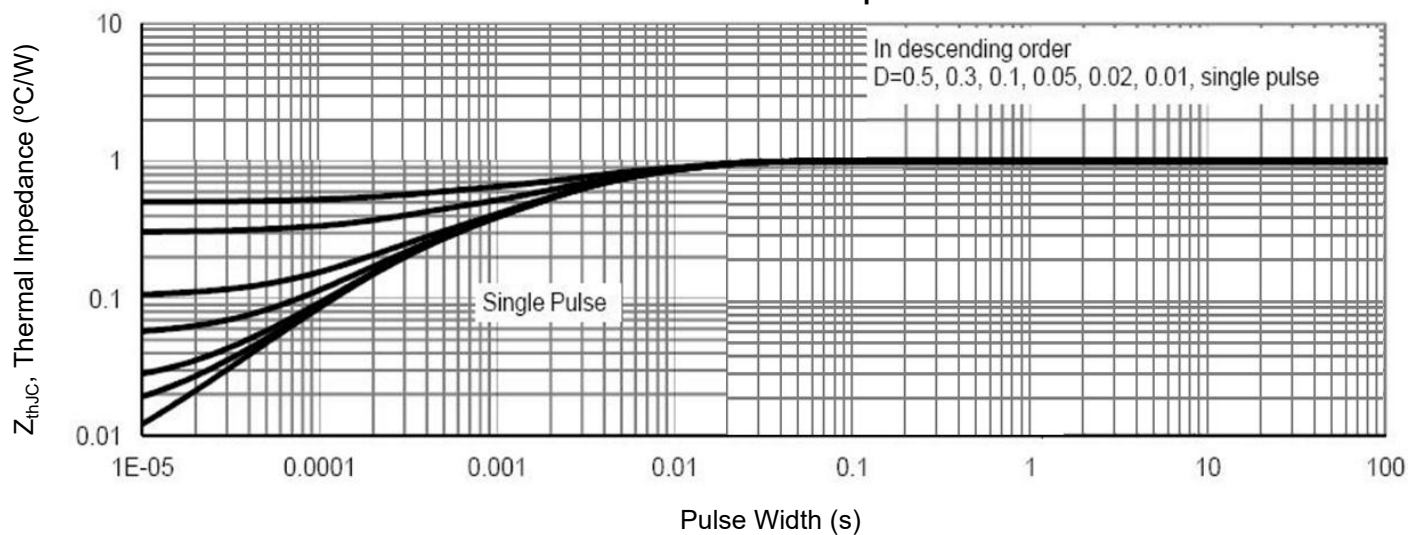
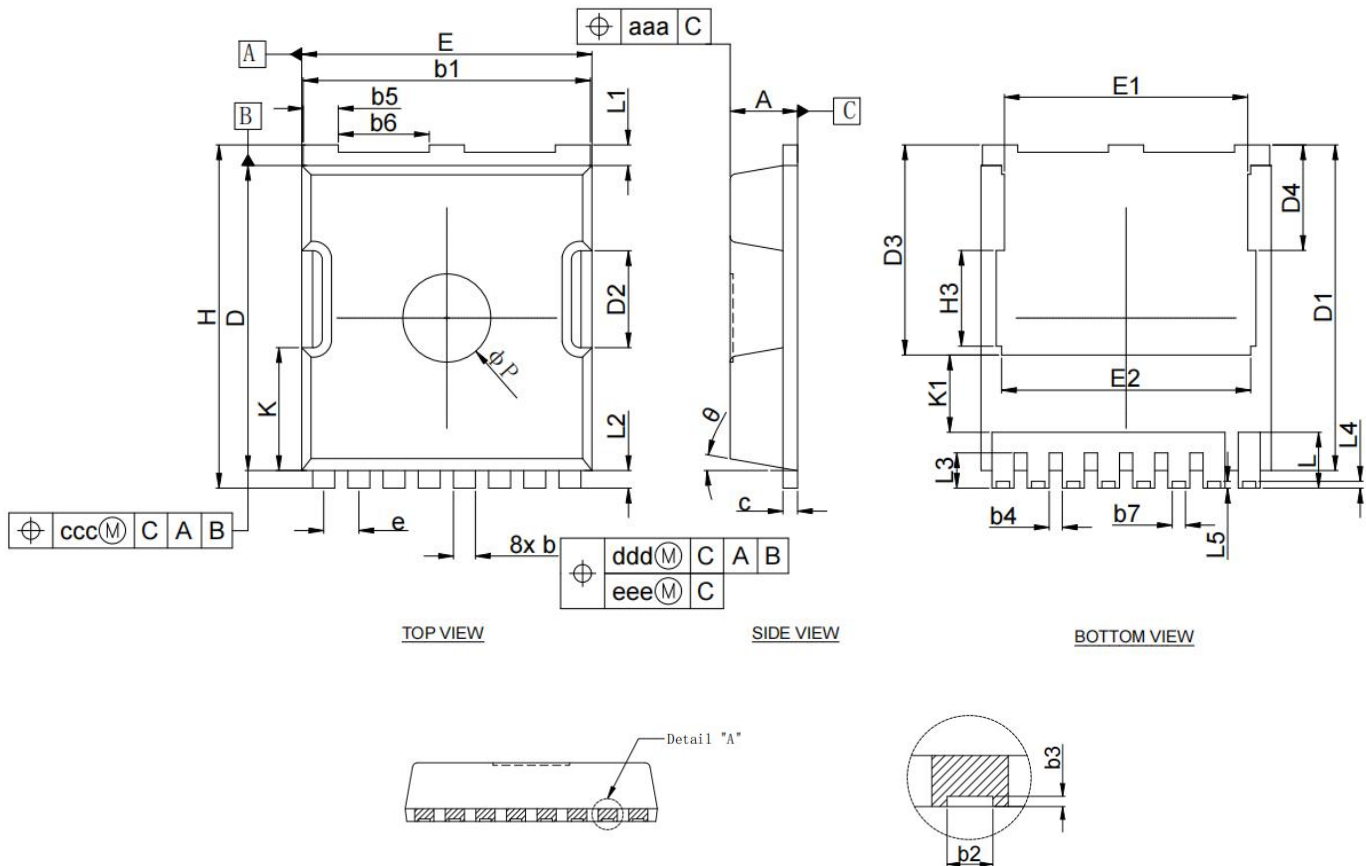


Figure 10. Normalized Maximum Transient Thermal Impedance



TOLL-8L Package Information



SYMBOL	COMMON			SYMBOL	COMMON		
	MILLIMETER				MILLIMETER		
	MIN.	NOMINAL	MAX.		MIN.	NOMINAL	MAX.
A	2.20	2.30	2.40	E2	8.35	8.50	8.65
b	0.70	0.80	0.90	H	11.50	11.68	11.85
b1	9.70	9.80	9.90	H3	3.16	3.26	3.36
b2	0.36	0.45	0.55	K	4.08	4.18	4.28
b3	0.05	0.10	0.35	K1	2.45	---	---
b4	0.30	0.40	0.50	L	1.60	1.90	2.00
b5	1.10	1.20	1.30	L1	0.50	0.70	0.90
b6	3.00	3.10	3.20	L2	0.50	0.60	0.70
b7	0.39	0.45	0.51	L3	1.00	1.20	1.30
c	0.40	0.50	0.60	L4	0.13	0.23	0.33
D	10.28	10.38	10.55	L5	0.13	0.23	0.33
D1	10.98	11.08	11.18	P	2.85	3.00	3.15
D2	3.20	3.30	3.40	θ	10° REF		
D3	7.00	7.15	7.30	aaa	0.20		
D4	3.44	3.59	3.74	ccc	0.20		
e	1.10	1.20	1.30	ddd	0.25		
E	9.80	9.90	10.00	eee	0.20		