

N-Channel Enhancement Mode Power MOSFET

Description

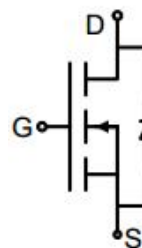
The GT043N15TL uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge. It can be used in a wide variety of applications.

General Features

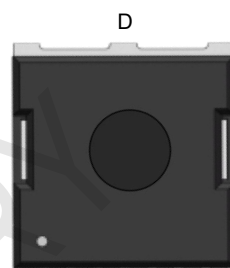
- V_{DS} 150V
- I_D (at $V_{GS} = 10V$) 202A
- $R_{DS(ON)}$ (at $V_{GS} = 10V$) < 4.3m Ω
- 100% Avalanche Tested
- RoHS Compliant

Application

- Power switch
- DC/DC converters



Schematic diagram

G₁ S₂ S₃ S₄ S₅ S₆ S₇ S₈

TOLL-8L

Ordering Information

Device	Package	Marking	Packaging
GT043N15TL	TOLL-8L	GT043N15	2000pcs/Reel

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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	150	V
Continuous Drain Current	I_D	202	A
		145	
Pulsed Drain Current (note1)	I_{DM}	808	A
Gate-Source Voltage	V_{GS}	± 20	V
Power Dissipation	P_D	306	W
Single pulse avalanche energy (note2)	E_{AS}	1367	mJ
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55 To 175	$^\circ\text{C}$

Thermal Resistance

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Ambient	R_{thJA}	62	$^\circ\text{C/W}$
Maximum Junction-to-Case	R_{thJC}	0.49	$^\circ\text{C/W}$

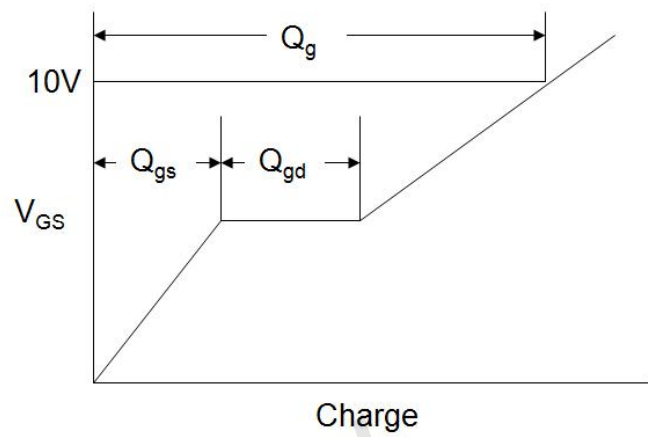
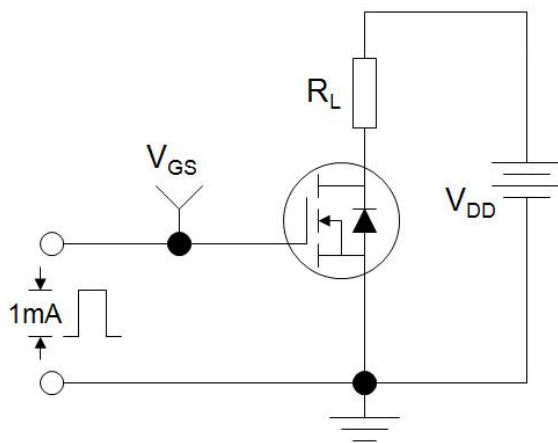
Specifications $T_J = 25^\circ\text{C}$, unless otherwise noted

Parameter	Symbol	Test Conditions	Value			Unit
			Min.	Typ.	Max.	
Static Parameters						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	150	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 150V, V_{GS} = 0V$	--	--	1	μA
Gate-Source Leakage	I_{GSS}	$V_{GS} = \pm 20V$	--	--	± 100	nA
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	2.0	3.0	4.0	V
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 90A$	--	3.8	4.3	m Ω
Forward Transconductance	g_{FS}	$V_{GS} = 5V, I_D = 90A$	--	135.9	--	S
Dynamic Parameters						
Input Capacitance	C_{iss}	$V_{GS} = 0V,$ $V_{DS} = 75V,$ $f = 0.5MHz$	--	5007	--	pF
Output Capacitance	C_{oss}		--	539	--	
Reverse Transfer Capacitance	C_{rss}		--	12	--	
Total Gate Charge	Q_g	$V_{DD} = 75V,$ $I_D = 90A,$ $V_{GS} = 10V$	--	75.3	--	nC
Gate-Source Charge	Q_{gs}		--	29.6	--	
Gate-Drain Charge	Q_{gd}		--	16.8	--	
Turn-on Delay Time	$t_{d(on)}$	$V_{DD} = 75V,$ $I_D = 90A,$ $R_G = 2.7\Omega$	--	22.3	--	ns
Turn-on Rise Time	t_r		--	60.2	--	
Turn-off Delay Time	$t_{d(off)}$		--	58.6	--	
Turn-off Fall Time	t_f		--	28.1	--	
Drain-Source Body Diode Characteristics						
Continuous Body Diode Current	I_S	$T_C = 25^\circ C$	--	--	202	A
Body Diode Voltage	V_{SD}	$T_J = 25^\circ C, I_{SD} = 90A, V_{GS} = 0V$	--	--	1.4	V
Reverse Recovery Charge	Q_{rr}	$I_F = 90A, V_{GS} = 0V$ $di/dt = 100A/us$	--	323.3	--	nC
Reverse Recovery Time	T_{rr}		--	99.6	--	ns

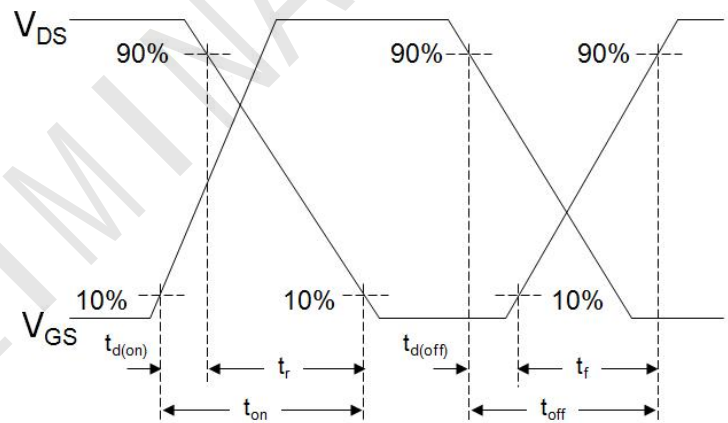
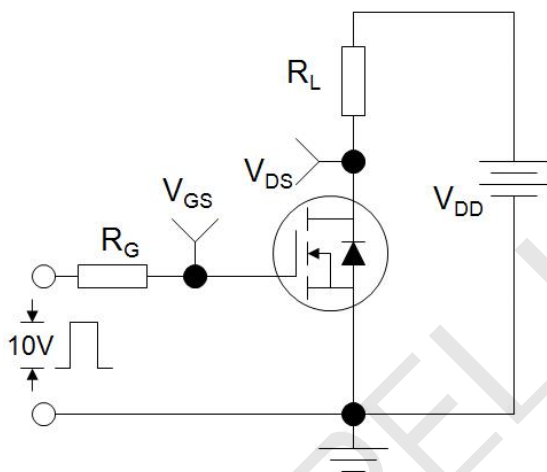
Notes

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. EAS condition : $T_J = 25^\circ\text{C}$, $V_{DD} = 50V$, $V_{GS} = 10V$, $L = 0.5mH$, $R_G = 25\Omega$
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

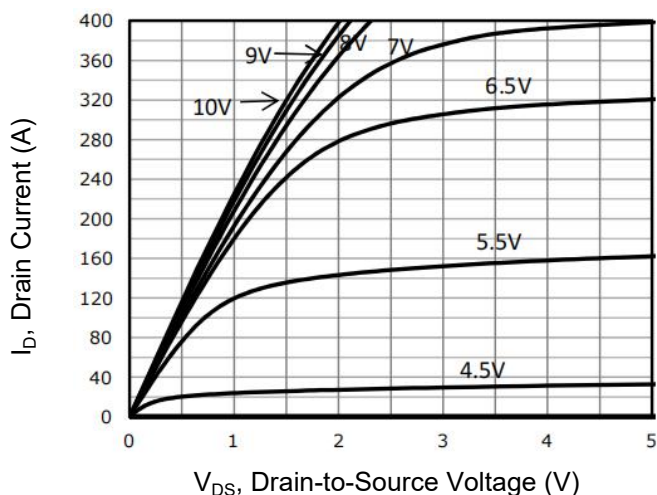


Figure 2. Transfer Characteristics

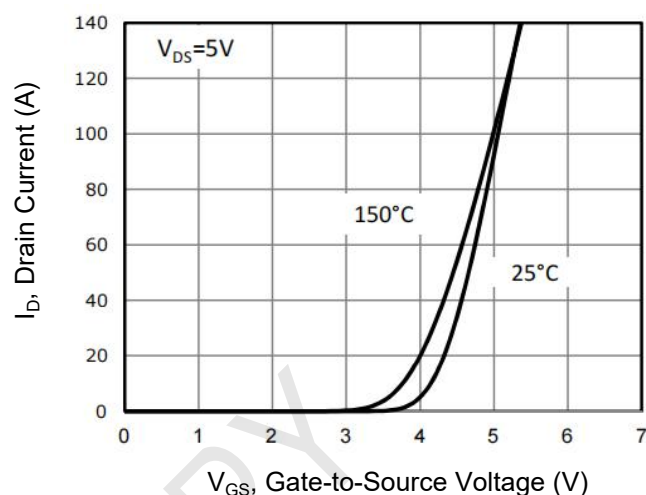


Figure 3. Drain Source On Resistance

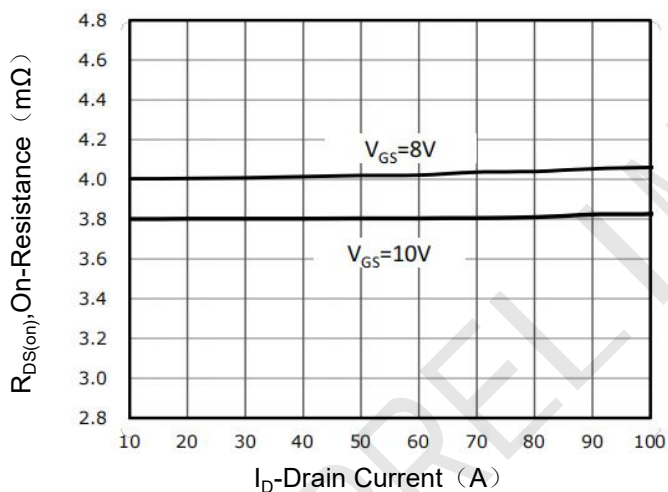


Figure 4. Gate Charge

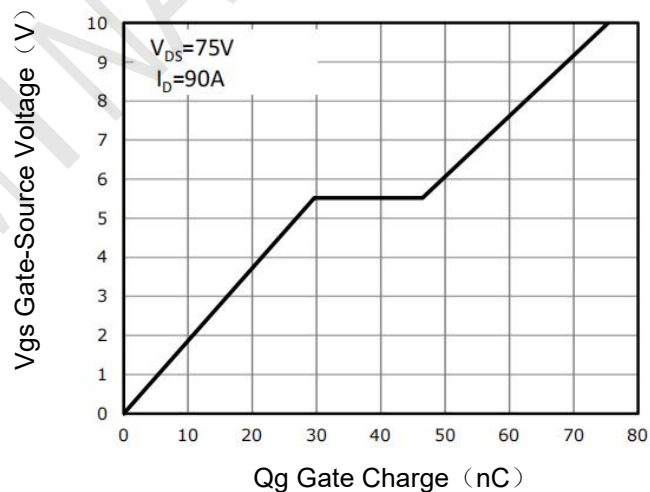


Figure 5. Capacitance

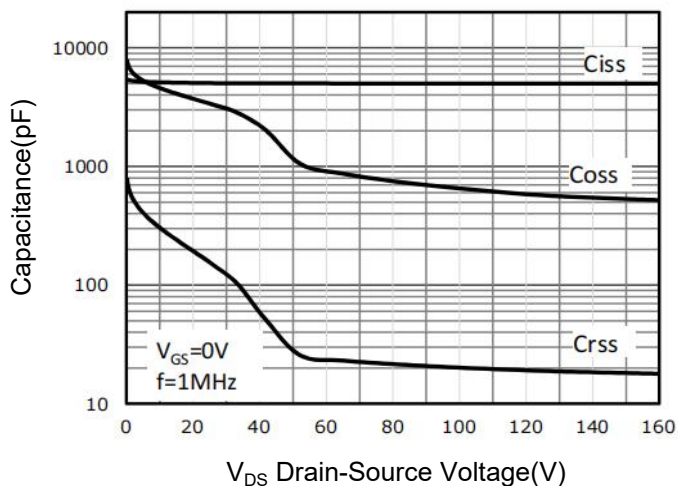
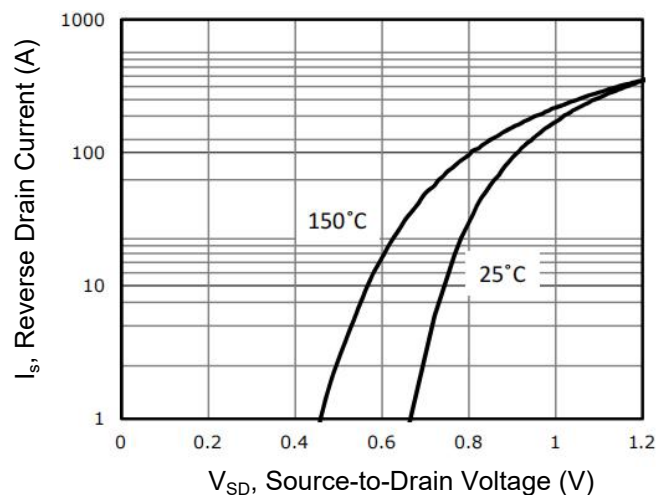


Figure 6. Source-Drain Diode Forward



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

Figure 7. Drain-Source On-Resistance

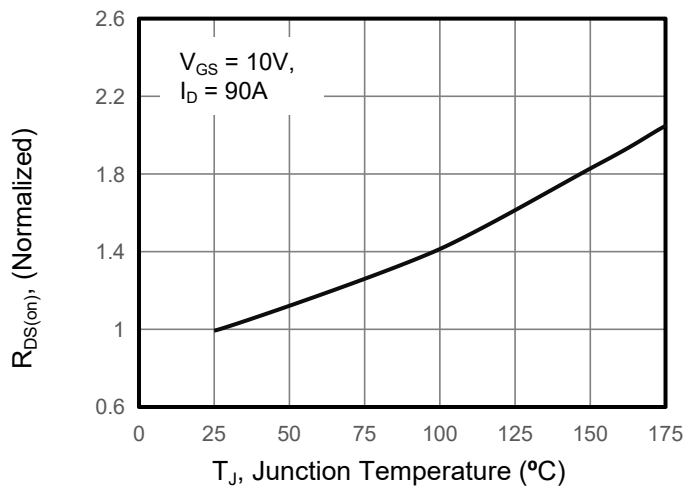


Figure 8. Safe Operation Area

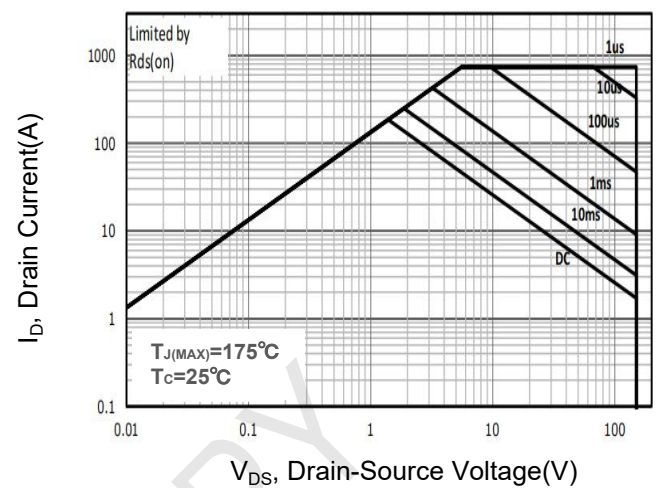


Figure 9. Maximum Continuous Drain Current vs Case Temperature

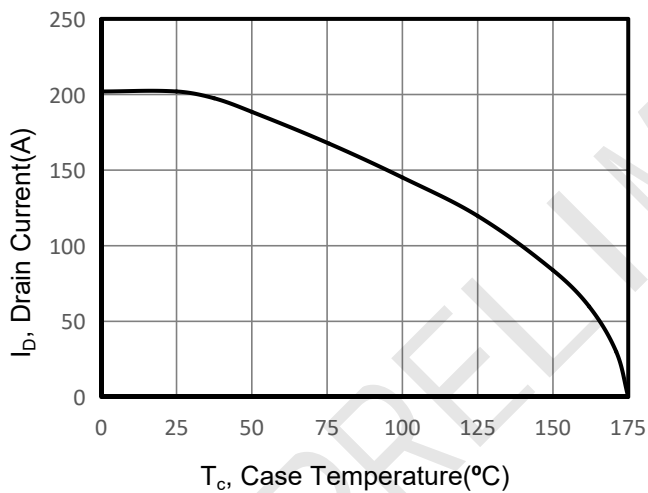
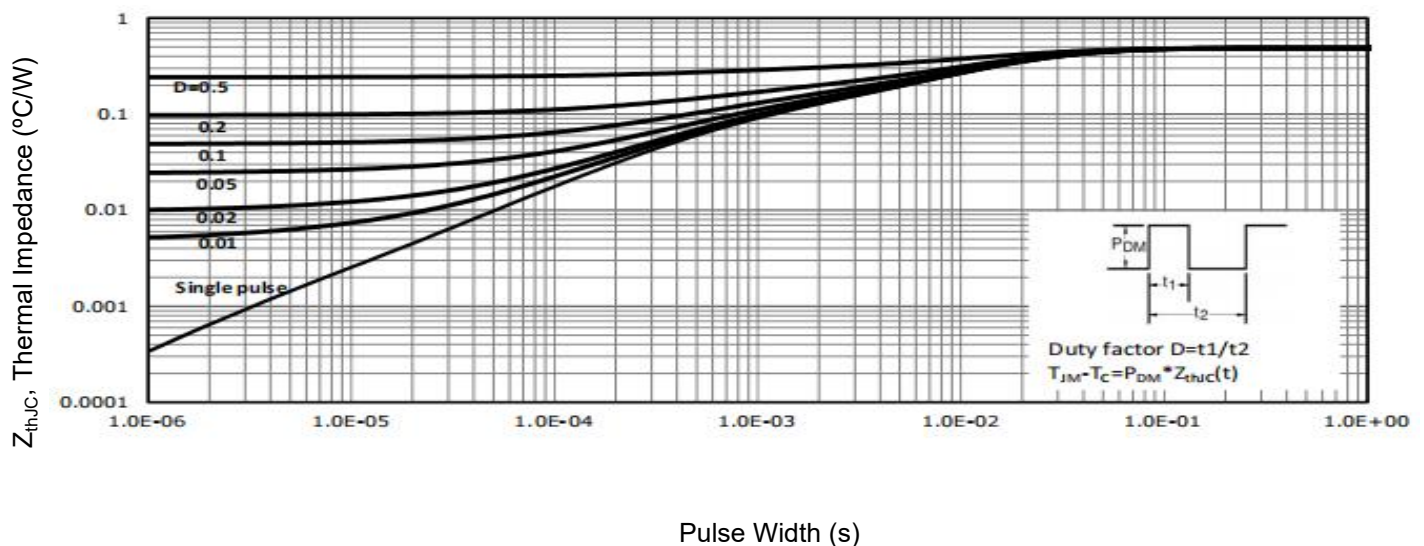
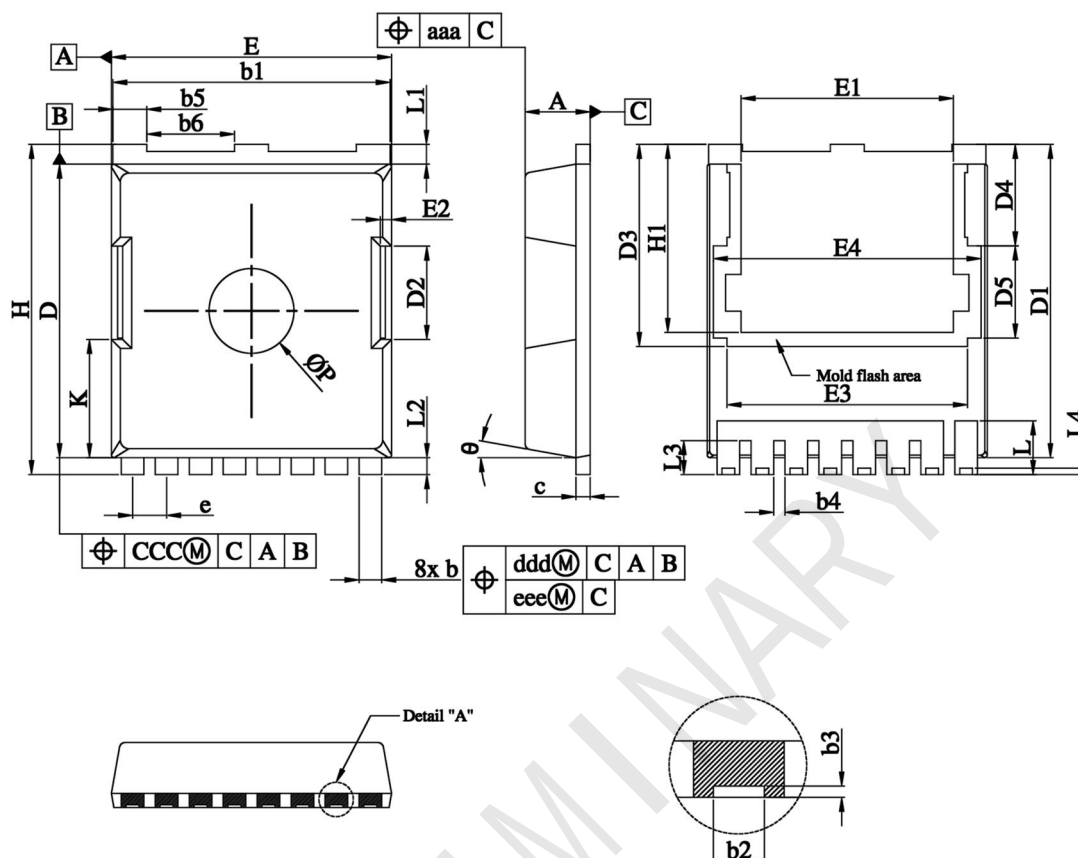


Figure 10. Normalized Maximum Transient Thermal Impedance



TOLL-8L Package Information



SYMBOL	COMMON			SYMBOL	COMMON		
	MILLIMETER				MILLIMETER		
	MIN.	NOMINAL	MAX.		MIN.	NOMINAL	MAX.
A	2.20	2.30	2.40	E2	0.30	0.40	0.50
b	0.70	0.80	0.90	E3	8.50		
b1	9.70	9.80	9.90	E4	9.46		
b2	0.36	0.45	0.55	H	11.50	11.68	11.85
b3	0.05	0.100	/	H1	6.55	6.65	6.75
b4	0.30	0.40	0.50	K	4.08	4.18	4.28
b5	1.10	1.20	1.30	L	1.60	1.90	2.10
b6	3.00	3.10	3.20	L1	0.50	0.70	0.90
c	0.40	0.50	0.60	L2	0.50	0.60	0.70
D	10.28	10.38	10.55	L3	1.00	1.20	1.30
D1	10.98	11.08	11.18	L4	0.13	0.23	0.33
D2	3.20	3.30	3.40	P	2.85	3.00	3.15
D3	7.15			θ	10° REF		
D4	3.59			aaa	0.20		
D5	3.26			ccc	0.20		
e	1.10	1.20	1.30	ddd	0.25		
E	9.80	9.90	10.00	eee	0.20		
E1	7.40	7.50	7.60				