N-Channel 120 V (D-S) MOSFET

PRODUCT SUMMARY			
V_{DS} (V)	$R_{DS(on)}$ (Ω) MAX.	I_D (A)	Q_g (TYP.)
120	0.0075 at V_{GS} = 10 V	110	63 nC

FEATURES

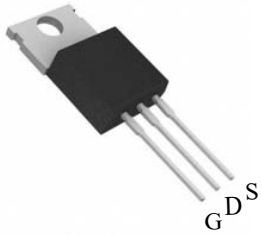
- DT-TrenchPower MOSFET
- Maximum 175 °C junction temperature
- 100 % R_g and UIS tested

RoHS COMPLIANT

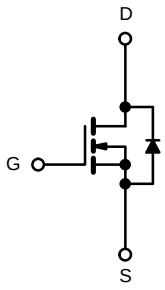
APPLICATIONS

- Power supplies:
  - Uninterruptible power supplies
  - AC/DC switch-mode power supplies
  - Lighting
- Synchronous rectification
- DC/DC converter
- Motor drive switch
- DC/AC inverter
- Solar micro inverter
- Class D audio amplifier
- Battery management

TO-220 Pin Configuration



Top View



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS (T_C = 25 °C, unless otherwise noted)				
PARAMETER		SYMBOL	LIMIT	UNIT
Drain-Source Voltage		V_{DS}	120	V
Gate-Source Voltage		V_{GS}	± 20	
Continuous Drain Current (T_J = 150 °C)	T_C = 25 °C	I_D	110	A
	T_C = 125 °C		75	
Pulsed Drain Current (t = 100 µs)		I_{DM}	440	
Avalanche Current	L = 0.1 mH	I_{AS}	100	
Single Avalanche Energy [a]		E_{AS}	205	mJ
Maximum Power Dissipation [a]	T_C = 25 °C	P_D	385 [b]	W
	T_C = 125 °C		156 [b]	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	-55 to +175	°C

THERMAL RESISTANCE RATINGS			
PARAMETER	SYMBOL	LIMIT	UNIT
Junction-to-Ambient (PCB Mount) [c]	R_{thJA}	40	°C/W
Junction-to-Case (Drain)	R_{thJC}	0.4	

Notes

a. Duty cycle ≤ 1 %.

b. See SOA curve for voltage derating.

c. When mounted on 1" square PCB (FR4 material).

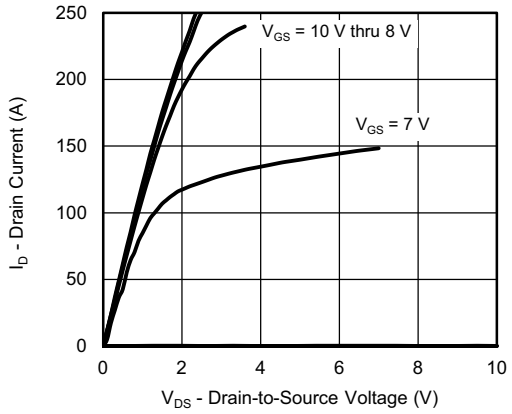
SPECIFICATIONS (T_J = 25 °C, unless otherwise noted)						
PARAMETER	**SYMBOL**	**TEST CONDITIONS**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Static						
Drain-Source Breakdown Voltage	V_{DS}	V_{GS} = 0 V, I_D = 250 µA	120	-	-	V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250 µA	2	-	5	
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ± 20 V	-	-	± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 120 V, V_{GS} = 0 V	-	-	1	µA
		V_{DS} = 120 V, V_{GS} = 0 V, T_J = 125 °C	-	-	100	
		V_{DS} = 120 V, V_{GS} = 0 V, T_J = 175 °C	-	-	2	mA
On-State Drain Current [a]	$I_{D(on)}$	V_{DS} ≥ 10 V, V_{GS} = 10 V	110	-	-	A
Drain-Source On-State Resistance [a]	$R_{DS(on)}$	V_{GS} = 10 V, I_D = 20 A	-	0.0075	0.0090	Ω
Forward Transconductance [a]	g_{fs}	V_{DS} = 15 V, I_D = 10 A	-	52	-	S
Dynamic [b]						
Input Capacitance	C_{iss}	V_{GS} = 0 V, V_{DS} = 75 V, f = 1 MHz	-	5607	-	pF
Output Capacitance	C_{oss}		-	1235	-	
Reverse Transfer Capacitance	C_{rss}		-	76	-	
Total Gate Charge [c]	Q_g	V_{DS} = 75 V, V_{GS} = 10 V, I_D = 10 A	-	63	95	nC
Gate-Source Charge [c]	Q_{gs}		-	18	-	
Gate-Drain Charge [c]	Q_{gd}		-	25	-	
Gate Resistance	R_g	f = 1 MHz	1.5	3	5	Ω
Turn-On Delay Time [c]	$t_{d(on)}$	V_{DD} = 75 V, R_L = 1.25 Ω I_D ≅ 30 A, V_{GEN} = 10 V, R_g = 1 Ω	-	15	-	ns
Rise Time [c]	t_r		-	114	-	
Turn-Off Delay Time [c]	$t_{d(off)}$		-	28	-	
Fall Time [c]	t_f		-	8	-	
Drain-Source Body Diode Ratings and Characteristics [b] (T_C = 25 °C)						
Pulsed Current (t = 100 µs)	I_{SM}		-	-	440	A
Forward Voltage [a]	V_{SD}	I_F = 10 A, V_{GS} = 0 V	-	0.75	1.2	V
Reverse Recovery Time	t_{rr}	I_F = 10 A, di/dt = 100 A/µs	-	105		ns
Peak Reverse Recovery Charge	$I_{RM(REC)}$		-	10		A
Reverse Recovery Charge	Q_{rr}		-	0.5		µC

Notes

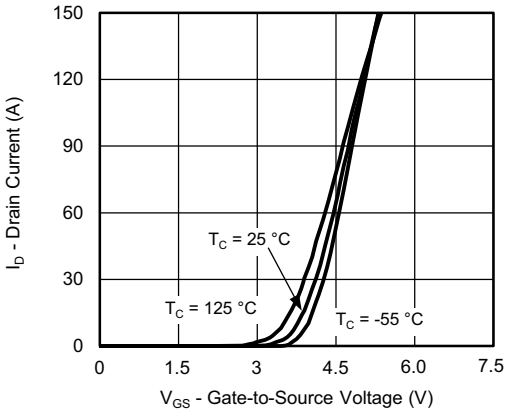
a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2 %.
b. Guaranteed by design, not subject to production testing.
c. Independent of operating temperature.

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

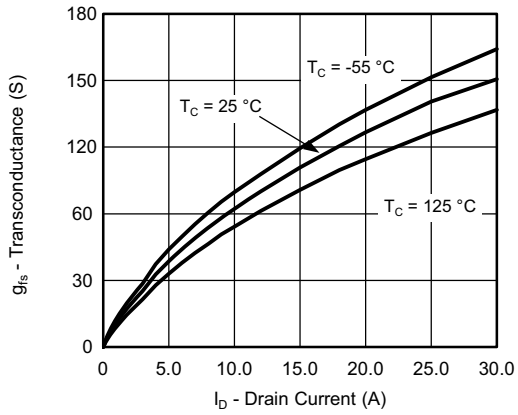
TYPICAL CHARACTERISTICS (T_A = 25 °C, unless otherwise noted)



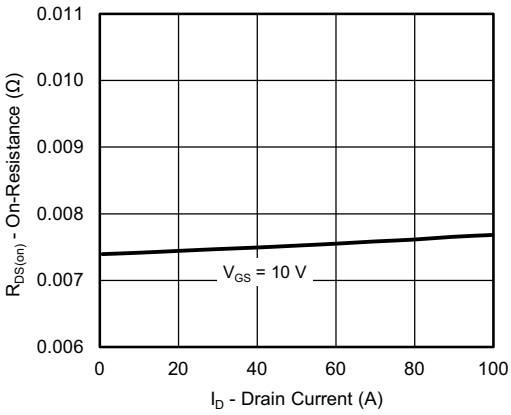
Output Characteristics



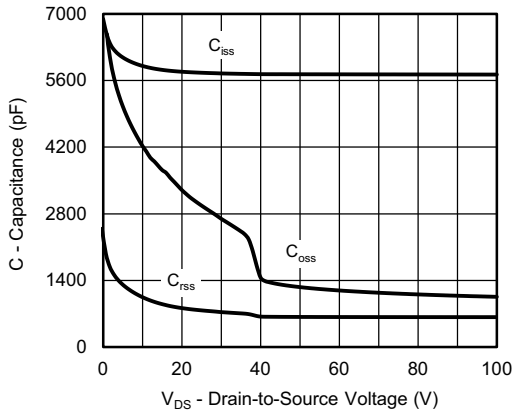
Transfer Characteristics



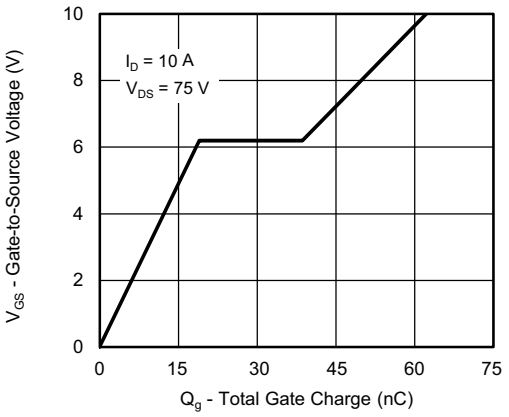
Transconductance



On-Resistance vs. Drain Current

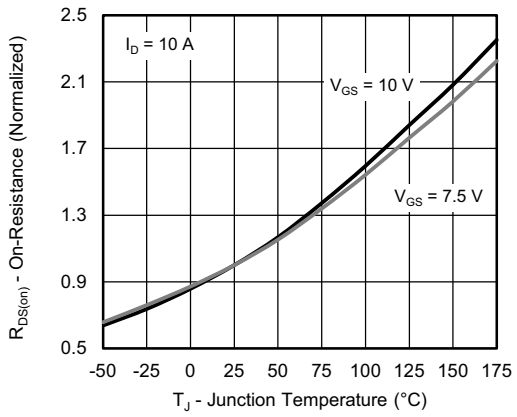


Capacitance

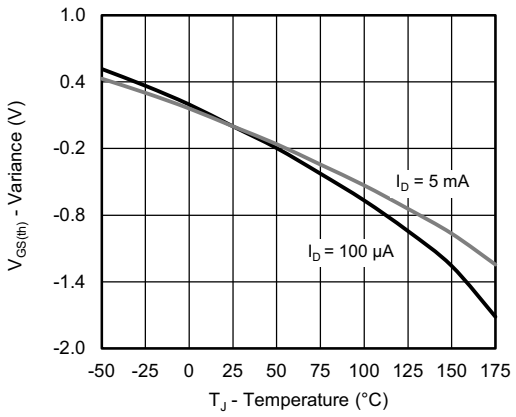


Gate Charge

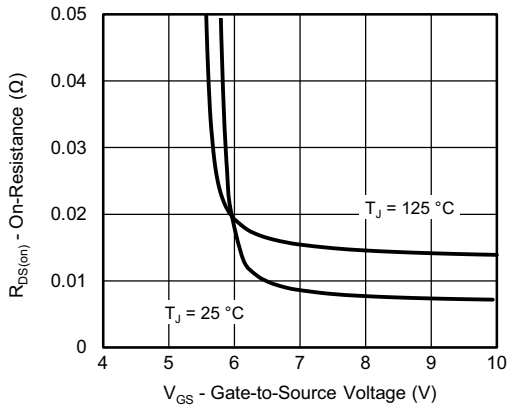
TYPICAL CHARACTERISTICS (T_A = 25 °C, unless otherwise noted)



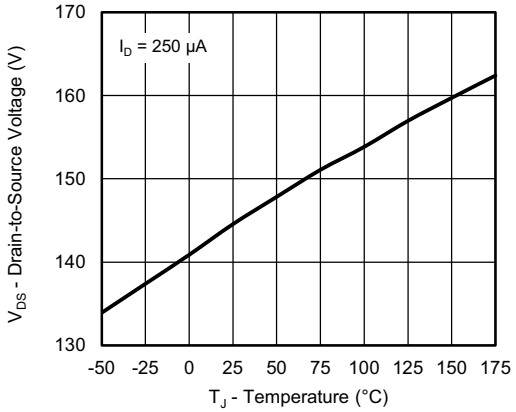
On-Resistance vs. Junction Temperature



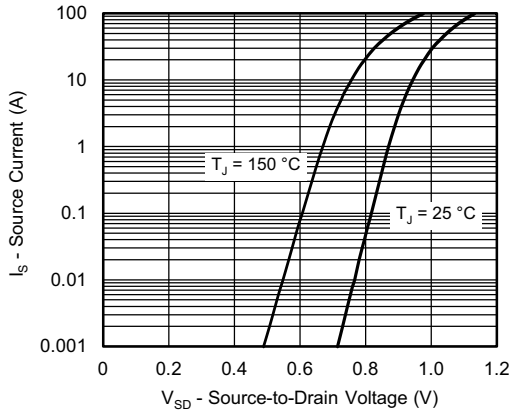
Threshold Voltage



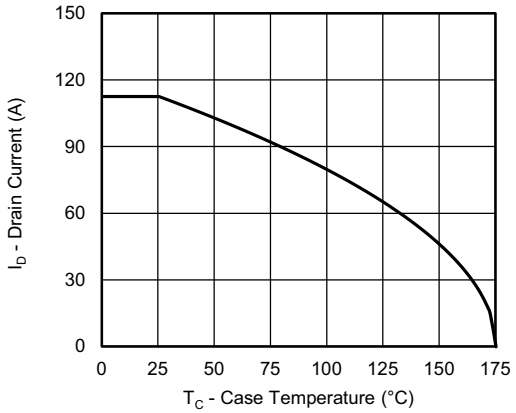
On-Resistance vs. Gate-to-Source Voltage



Drain Source Breakdown vs. Junction Temperature

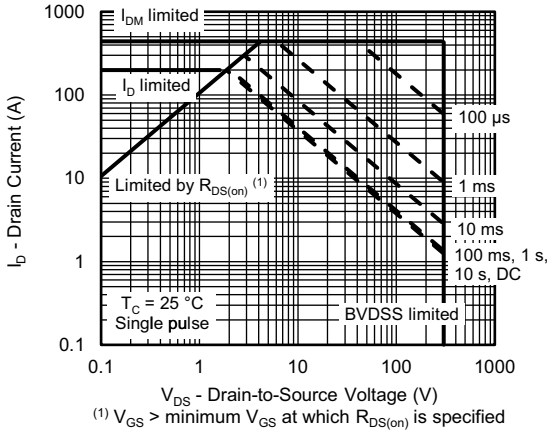


Source Drain Diode Forward Voltage

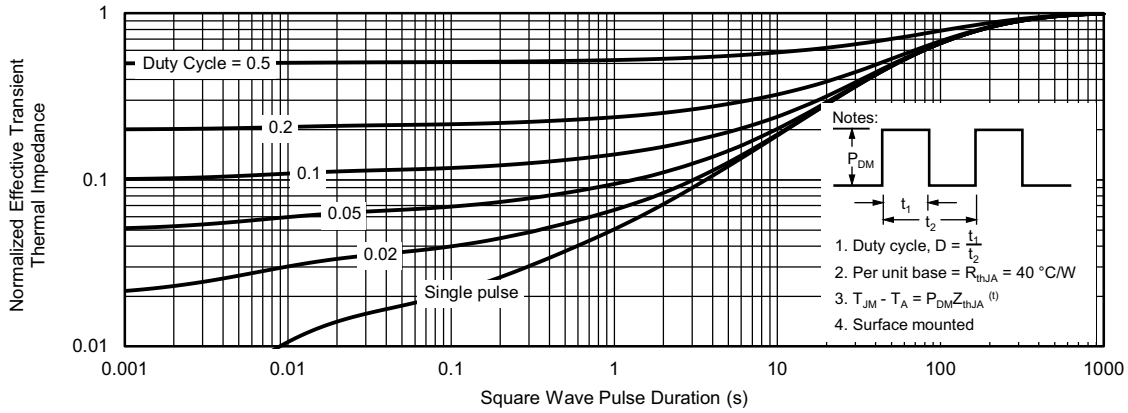


Current De-Rating

THERMAL RATINGS (T_A = 25 °C, unless otherwise noted)

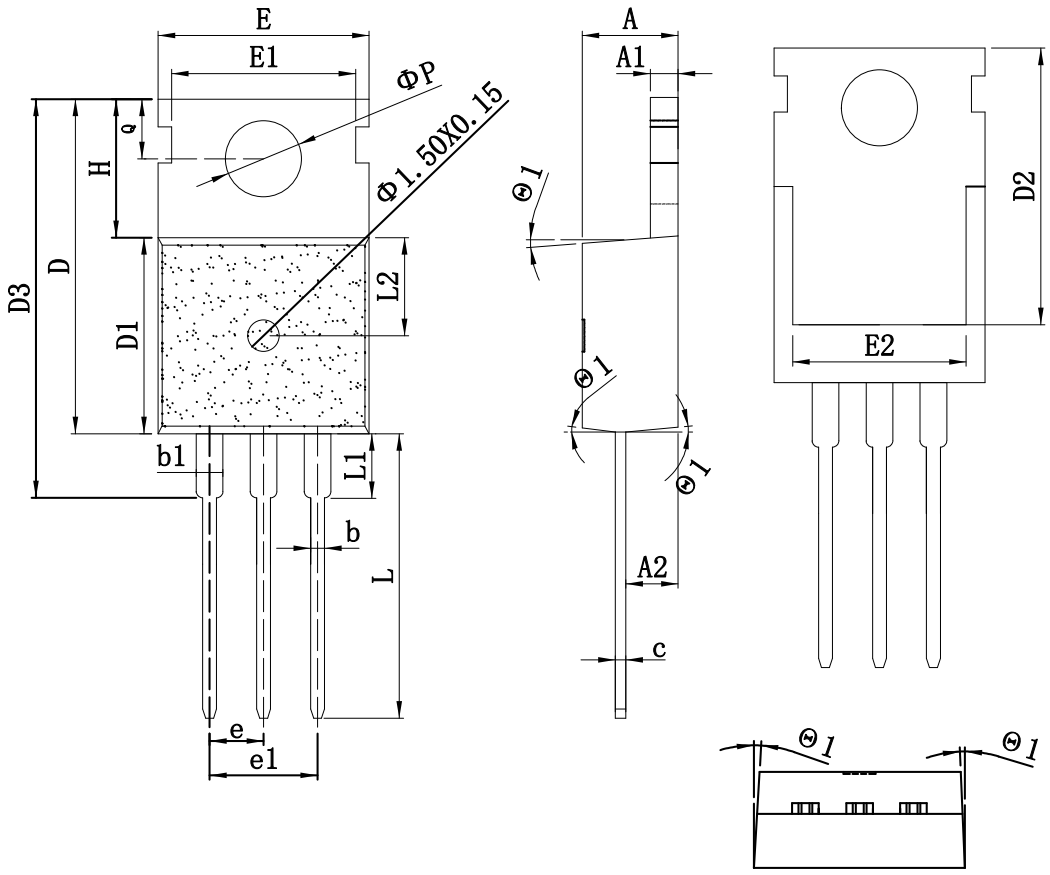


Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Ambient

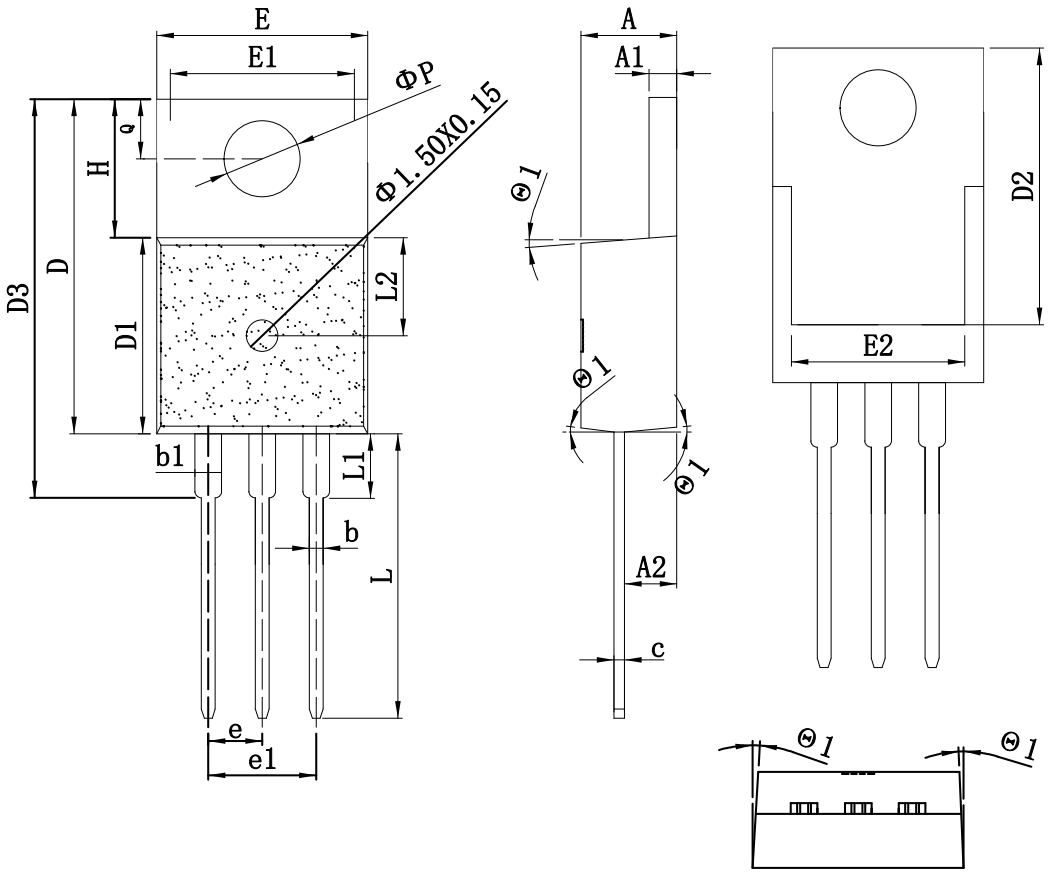
TO-220_3L-A PACKAGE OUTLINE



COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

SYMBOL	mm			SYMBOL	mm		
	MIN	TYP	MAX		MIN	TYP	MAX
A	4.15	4.50	4.80	E1	8.25	8.70	9.15
A1	1.15	1.30	1.50	E2	7.20	8.00	8.80
A2	2.10	2.40	2.65	e	2.38	2.54	2.74
b	0.65	0.80	1.00	e1	5.08REF		
b1	1.10	1.33	1.80	H	6.20	6.50	6.90
c	0.35	0.50	0.65	L	12.75	13.28	13.70
D	14.25	15.75	16.15	L1	-	-	3.50
D1	8.70	9.20	9.60	L2	2.30	4.65	7.00
D2	12.30	13.10	13.85	ϕP	3.40	3.65	3.85
D3	16.20	18.80	20.60	Q	2.50	2.80	3.00
E	8.68	10.02	11.00	θ	2°	-	7°

TO-220_3L-B PACKAGE OUTLINE



COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

SYMBOL	mm			SYMBOL	mm		
	MIN	TYP	MAX		MIN	TYP	MAX
A	4.15	4.50	4.80	E1	8.25	8.70	9.15
A1	1.15	1.30	1.50	E2	7.20	8.00	8.80
A2	2.10	2.40	2.65	e	2.38	2.54	2.74
b	0.65	0.80	1.00	e1	5.08REF		
b1	1.10	1.33	1.80	H	6.20	6.50	6.90
c	0.35	0.50	0.65	L	12.75	13.28	13.70
D	14.25	15.75	16.15	L1	-	-	3.50
D1	8.70	9.20	9.60	L2	2.30	4.65	7.00
D2	12.30	13.10	13.85	ϕP	3.40	3.65	3.85
D3	16.20	18.80	20.60	Q	2.50	2.80	3.00
E	8.68	10.02	11.00	θ	2°	-	7°

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