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Fast Switching Emitter Controlled Diode

Product Summary

V_{RRM}	600	V
I_F	15	A
V_F	1.5	V
T_{jmax}	175	°C

Features

- 600V Emitter Controlled technology
- Fast recovery
- Soft switching
- Low reverse recovery charge
- Low forward voltage
- Easy paralleling
- Pb-free lead plating; RoHS compliant
- Halogen-free according to IEC61249-2-21
- Qualified according to JEDEC for target applications

Type	Package	Ordering Code	Marking	Pin 1	PIN 2	PIN 3
IDP15E60	PG-TO220-2	-	D15E60	C	A	-

Maximum Ratings, at T_j = 25 °C, unless otherwise specified

Parameter	Symbol	Value	Unit
Repetitive peak reverse voltage	V_{RRM}	600	V
Continuous forward current T_C = 25°C T_C = 90°C	I_F	 29.2 19.6	A
Surge non repetitive forward current T_C = 25°C, t_p = 10 ms, sine halfwave	I_{FSM}	60	A
Maximum repetitive forward current T_C = 25°C, t_p limited by $t_{j,max}$, D = 0.5	I_{FRM}	45	A
Power dissipation T_C = 25°C T_C = 90°C	P_{tot}	 83.3 47.2	W
Operating junction temperature	T_j	-40…+175	°C
Storage temperature	T_{stg}	-55...+150	
Soldering temperature 1.6mm (0.063 in.) from case for 10 s	T_S	260	

Thermal Characteristics

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Characteristics					
Thermal resistance, junction - case	R_{thJC}	-	-	1.8	K/W
Thermal resistance, junction - ambient, leaded	R_{thJA}	-	-	62	
SMD version, device on PCB:	R_{thJA}				
@ min. footprint		-	-	62	
@ 6 cm^2 cooling area [1)]		-	35	-	

Electrical Characteristics, at T_j = 25 °C, unless otherwise specified

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Static Characteristics					
Reverse leakage current	I_R				µA
V_R=600V, T_j=25°C		-	-	50	
V_R=600V, T_j=150°C		-	-	1250	
Forward voltage drop	V_F				V
I_F=15A, T_j=25°C		-	1.5	2	
I_F=15A, T_j=150°C		-	1.5	-	

[0] J-STD20 and JESD22

[1] Device on 40mm*40mm*1.5mm epoxy PCB FR4 with 6cm² (one layer, 70 µm thick) copper area for drain connection. PCB is vertical without blown air.

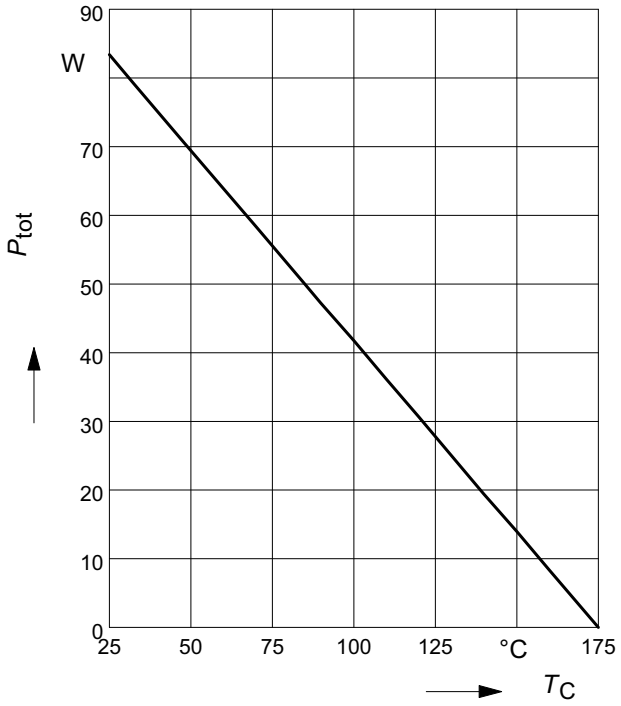
Electrical Characteristics, at T_j = 25 °C, unless otherwise specified

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Dynamic Characteristics					
Reverse recovery time	t_{rr}				ns
V_R=400V, I_F=15A, di_F/dt=1000A/µs, T_j=25°C		-	87	-	
V_R=400V, I_F=15A, di_F/dt=1000A/µs, T_j=125°C		-	124	-	
V_R=400V, I_F=15A, di_F/dt=1000A/µs, T_j=150°C		-	131	-	
Peak reverse current	I_{rrm}				A
V_R=400V, I_F = 15A, di_F/dt=1000A/µs, T_j=25°C		-	13.7	-	
V_R=400V, I_F =15A, di_F/dt=1000A/µs, T_j=125°C		-	16.4	-	
V_R=400V, I_F =15A, di_F/dt=1000A/µs, T_j=150°C		-	19.3	-	
Reverse recovery charge	Q_{rr}				nC
V_R=400V, I_F=15A, di_F/dt=1000A/µs, T_j=25°C		-	595	-	
V_R=400V, I_F =15A, di_F/dt=1000A/µs, T_j=125°C		-	995	-	
V_R=400V, I_F =15A, di_F/dt=1000A/µs, T_j=150°C		-	1104	-	
Reverse recovery softness factor	S				
V_R=400V, I_F=15A, di_F/dt=1000A/µs, T_j=25°C		-	3.6	-	
V_R=400V, I_F=15A, di_F/dt=1000A/µs, T_j=125°C		-	4.3	-	
V_R=400V, I_F=15A, di_F/dt=1000A/µs, T_j=150°C		-	4.5	-	

1 Power dissipation

$P_{tot} = f(T_C)$

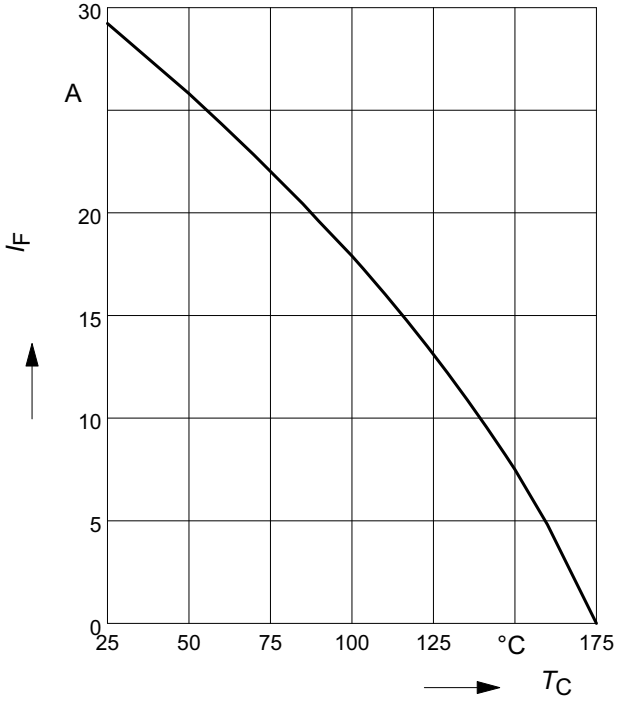
parameter: $T_j \leq 175$ °C



2 Diode forward current

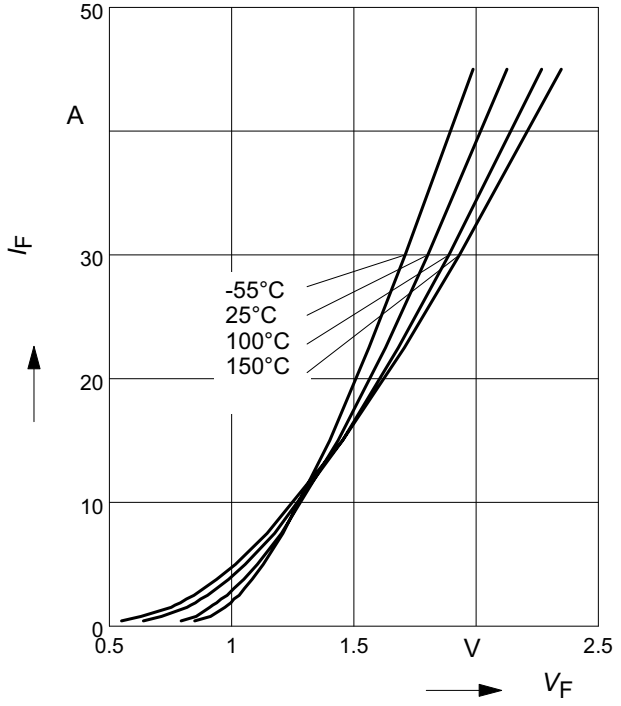
$I_F = f(T_C)$

parameter: $T_j \leq 175$°C



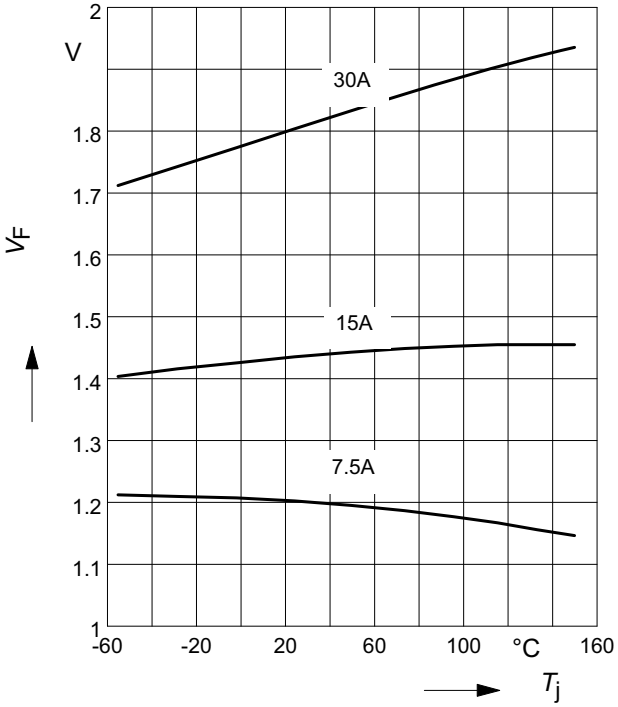
3 Typ. diode forward current

$I_F = f(V_F)$



4 Typ. diode forward voltage

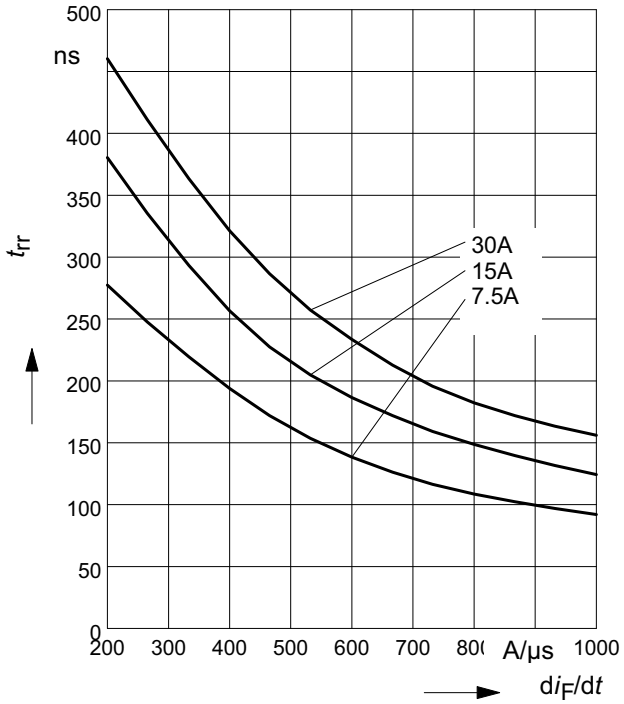
$V_F = f(T_j)$



5 Typ. reverse recovery time

$t_{rr} = f\,(di_F/dt)$

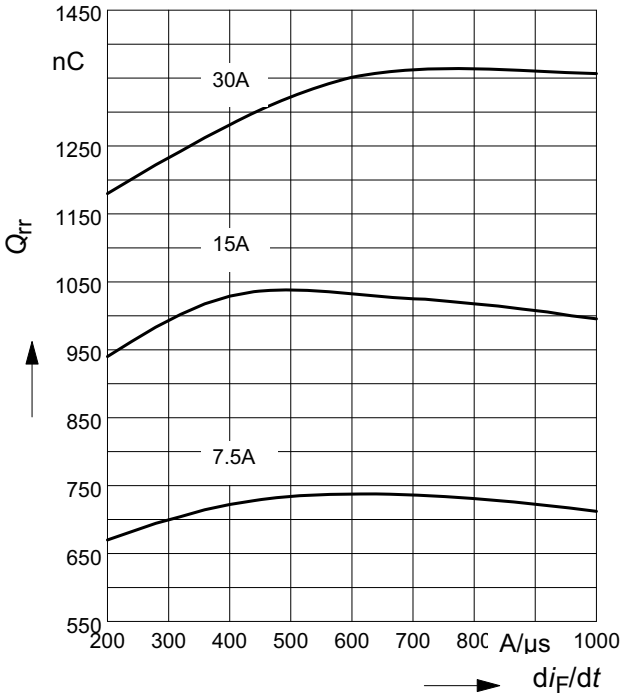
parameter: V_R = 400V, T_j = 125°C



6 Typ. reverse recovery charge

$Q_{rr}=f(di_F/dt)$

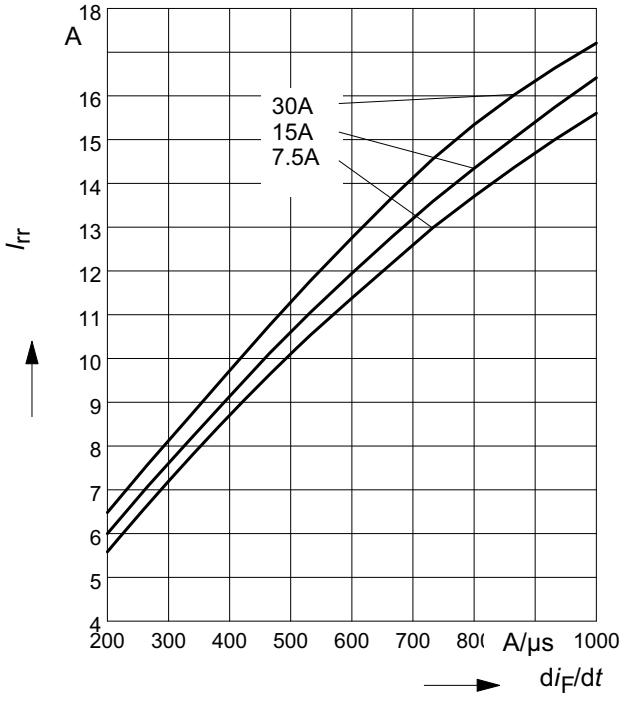
parameter: V_R = 400V, T_j = 125 °C



7 Typ. reverse recovery current

$I_{rr} = f\,(di_F/dt)$

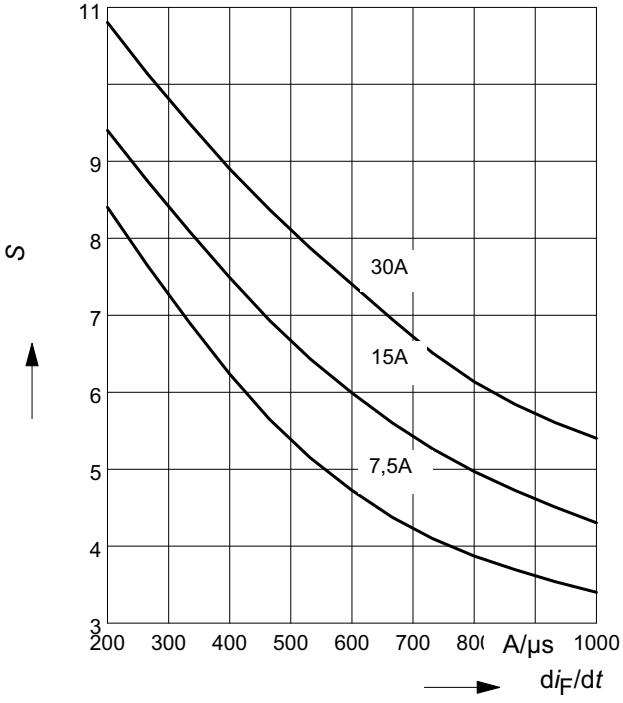
parameter: V_R = 400V, T_j = 125°C



8 Typ. reverse recovery softness factor

S = f(di_F/dt)

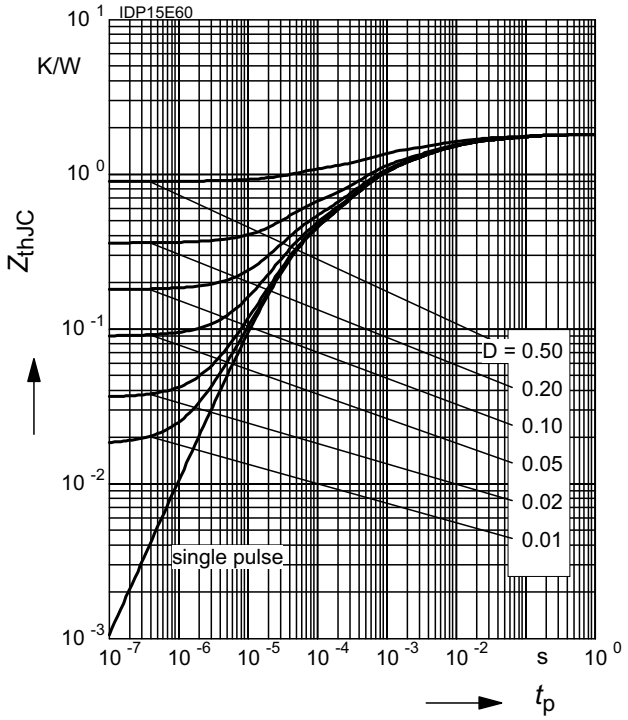
parameter: V_R = 400V, T_j = 125°C



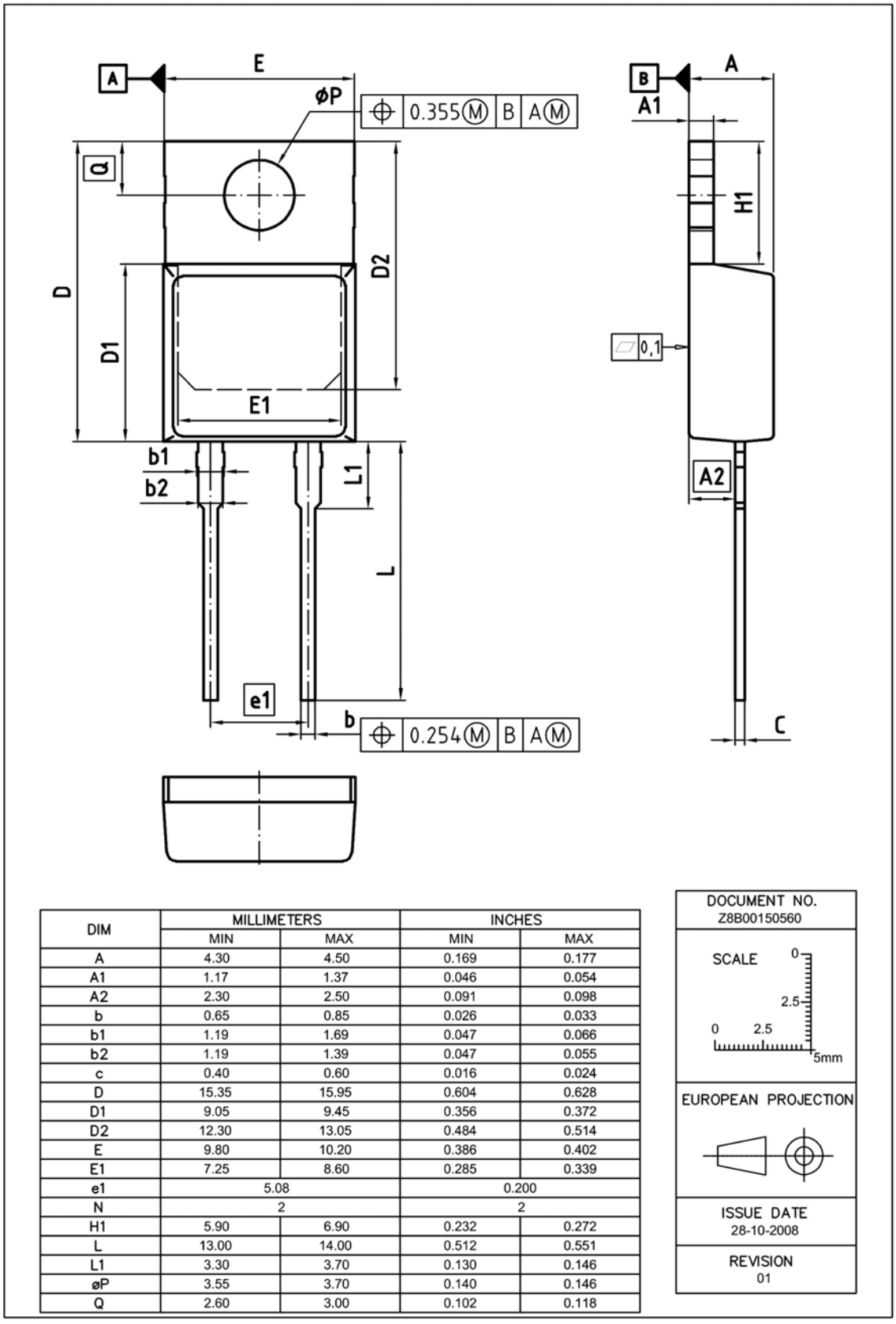
9 Max. transient thermal impedance

$Z_{thJC} = f(t_p)$

parameter : $D = t_p/T$



Package Outline: TO220-2



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.30	4.50	0.169	0.177
A1	1.17	1.37	0.046	0.054
A2	2.30	2.50	0.091	0.098
b	0.65	0.85	0.026	0.033
b1	1.19	1.69	0.047	0.066
b2	1.19	1.39	0.047	0.055
c	0.40	0.60	0.016	0.024
D	15.35	15.95	0.604	0.628
D1	9.05	9.45	0.356	0.372
D2	12.30	13.05	0.484	0.514
E	9.80	10.20	0.386	0.402
E1	7.25	8.60	0.285	0.339
e1	5.08		0.200	
N	2		2	
H1	5.90	6.90	0.232	0.272
L	13.00	14.00	0.512	0.551
L1	3.30	3.70	0.130	0.146
øP	3.55	3.70	0.140	0.146
Q	2.60	3.00	0.102	0.118

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SCALE 0 2.5 0 2.5 5mm

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