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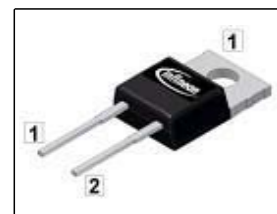
sales@integrated-circuit.com


IDP45E60
Fast Switching Diode
Product Summary

V_{RRM}	600	V
I_F	45	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
IDP45E60	PG-TO220-2	-	D45E60	C	A	-

Maximum Ratings, at $T_j = 25\text{ °C}$, unless otherwise specified

Parameter	Symbol	Value	Unit
Repetitive peak reverse voltage	V_{RRM}	600	V
Continuous forward current $T_C = 25\text{ °C}$ $T_C = 90\text{ °C}$	I_F	71 47	A
Surge non repetitive forward current $T_C = 25\text{ °C}$, $t_p = 10\text{ ms}$, sine halfwave	I_{FSM}	162	A
Maximum repetitive forward current $T_C = 25\text{ °C}$, t_p limited by $t_{j,max}$, $D = 0.5$	I_{FRM}	111.5	A
Power dissipation $T_C = 25\text{ °C}$ $T_C = 90\text{ °C}$	P_{tot}	187 106	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	


IDP45E60
Thermal Characteristics

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Characteristics					
Thermal resistance, junction - case	R_{thJC}	-	-	0.8	K/W
Thermal resistance, junction - ambient, leaded	R_{thJA}	-	-	62	
SMD version, device on PCB: @ min. footprint @ 6 cm ² cooling area ¹⁾	R_{thJA}	-	-	62	
		-	35	-	

Electrical Characteristics, at $T_j = 25\text{ }^\circ\text{C}$, unless otherwise specified

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Static Characteristics					
Reverse leakage current $V_R=600\text{V}$, $T_j=25\text{ }^\circ\text{C}$ $V_R=600\text{V}$, $T_j=150\text{ }^\circ\text{C}$	I_R	-	-	50 3000	μA
Forward voltage drop $I_F=45\text{A}$, $T_j=25\text{ }^\circ\text{C}$ $I_F=45\text{A}$, $T_j=150\text{ }^\circ\text{C}$	V_F	-	1.5 1.5	2 -	V

⁰J-STD20 and JESD22

¹Device 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.


IDP45E60
Electrical Characteristics, at $T_j = 25\text{ }^\circ\text{C}$, unless otherwise specified

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Dynamic Characteristics					
Reverse recovery time	t_{rr}				ns
$V_R=400\text{V}$, $I_F=45\text{A}$, $di_F/dt=1000\text{A}/\mu\text{s}$, $T_j=25^\circ\text{C}$		-	140	-	
$V_R=400\text{V}$, $I_F=45\text{A}$, $di_F/dt=1000\text{A}/\mu\text{s}$, $T_j=125^\circ\text{C}$		-	185	-	
$V_R=400\text{V}$, $I_F=45\text{A}$, $di_F/dt=1000\text{A}/\mu\text{s}$, $T_j=150^\circ\text{C}$		-	195	-	
Peak reverse current	I_{rrm}				A
$V_R=400\text{V}$, $I_F = 45\text{A}$, $di_F/dt=1000\text{A}/\mu\text{s}$, $T_j=25^\circ\text{C}$		-	23	-	
$V_R=400\text{V}$, $I_F = 45\text{A}$, $di_F/dt=1000\text{A}/\mu\text{s}$, $T_j=125^\circ\text{C}$		-	28.1	-	
$V_R=400\text{V}$, $I_F = 45\text{A}$, $di_F/dt=1000\text{A}/\mu\text{s}$, $T_j=150^\circ\text{C}$		-	29	-	
Reverse recovery charge	Q_{rr}				nC
$V_R=400\text{V}$, $I_F=45\text{A}$, $di_F/dt=1000\text{A}/\mu\text{s}$, $T_j=25^\circ\text{C}$		-	1400	-	
$V_R=400\text{V}$, $I_F = 45\text{A}$, $di_F/dt=1000\text{A}/\mu\text{s}$, $T_j=125^\circ\text{C}$		-	2650	-	
$V_R=400\text{V}$, $I_F = 45\text{A}$, $di_F/dt=1000\text{A}/\mu\text{s}$, $T_j=150^\circ\text{C}$		-	2900	-	
Reverse recovery softness factor	S				
$V_R=400\text{V}$, $I_F=45\text{A}$, $di_F/dt=1000\text{A}/\mu\text{s}$, $T_j=25^\circ\text{C}$		-	3.1	-	
$V_R=400\text{V}$, $I_F=45\text{A}$, $di_F/dt=1000\text{A}/\mu\text{s}$, $T_j=125^\circ\text{C}$		-	4.2	-	
$V_R=400\text{V}$, $I_F=45\text{A}$, $di_F/dt=1000\text{A}/\mu\text{s}$, $T_j=150^\circ\text{C}$		-	4.4	-	

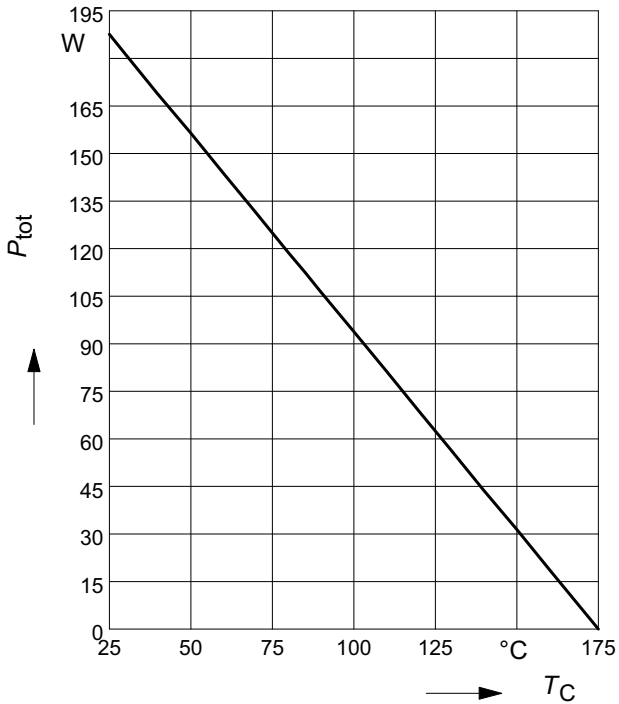


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1 Power dissipation

$P_{tot} = f(T_C)$

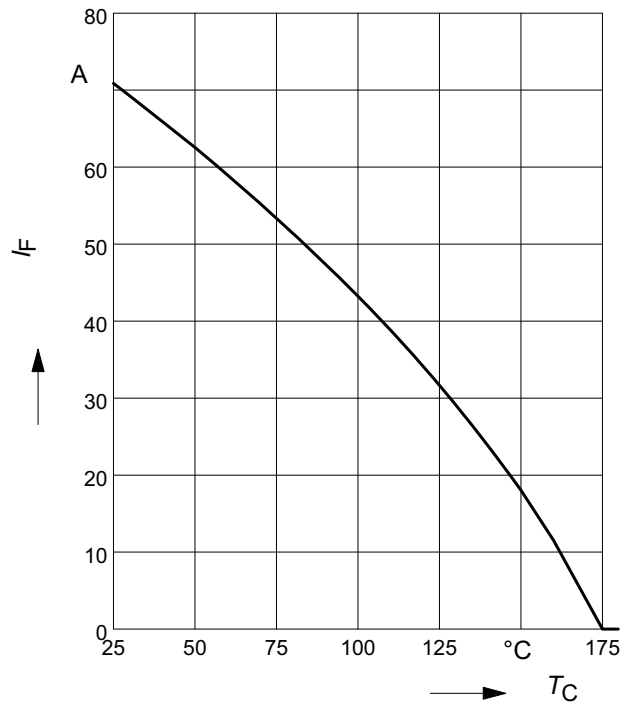
parameter: $T_j \leq 175^\circ\text{C}$



2 Diode forward current

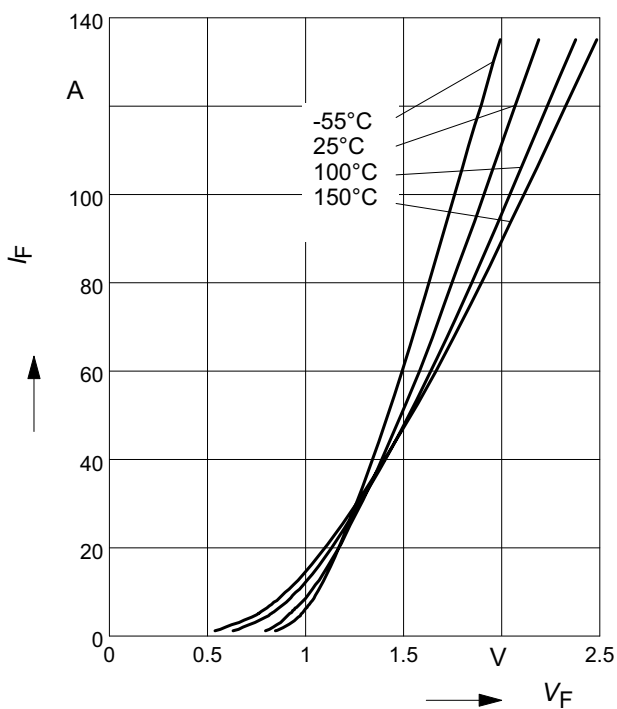
$I_F = f(T_C)$

parameter: $T_j \leq 175^\circ\text{C}$



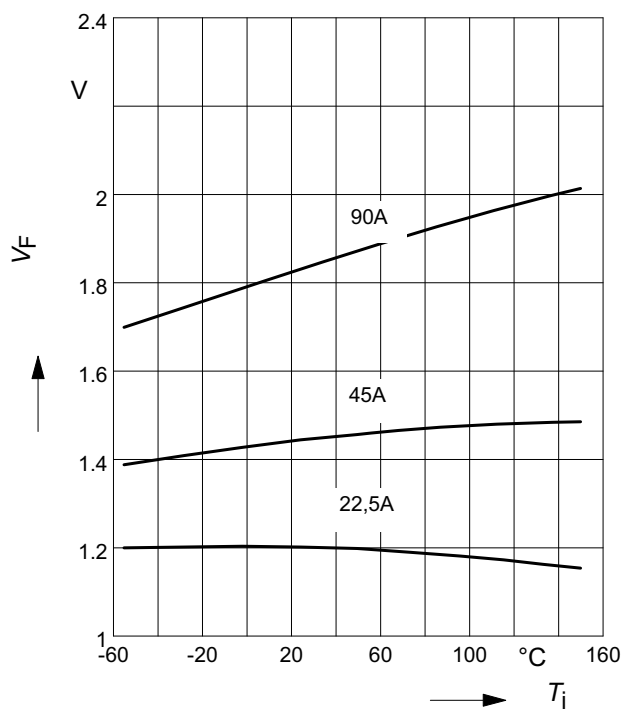
3 Typ. diode forward current

$I_F = f(V_F)$



4 Typ. diode forward voltage

$V_F = f(T_j)$



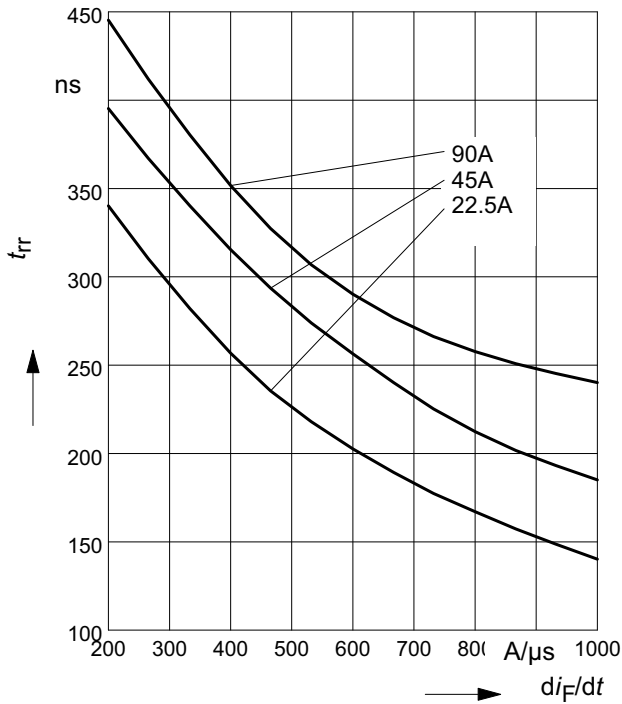


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5 Typ. reverse recovery time

$t_{rr} = f(dI_F/dt)$

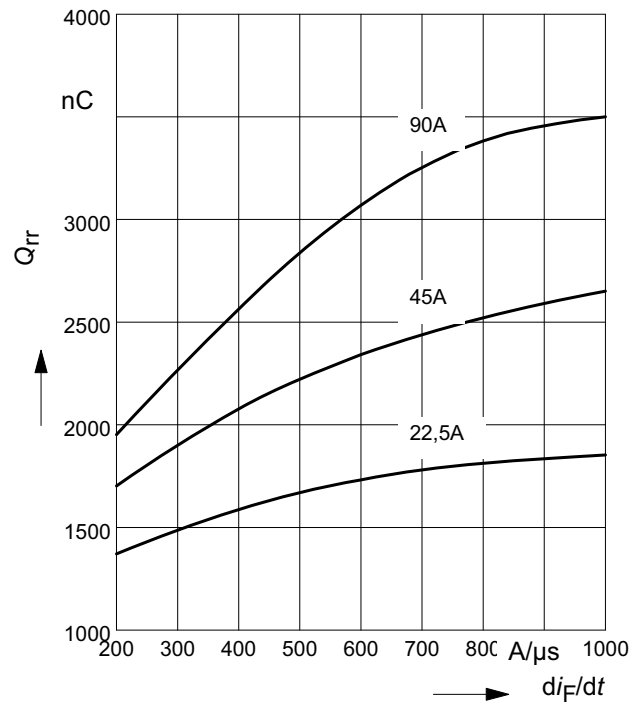
parameter: $V_R = 400V, T_j = 125^\circ C$



6 Typ. reverse recovery charge

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

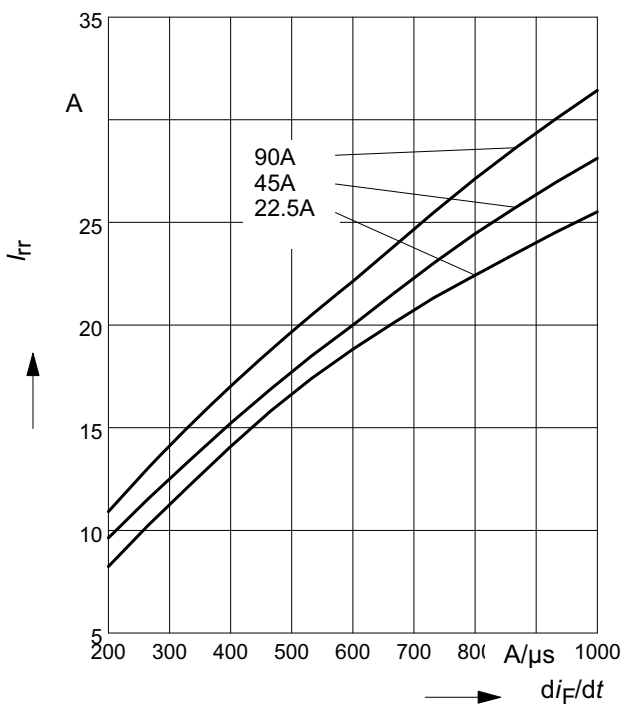
parameter: $V_R = 400V, T_j = 125^\circ C$



7 Typ. reverse recovery current

$I_{rr} = f(dI_F/dt)$

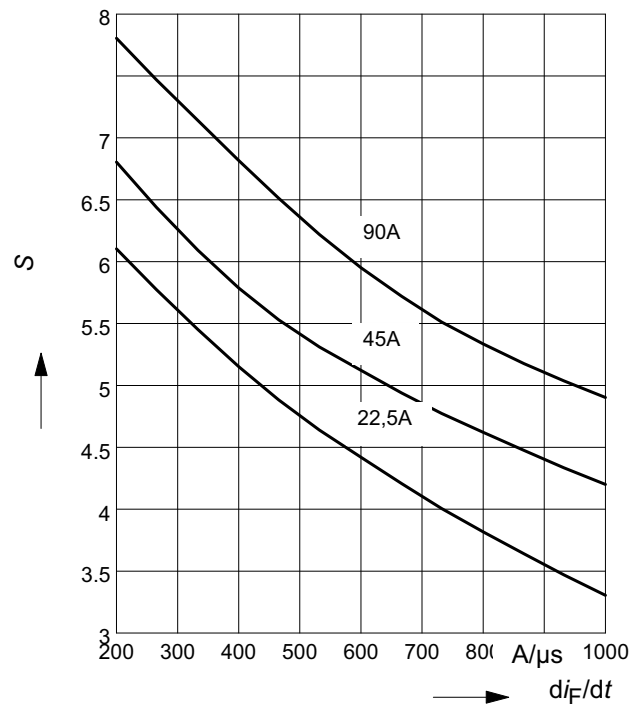
parameter: $V_R = 400V, T_j = 125^\circ C$



8 Typ. reverse recovery softness factor

$S = f(dI_F/dt)$

parameter: $V_R = 400V, T_j = 125^\circ C$



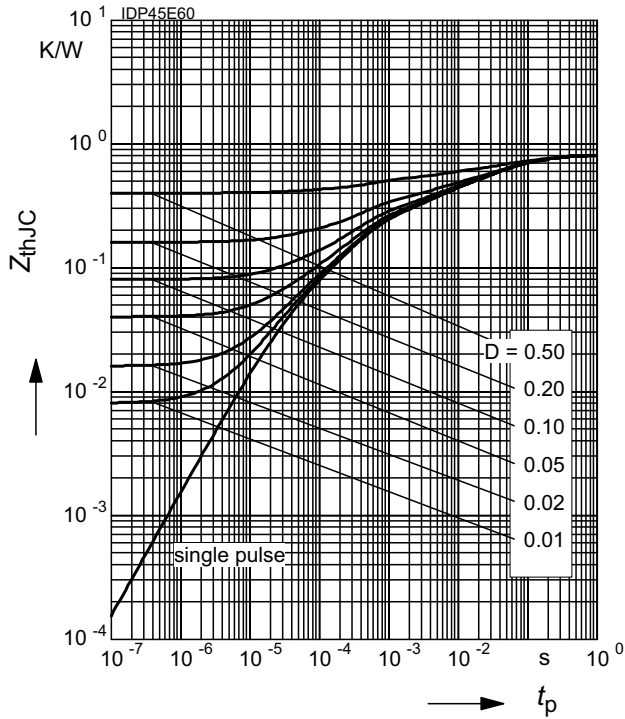


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9 Max. transient thermal impedance

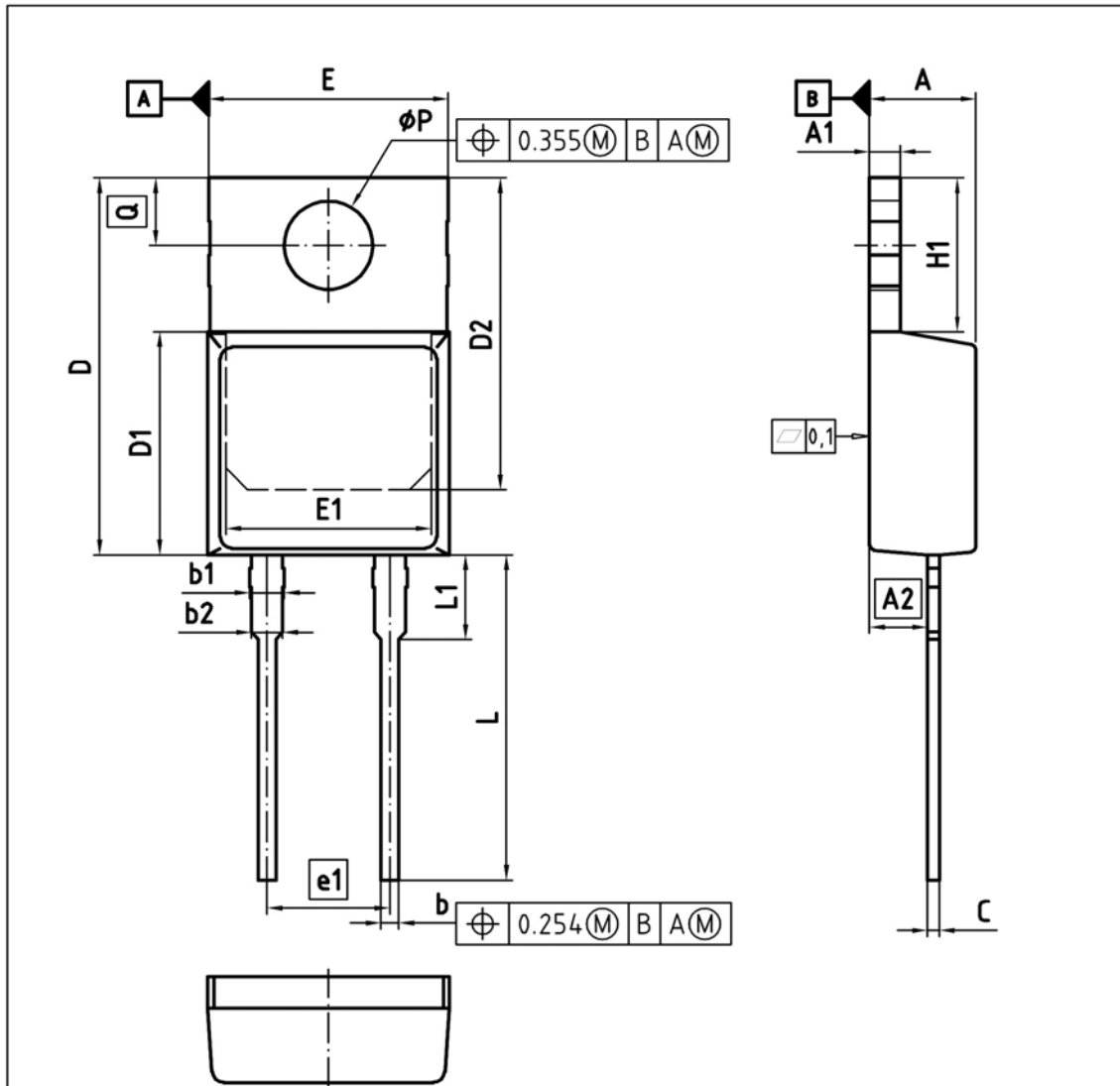
$Z_{thJC} = f(t_p)$

parameter : $D = t_p/T$





IDP45E60



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
φP	3.55	3.70	0.140	0.146
Q	2.60	3.00	0.102	0.118

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SCALE

EUROPEAN PROJECTION

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01



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