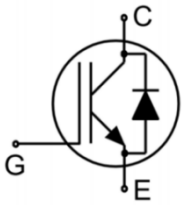
Main Product Characteristics:

V_{CES}	700V
I_C	50A
$V_{CE(sat)}$	1.75V

TO - 247



Schematic Diagram

Features and Benefits:

- Trench FS technology offering
- High speed switching
- Low gate charge and $V_{CE(sat)}$
- High ruggedness, temperature stable behavior
- Maximum junction temperature 175°C

Applications:

- Solar Inverters
- Uninterruptible power supplies
- Motor drives
- Air condition

Absolute Max Rating:

Symbol	Parameter	Value	Units
V_{CES}	Collector-Emitter Voltage	700	V
V_{GES}	Gate- Emitter Voltage	±30	V
I_C	Collector Current	100	A
	Collector Current @T_C = 100 °C	50	
I_{Cpuls}	Pulsed Collector Current，t_p limited by T_{jmax}	200	
-	Turn off safe operating area，V_{CE}=650V，T_J=175°C	200	
I_F	Diode Continuous Forward Current @T_C = 25 °C	100	A
	Diode Continuous Forward Current @T_C = 100 °C	50	
I_{FM}	Diode Maximum Forward Current	200	
P_D	Power Dissipation @ T_C = 25°C	296	W
	Power Dissipation @ T_C = 100°C	148	W
T_J T_{STG}	Operating Junction and Storage Temperature Range	-55 to +175	°C
T_L	Maximum Temperature for Soldering	260	°C

Thermal Resistance

Symbol	Characterizes	Typ.	Max.	Units
$R_{\theta JC}$	Thermal Resistance,Junction-to-case for IGBT	—	0.5	°C/W
	Thermal Resistance,Junction-to-case for Diode	—	0.63	°C/W
$R_{\theta JA}$	Thermal Resistance,Junction-to-ambient	—	40	°C/W

Electrical Characteristics @T_A=25°C unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)CES}$	Collector-Emitter Breakdown Voltage	700	—	—	V	V_{GE}=0V,I_{CE}=1mA
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	—	1.75	1.9	V	I_C=50A ,V_{GE}=15V @T_J=25°C
$V_{GE(th)}$	Gate Threshold Voltage	4	—	6	V	I_C=250μA,V_{CE}=V_{GE}
I_{CES}	Collector-Emitter Leakage Current	—	—	1	μA	V_{GE} =0V,V_{CE}=700V
I_{GES}	Gate to Emitter Reverse Leakage	—	—	100	nA	V_{GE}=25V,V_{CE} =0V
		—	—	-100		V_{GE}=-25V,V_{CE} =0V
C_{ies}	Input capacitance	—	2750	—	pF	V_{GS} = 0V V_{DS} = 25V f = 1MHz
C_{oes}	Output capacitance	—	120	—		
C_{res}	Reverse transfer capacitance	—	68	—		
$t_{d(on)}$	Turn-on delay time	—	29	—	ns	V_{CC}=400V,I_C=50A, V_{GE}=0/15V, R_g=10Ω,
t_r	Rise time	—	51	—		
$t_{d(off)}$	Turn-Off delay time	—	150	—		
t_f	Fall time	—	61	—		
E_{on}	Turn-On Switching Loss	—	1.18	—	mJ	V_{CC}=400V,I_C=50A, V_{GE}=0/15V, R_g=10Ω,
E_{off}	Turn-Off Switching Loss	—	0.79	—		
E_{ts}	Total Switching Loss	—	1.97	—		
Q_g	Total Gate Charge	—	155	—	nC	V_{CC}=480V, I_C=50A, V_{GE}=15V
Q_{ge}	Gate to Emitter Charge	—	35	—		
Q_{gc}	Gate to Collector Charge	—	65	—		
$I_{C(SC)}$	Short circuit collector current Max.1000 short circuits Time between short circuits: ≥1.0s	—	340	—	A	V_{GE}=15V,V_{CC}≤400V, t_{sc}≤5μs

Electrical Characteristics of the Diode@T_A=25°C unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
V_{FM}	Diode Forward Voltage	—	1.77	2.5	V	I_F=50A
t_{rr}	Reverse Recovery Time	—	83	—	ns	T_J = 25°C, I_F =50A, di/dt = 200A/μs
Q_{rr}	Reverse Recovery Charge	—	0.79	—	μC	
I_{RRM}	Diode Peak Reverse Recovery Current	—	18.2	—	A	

Typical Electrical and Thermal Characteristics

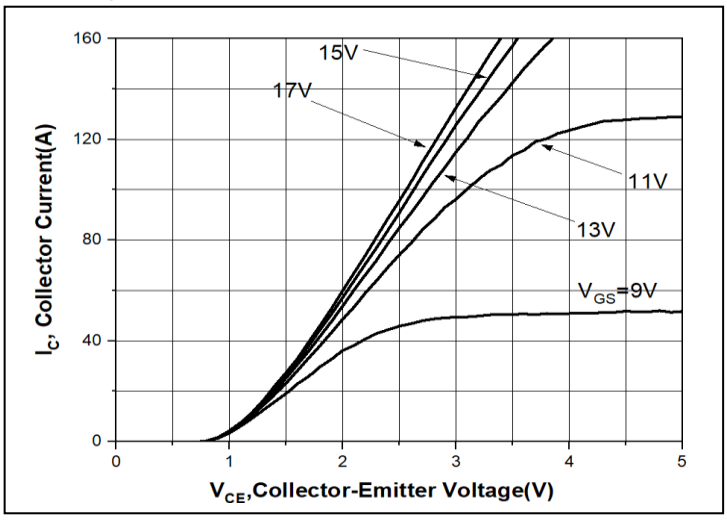


Figure1. Typical Output Characteristics

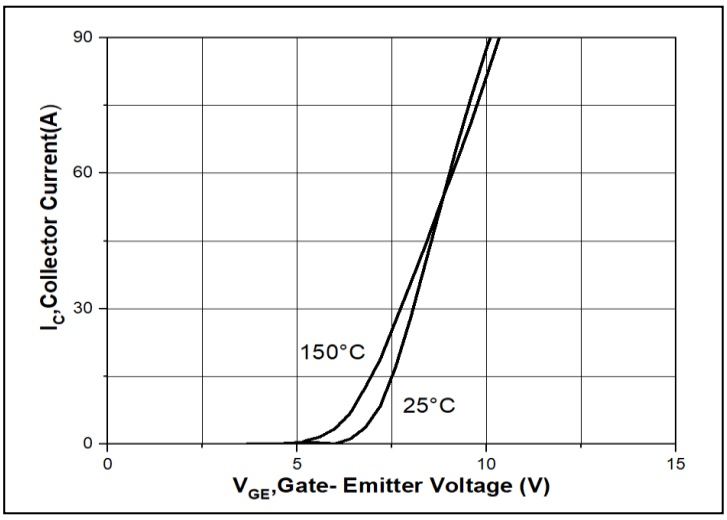


Figure2. Typical Transfer Characteristics

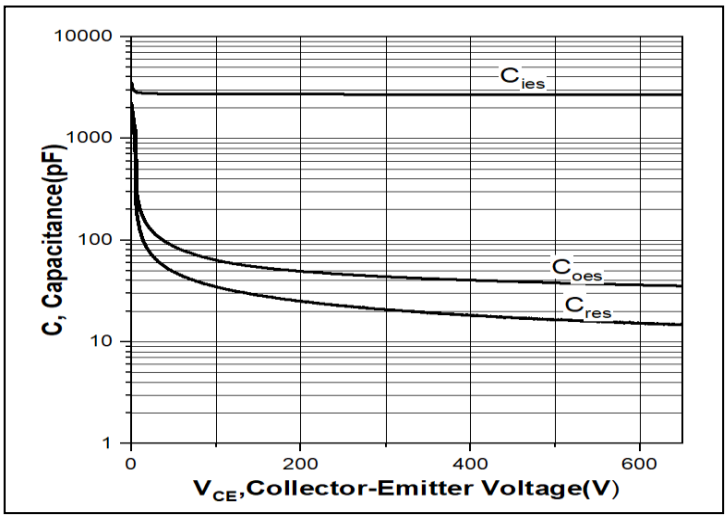


Figure3.Typical Capacitance

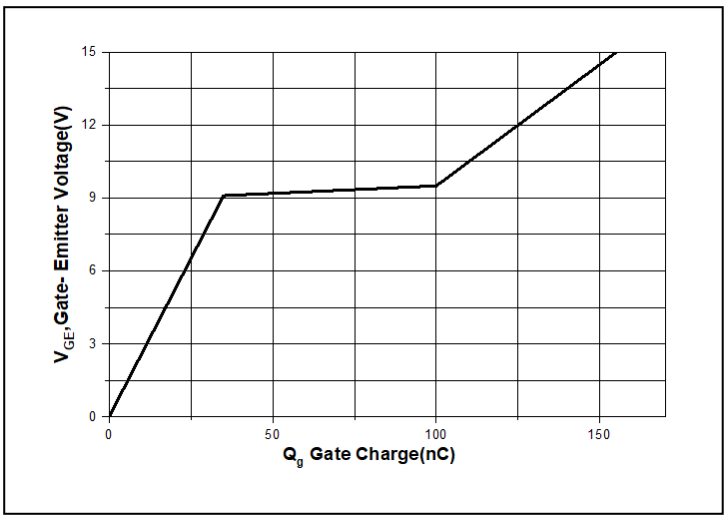


Figure4. Typical Gate Charge

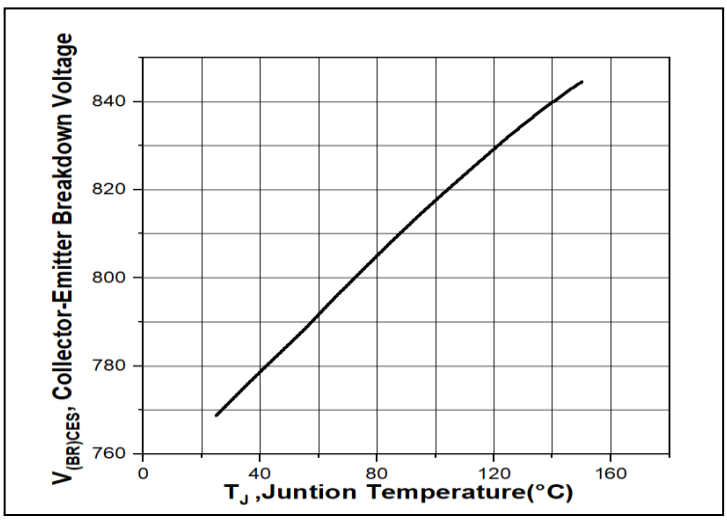


Figure5.Collector-Emitter Breakdown Voltage vs. Temperature

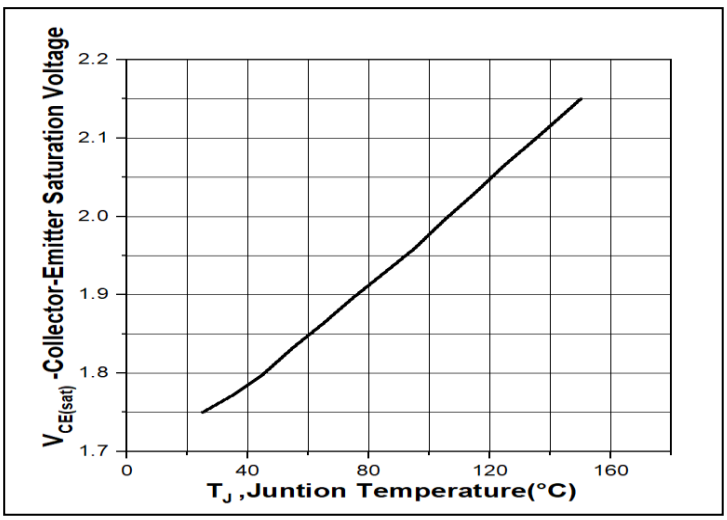


Figure6. Collector-Emitter Saturation Voltage vs. Temperature

Typical Electrical and Thermal Characteristics

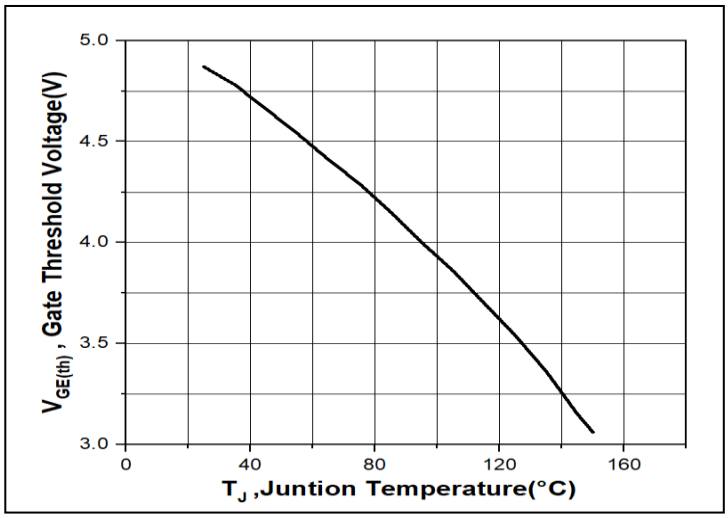


Figure7.Gate Threshold Voltage vs. Temperature

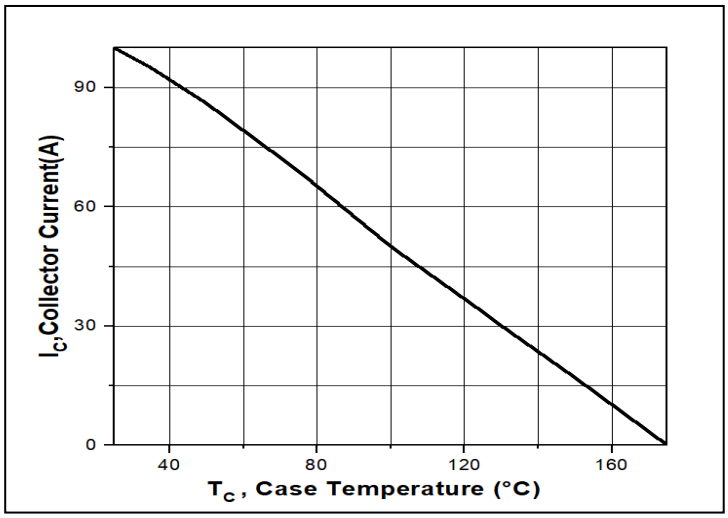


Figure8.Collector Current vs. Temperature

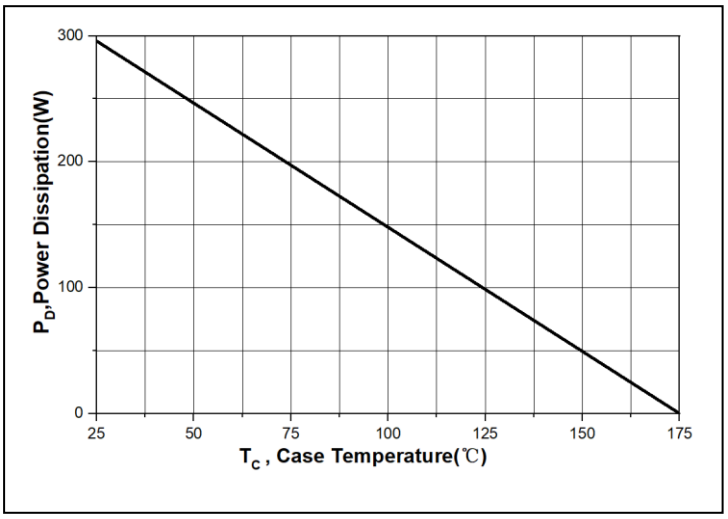
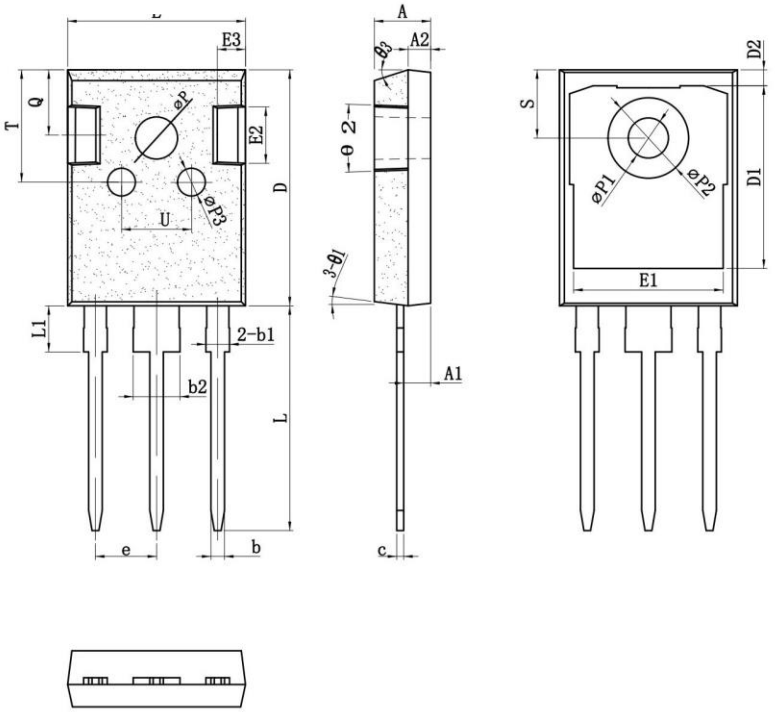


Figure9. Power Dissipation vs. Case Temperature

Mechanical Data：

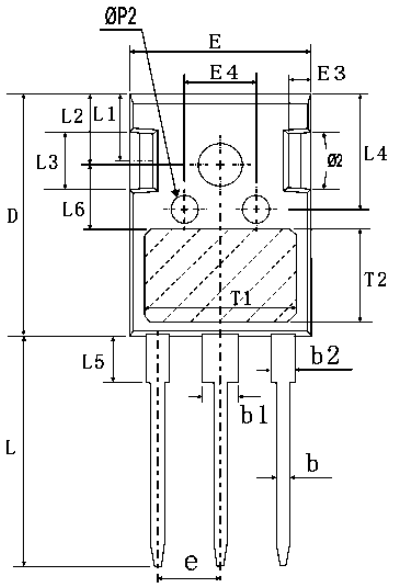
Option1:

Unit:mm

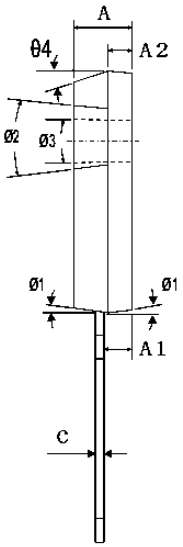


SYMBOL	mm		
	MIN	NOM	MAX
✻A	4.90	5.00	5.10
✻A1	2.31	2.41	2.51
A2	1.90	2.00	2.10
✻b	1.15	1.20	1.25
✻b1	1.95	2.10	2.25
✻b2	2.95	3.10	3.25
✻c	0.55	0.60	0.65
✻D	20.90	21.00	21.10
D1	16.35	16.55	16.75
D2	1.05	1.20	1.35
✻E	15.70	15.80	15.90
E1	13.10	13.25	13.40
E2	4.90	5.00	5.10
E3	2.40	2.50	2.60
✻e	5.40	5.44	5.48
✻L	19.80	19.98	20.15
✻L1	–	–	4.30
✻ΦP	3.60	3.70	3.80
✻ΦP1	3.45	3.55	3.65
ΦP2	7.03	7.18	7.33
ΦP3	2.40	2.50	2.60
Q	5.60	5.80	6.00
✻S	6.05	6.15	6.25
T	9.80	10.00	10.20
U	6.00	6.20	6.40
θ1	5°	7°	9°
θ2	1°	3°	5°
θ3	13°	15°	17°

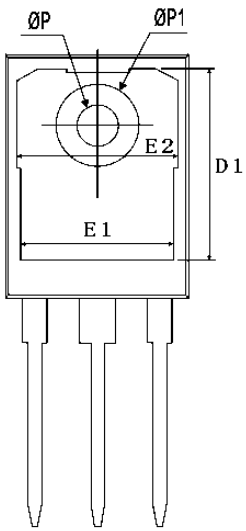
Option2:



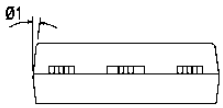
TOP VIEW



SIDE VIEW



BOTTOM VIEW

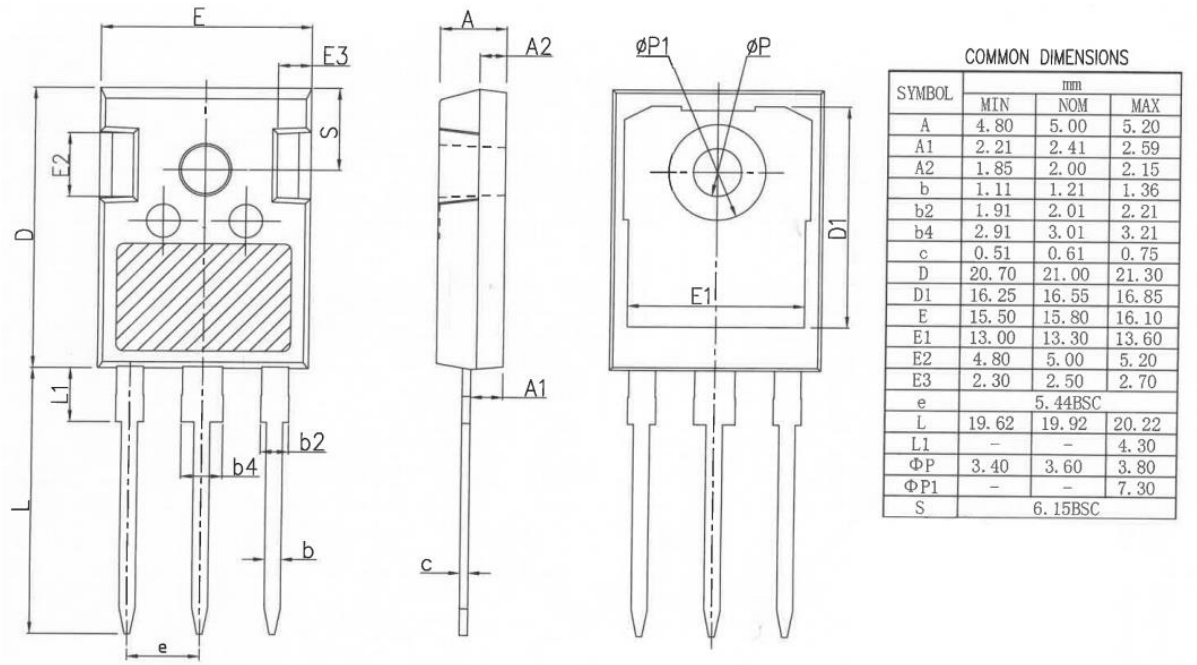


SIDE VIEW

COMMON DIMENSIONS
(UNITS OF MEASURE=mm)

SYMBOL	MIN	NOM	MAX
A	4.80	5.00	5.20
A1	2.20	2.40	2.60
A2	1.85	2.00	2.15
b	1.10	1.20	1.30
b1	2.80	3.00	3.20
b2	1.80	2.00	2.20
c	0.52	0.62	0.72
D	20.35	20.65	20.95
D1	16.35	16.55	16.75
E	15.50	15.80	16.10
E1	13.10	13.30	13.50
E2	13.80	14.00	14.20
E3	1.45	1.60	1.75
E4	6.00	6.20	6.40
L	19.80	20.00	20.20
L1	5.88	5.98	6.08
L2	5.88	5.98	6.08
L3	4.90	5.00	5.10
L4	9.70	9.80	9.90
L5	4.10	4.30	4.50
Ø1	4°	7°	10°
Ø2	11°	14°	17°
Ø3	1°	--	2°
Ø4	10°	15°	20°
ØP	3.35	3.60	3.85
ØP1	--	--	7.30
ØP2	2.25	2.50	2.75
e	5.44BSC		
T1	12.80REF		
T2	7.80REF		
L6	5.50REF		

Option3:



COMMON DIMENSIONS

SYMBOL	mm		
	MIN	NOM	MAX
A	4.80	5.00	5.20
A1	2.21	2.41	2.59
A2	1.85	2.00	2.15
b	1.11	1.21	1.36
b2	1.91	2.01	2.21
b4	2.91	3.01	3.21
c	0.51	0.61	0.75
D	20.70	21.00	21.30
D1	16.25	16.55	16.85
E	15.50	15.80	16.10
E1	13.00	13.30	13.60
E2	4.80	5.00	5.20
E3	2.30	2.50	2.70
e	5.44BSC		
L	19.62	19.92	20.22
L1	–	–	4.30
ΦP	3.40	3.60	3.80
ΦP1	–	–	7.30
S	6.15BSC		

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