

产品规格书

批准	审核	校核	编制
纪春华	朴致均	赵宇辉	郑羿
2019.04.08	2019.04.08	2019.04.08	2019.04.08

规格书更改履历:

序号	更改内容	履历号	更改时间	责任人
1	新规制定	000	2019.04.08	郑羿

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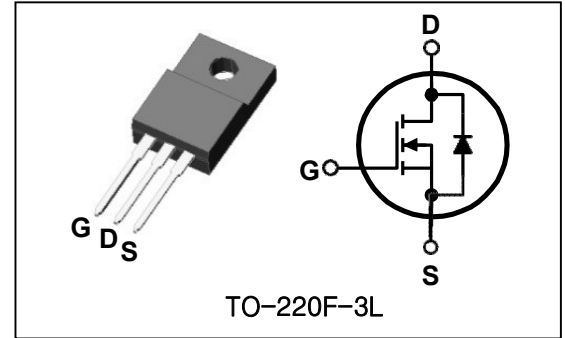
Features

- High Voltage : $BV_{DSS}=650V(\text{Min.})$
- Low $R_{DS(on)}$: $R_{DS(on)}=0.38\Omega(\text{Typ.})$

Ordering Information

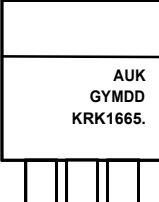
Type No.	Marking	Package Code
KRK1665F	KRK1665.	TO-220F-3L

PIN Connection



. Dalian

Marking Diagram

	<p>Column 1 : Manufacturer</p> <p>Column 2 : Production Information e.g.) GYMDD -. G : Factory management code -. YMDD : Date Code (year, month, date)</p> <p>Column 3 : Device Code . Dalian</p>
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Absolute maximum ratings ($T_C=25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Value	Units
V_{DSS}	Drain-Source Voltage	650	V
V_{GS}	Gate-Source Voltage	± 30	V
I_D	Drain Current	$T_C = 25^\circ\text{C}$	16*
		$T_C = 100^\circ\text{C}$	10.1*
I_{DM}	Pulsed Drain Current	64*	A
E_{AS}	Single Pulsed Avalanche Energy (Note 2)	698	mJ
E_{AR}	Repetitive Avalanche Energy (Note 1)	4	mJ
I_{AR}	Repetitive avalanche current (Note 1)	16	A
P_D	Power Dissipation ($T_C = 25^\circ\text{C}$)	40	W
T_J, T_{STG}	Operating and Storage Temperature Range	-55 to +150	$^\circ\text{C}$

* Drain current limited by maximum junction temperature.

Symbol	Parameter	Value	Units
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	3.13	$^\circ\text{C}/\text{W}$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	62.5	$^\circ\text{C}/\text{W}$

Electrical Characteristics (T_C=25°C unless otherwise noted)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
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On Characteristics

V _{GS}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = 250 μA	3	--	5	V
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} = 10 V, I _D = 8A	--	0.38	0.48	Ω
g _{fs}	Forward transfer conductance(note 3)	V _{DS} = 10 V, I _D = 8A (Note 3)	--	11	--	S

Off Characteristics

BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} = 0 V, I _D = 250 μA	650	--	--	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 650 V, V _{GS} = 0 V	--	--	1	μA
		V _{DS} = 520 V, T _C = 125°C	--	--	100	
I _{GSSF}	Gate-Body Leakage Current, Forward	V _{GS} = 30 V, V _{DS} = 0 V	--	--	100	nA
I _{GSSR}	Gate-Body Leakage Current, Reverse	V _{GS} = -30 V, V _{DS} = 0 V	--	--	-100	nA

Dynamic Characteristics

C _{iss}	Input Capacitance	V _{DS} = 25 V, V _{GS} = 0 V, f = 1.0 MHz	--	3325	--	pF
C _{oss}	Output Capacitance		--	225	--	pF
C _{rss}	Reverse Transfer Capacitance		--	22	--	pF

Switching Characteristics

t _{d(on)}	Turn-On Time	V _{DS} = 325 V, I _D = 16A, R _G = 25 Ω (Note 3,4)	--	175	--	ns
t _r	Turn-On Rise Time		--	121	--	ns
t _{d(off)}	Turn-Off Delay Time		--	373	--	ns
t _f	Turn-Off Fall Time		--	64	--	ns
Q _g	Total Gate Charge	V _{DS} = 520 V, I _D = 16A, V _{GS} = 10 V (Note 3,4)	--	50	55	nC
Q _{gs}	Gate-Source Charge		--	20	--	nC
Q _{gd}	Gate-Drain Charge		--	10	--	nC

Source-Drain Diode Maximum Ratings and Characteristics

I _S	Continuous Source-Drain Diode Forward Current	--	--	16	A	
I _{SM}	Pulsed Source-Drain Diode Forward Current	--	--	64		
V _{SD}	Source-Drain Diode Forward Voltage	I _S = 16A, V _{GS} = 0 V	--	--	1.4	V
t _{rr}	Reverse Recovery Time	I _S = 16A, V _{GS} = 0 V	--	484	--	ns
Q _{rr}	Reverse Recovery Charge	di _F /dt = 100 A/μs (Note 3,4)	--	1.62	--	μC

Note:

1. Repeated rating: Pulse width limited by safe operating area
2. L=5mH, I_{AS}=16A, V_{DD}=50V, R_G=25Ω, Starting T_J=25°C
3. Pulse test: Pulse width ≤ 300μs, Duty cycle ≤ 2%
4. Essentially independent of operating temperature typical characteristics

Electrical Characteristic Curves

Fig. 1 Typical Output Characteristics

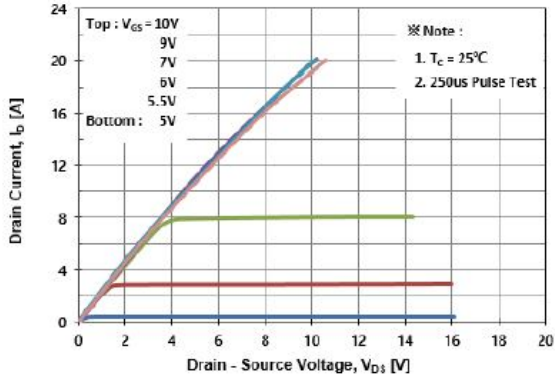


Fig. 2 Typical Output Characteristics

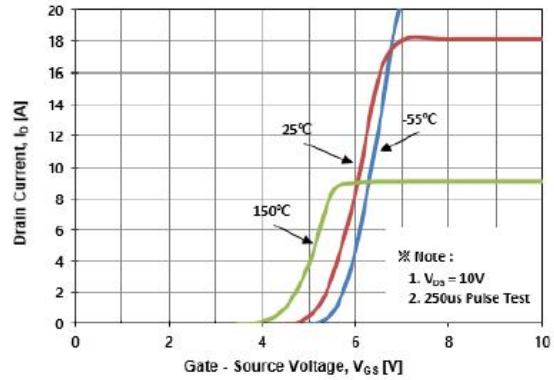


Fig. 3 On-Resistance Variation with Drain Current and Gate Voltage

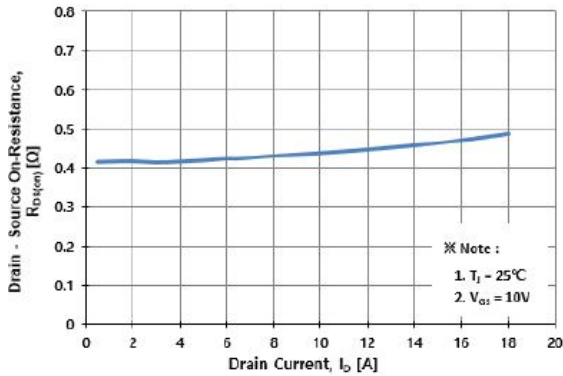


Fig. 4 Body Diode Forward Voltage Variation with Source Current

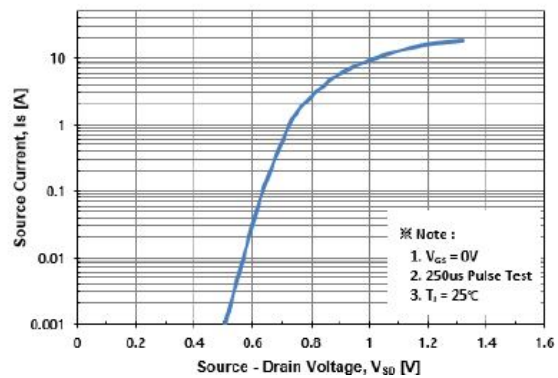


Fig. 5 Typical Capacitance Characteristics

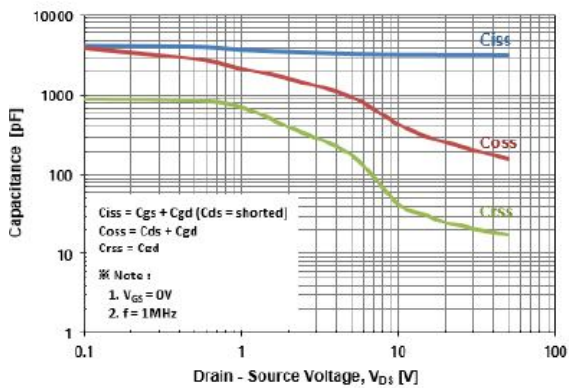
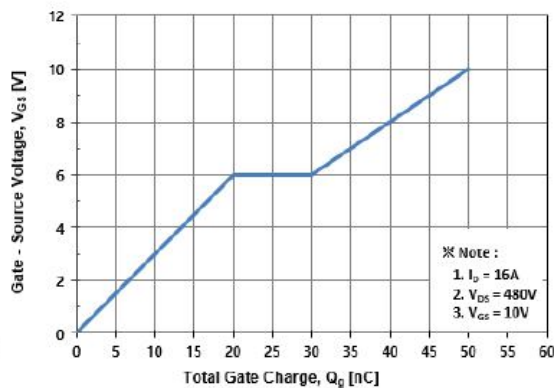


Fig. 6 Typical Total Gate Charge Characteristics



Electrical Characteristic Curves

Fig. 7 Breakdown Voltage Variation vs. Temperature

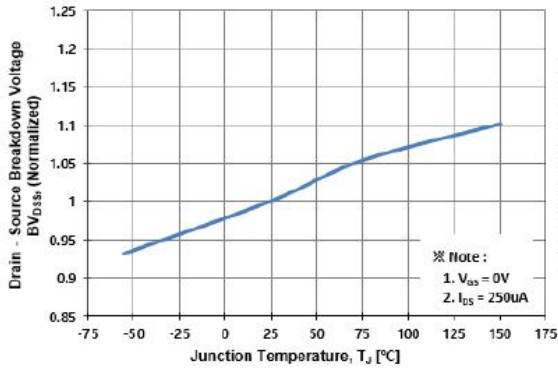


Fig. 8 On-Resistance Variation vs. Temperature

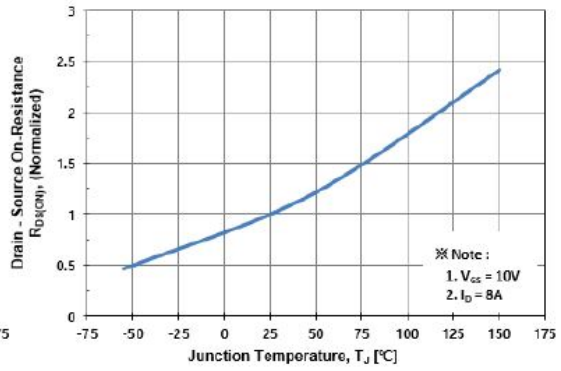


Fig. 9 Maximum Drain Current vs. Case Temperature

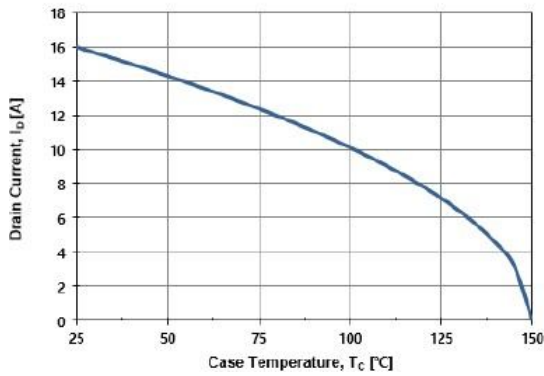


Fig. 10 Maximum Safe Operating Area

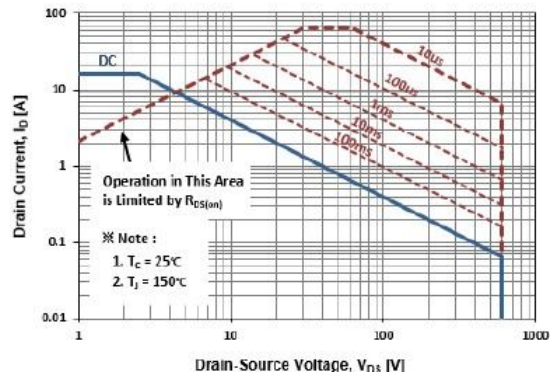


Fig. 11 Transient Thermal Impedance

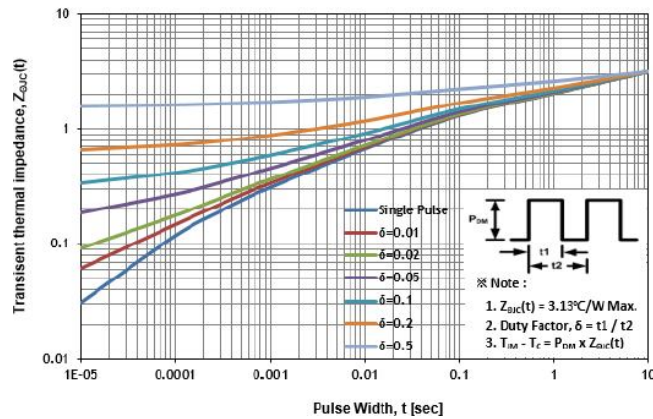


Fig.12. Gate Charge Test Circuit & Waveform

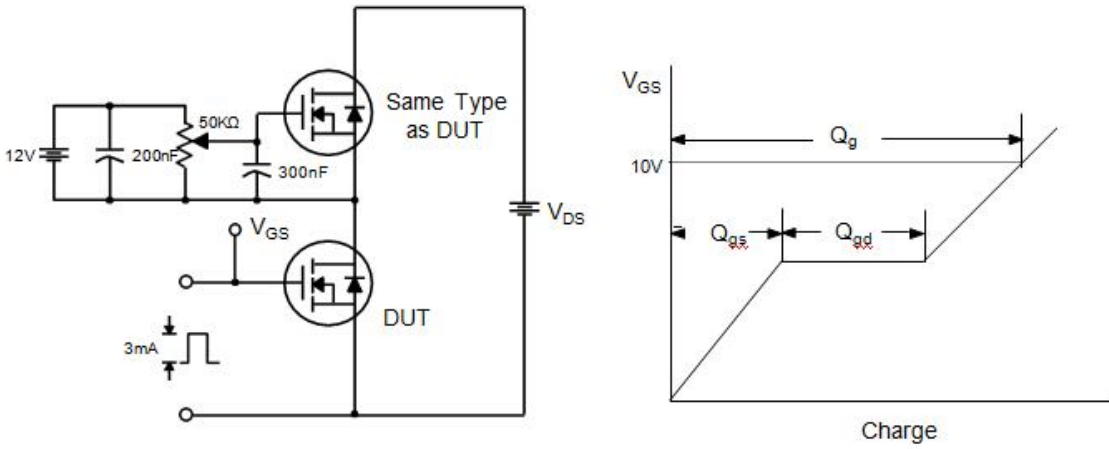


Fig.13. Resistive Switching Test Circuit & Waveforms

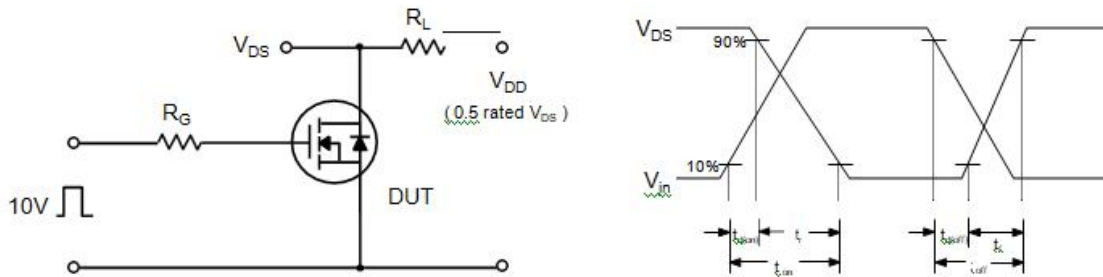


Fig.14. Unclamped Inductive Switching Test Circuit & Waveforms

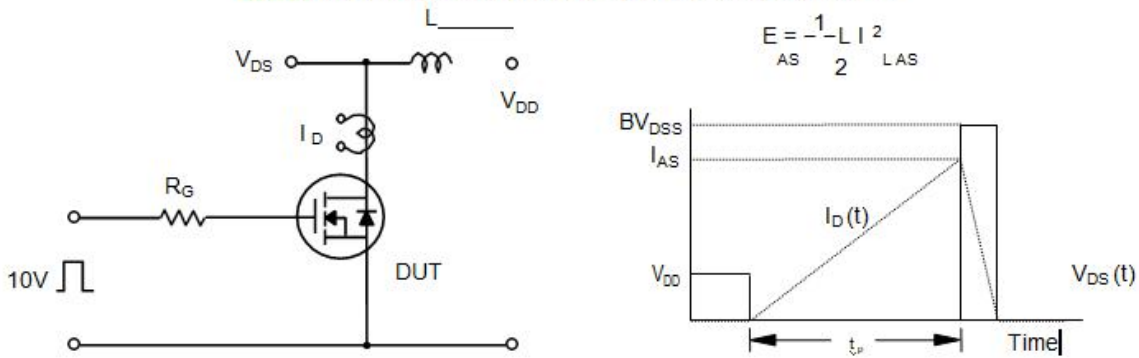
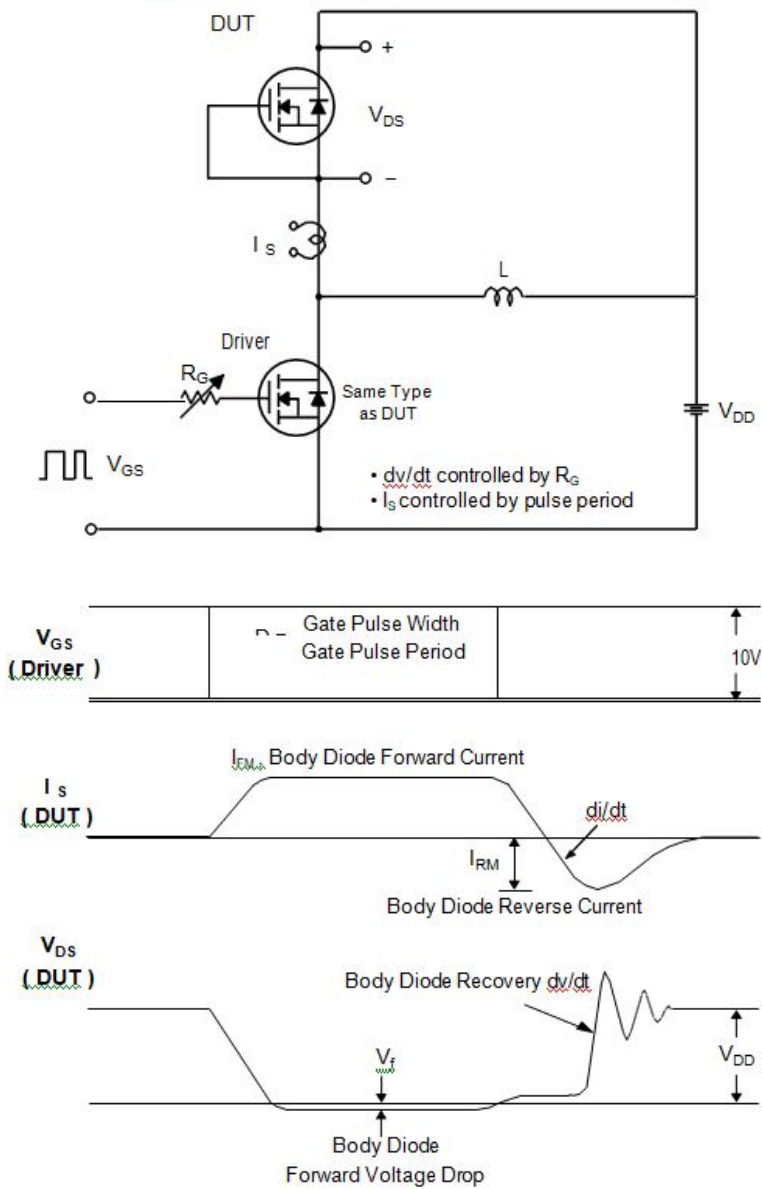
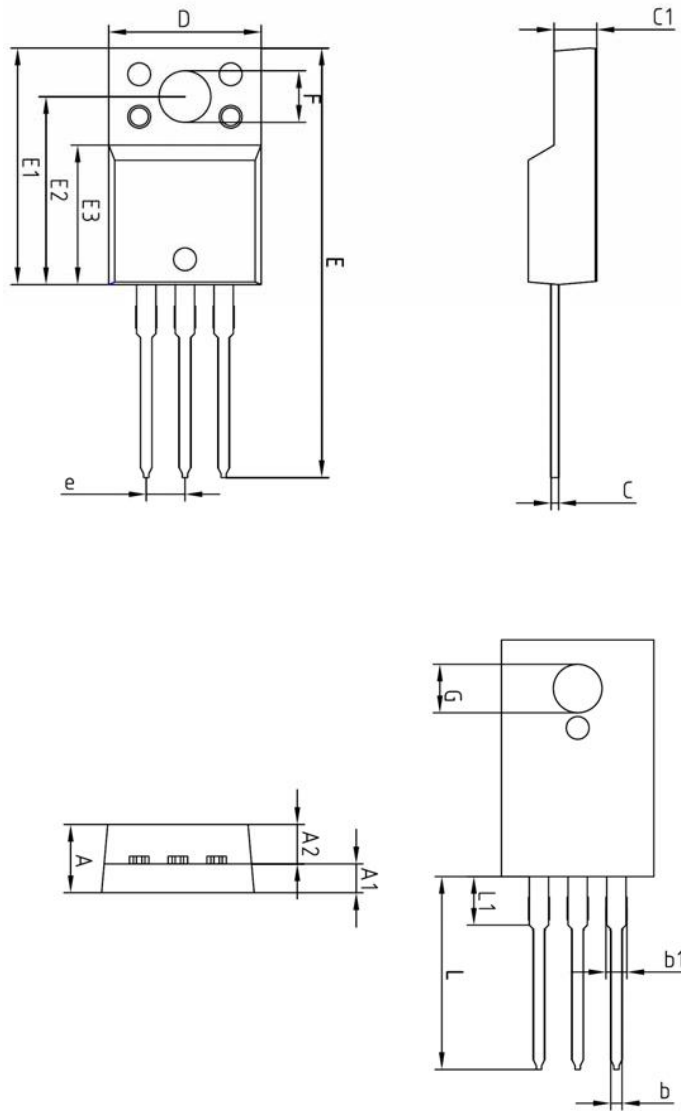


Fig. 15. Peak Diode Recovery dv/dt Test Circuit & Waveforms



Outline Dimension

unit: mm



SYMBOL	MILLIMETERS			NOTE
	MINIMUM	NOMINAL	MAXIMUM	
A	—	—	4.60	
A1	2.45	2.50	2.55	
A2	1.95	2.00	2.05	
b	0.65	0.75	0.85	
b1	1.07	1.27	1.47	
C	0.40	0.50	0.60	
C1	2.70	2.80	2.90	
D	9.90	10.00	10.10	
E	28.00	—	28.60	
E1	15.50	15.60	15.70	
E2	12.30	12.40	12.50	
E3	9.15	9.20	9.25	
F	3.30	3.40	3.50	
G	3.10	3.20	3.30	
e	2.54 BSC			
L	12.40	—	13.00	
L1	3.46 BSC			

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