

Product Summary

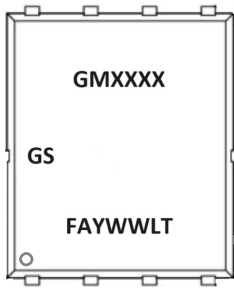
V_{DS} (V)	$R_{DS(on),max}$ (mΩ)	I_D (A)
-20	7.8@ $V_{GS} = -4.5V$	-60

Features

- ❖ Fast Switching
- ❖ Low On-Resistance
- ❖ Low Gate Charge

Application

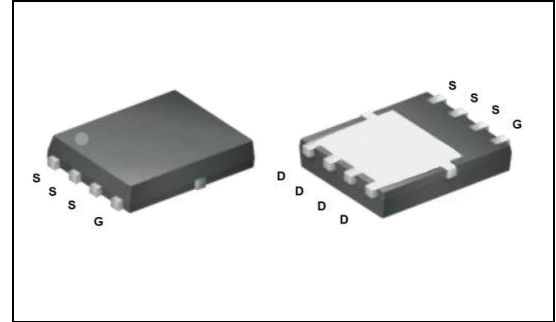
- ❖ Load Switch
- ❖ Battery protection
- ❖ Uninterruptible power supply



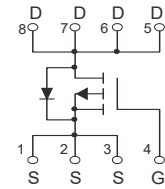
PDFN5060

NOTE:
 LOGO - GS
 GMXXXX- Part number code
 F - Fab location code
 A - Assembly location code
 Y - Year code
 WW - Week code
 L&T - Assembly lot code

PDFN5060



Equivalent circuit



Absolute Maximum Rating ($T_A=25^\circ C$)

Parameter	Symbol	Limit	Unit
Drain-source voltage	V_{DS}	-20	V
Gate-source voltage	V_{GS}	± 12	
Continuous drain current ($V_{GS}=-4.5V$)	$T_A=25^\circ C$	I_D	A
	$T_A=70^\circ C$	-39	
Pulsed drain current ⁽¹⁾	$I_{D,pulse}$	-220	
Single Pulsed Avalanche Energy ⁽²⁾	E_{AS}	101	mJ
Power dissipation	P_D	80	W
Operating junction and storage temperature range	T_J, T_{stg}	-55 to 150	$^\circ C$

Thermal Characteristic

Parameter	Symbol	Max.	Unit
Thermal resistance, junction-to-case	$R_{\theta JC}$	1.32	$^\circ C/W$
Thermal resistance, junction-to-ambient ⁽⁴⁾	$R_{\theta JA}$	48	

**Electrical characteristics (Ta=25°C ± 3°C)**

Parameter	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Static parameter ⁽⁴⁾						
Drain to source breakdown voltage	V _{(BR)DSS}	V _{GS} = 0 V, I _D = -250 μA	-20			V
Gate-source threshold voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = -250 μA	-0.45	-0.65	-0.9	V
Gate-body leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ±12 V			±100	nA
Zero gate voltage drain current	I _{DSS}	V _{DS} = -20 V, V _{GS} = 0 V			-1	μA
Drain-source on-resistance	R _{DS(on)}	V _{GS} = -4.5V, I _D = -15 A		5.8	7.8	mΩ
	R _{DS(on)}	V _{GS} = -2.5V, I _D = -15 A		7.5	10	mΩ
Dynamic ^(3、 4)						
Total gate charge	Q _g	V _{DS} = -15V, I _D = -10A V _{GS} = -4.5V		59		nC
Gate-source charge	Q _{gs}			9		
Gate-drain charge	Q _{gd}			11.5		
Turn-on delay time	t _{d(on)}	V _{GS} = -4.5V, V _{DS} = -10V I _D = -10 A, R _{GEN} = 3.3Ω		15		ns
Rise time	t _r			57		
Turn-off delay time	t _{d(off)}			186		
Fall time	t _f			39		
Input capacitance	C _{iss}	V _{DS} = -15 V, V _{GS} = 0 V, f = 1 MHz		5700		pF
Output capacitance	C _{oss}			740		
Reverse transfer capacitance	C _{rss}			565		
Reverse Diode Characteristics ⁽⁵⁾						
Diode forward voltage	V _{SD}	I _S = -2.0A, V _{GS} = 0V			-1.2	V
Diode Forward Current	I _s	T _A = 25°C			-60	A

Notes

1. Repetitive Rating : Pulse width limited by maximum junction temperature
2. $L = 0.5\text{ mH}, V_{DD} = -10\text{ V}, R_G = 25\text{ }\Omega$, Starting $T_j = 25^\circ\text{C}$
3. $I_{SD} \leq -20\text{ A}, di/dt = 100\text{ A}/\mu\text{s}, V_{DD} \leq BV_{DSS}$, Starting $T_j = 25^\circ\text{C}$
4. Pulse Test : Pulse width $\leq 300\mu\text{s}$, Duty cycle $\leq 2\%$
5. Essentially independent of operating temperature

Electrical characteristics diagrams

Fig.1 Power Dissipation Derating Curve

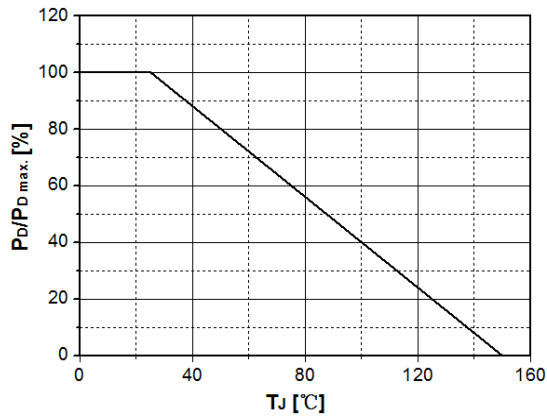


Fig.2 Avalanche Energy Derating Curve vs. Junction Temperature

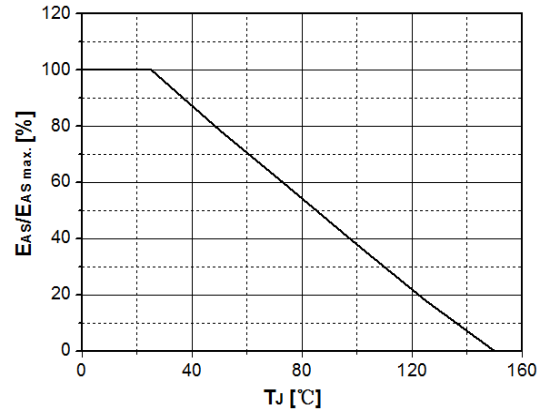


Fig.3 Typical Output Characteristics

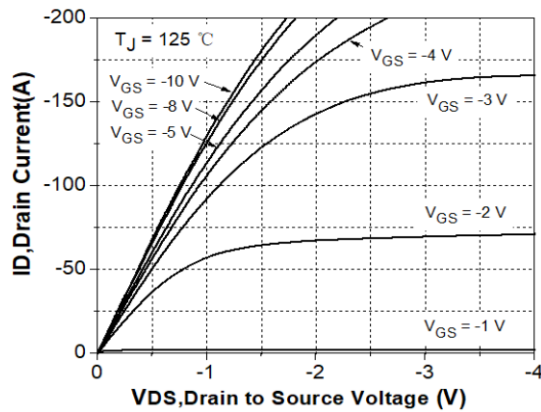


Fig. 4 Transconductance vs. Drain Current

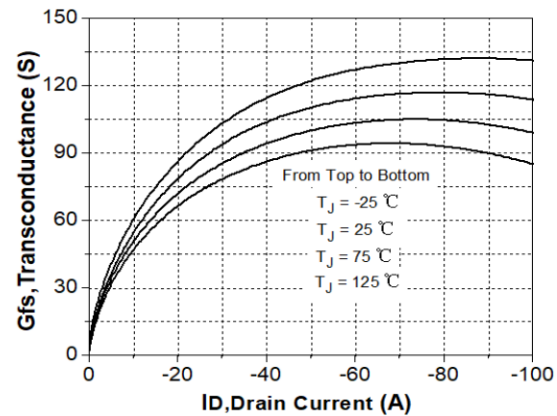


Fig.5 Typical Transfer Characteristics

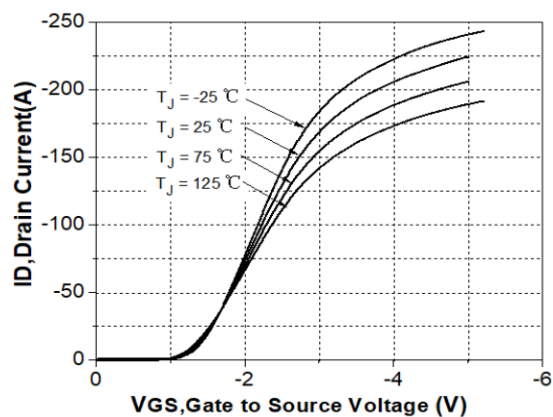
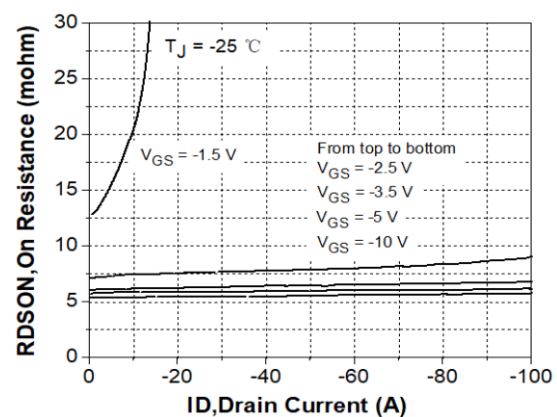


Fig. 6 State Resistance vs. Drain Current @-25°C



Electrical characteristics diagrams

Fig.7 State Resistance vs. Drain Current @25°C

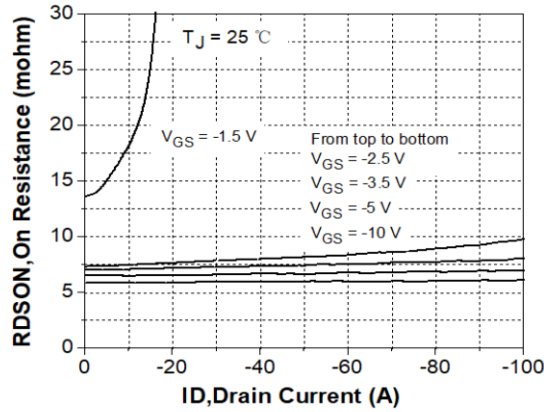


Fig. 8 State Resistance vs. Drain Current @125°C

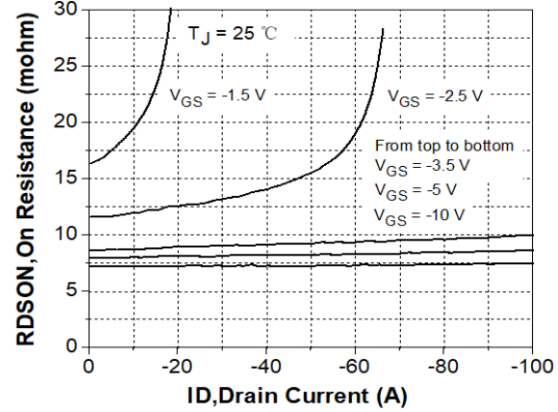


Fig.9 Typical Capacitance vs. Drain Source Voltage

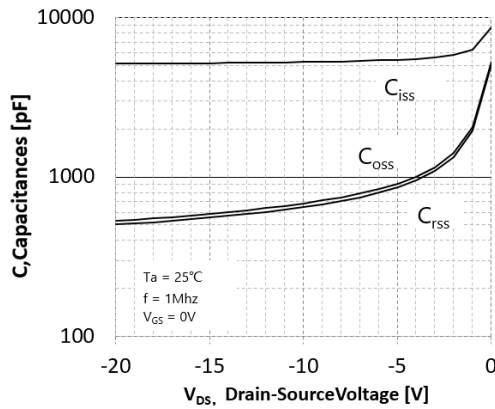


Fig.10 Dynamic Input Characteristics

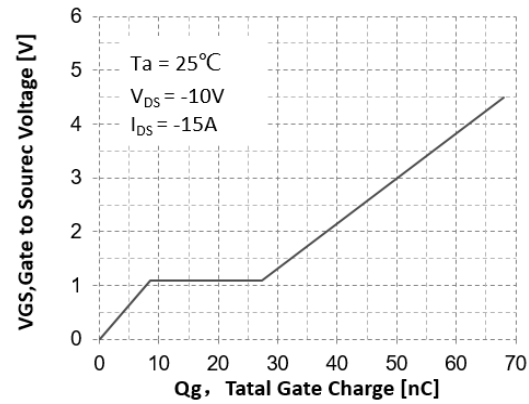


Fig.11 Breakdown Voltage vs. Junction Temperature

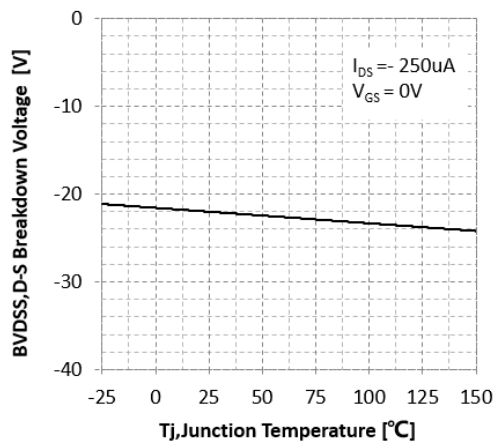
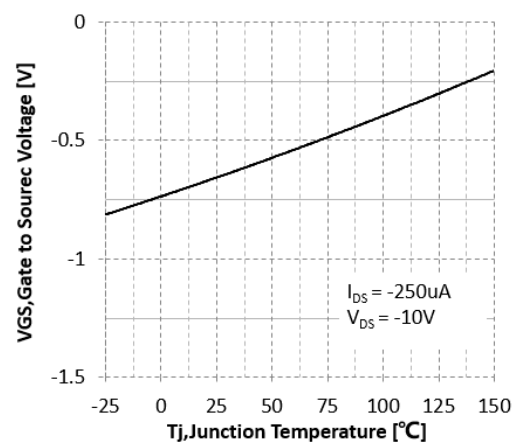


Fig. 12 Gate Threshold Voltage vs. Junction Temperature



Electrical characteristics diagrams

Fig.13 On-Resistance Variation vs. Junction Temperature

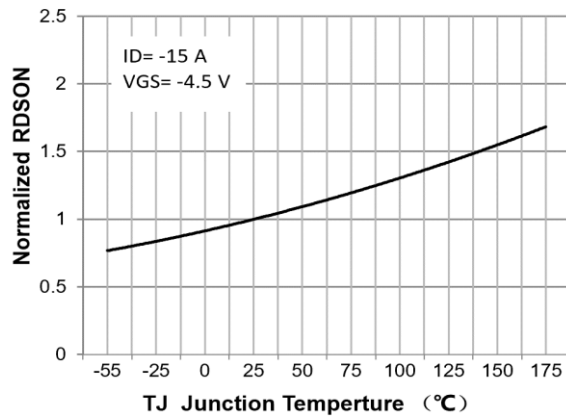


Fig.14 Maximum Drain Current vs. Case Temperature

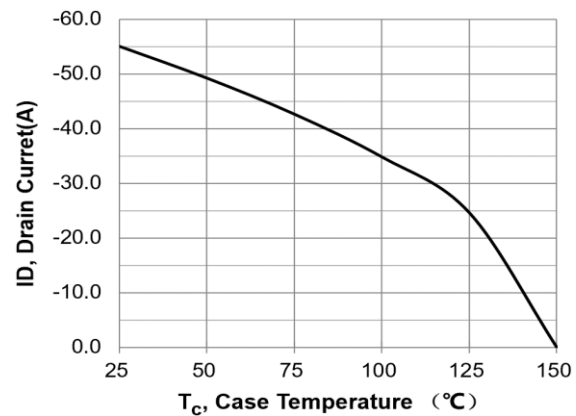
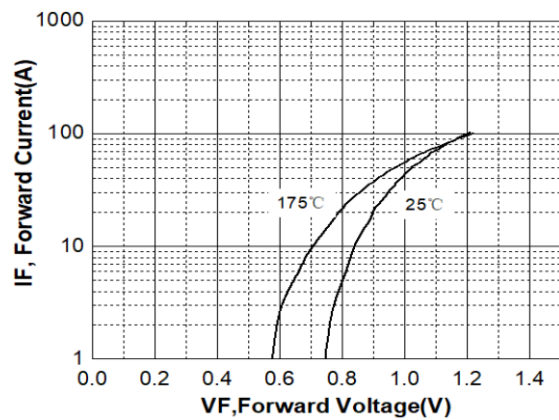


Fig.15 Body Diode Forward Voltage Vs Reverse Drain Current



Electrical characteristics diagrams

Fig.16 Safe Operating Area

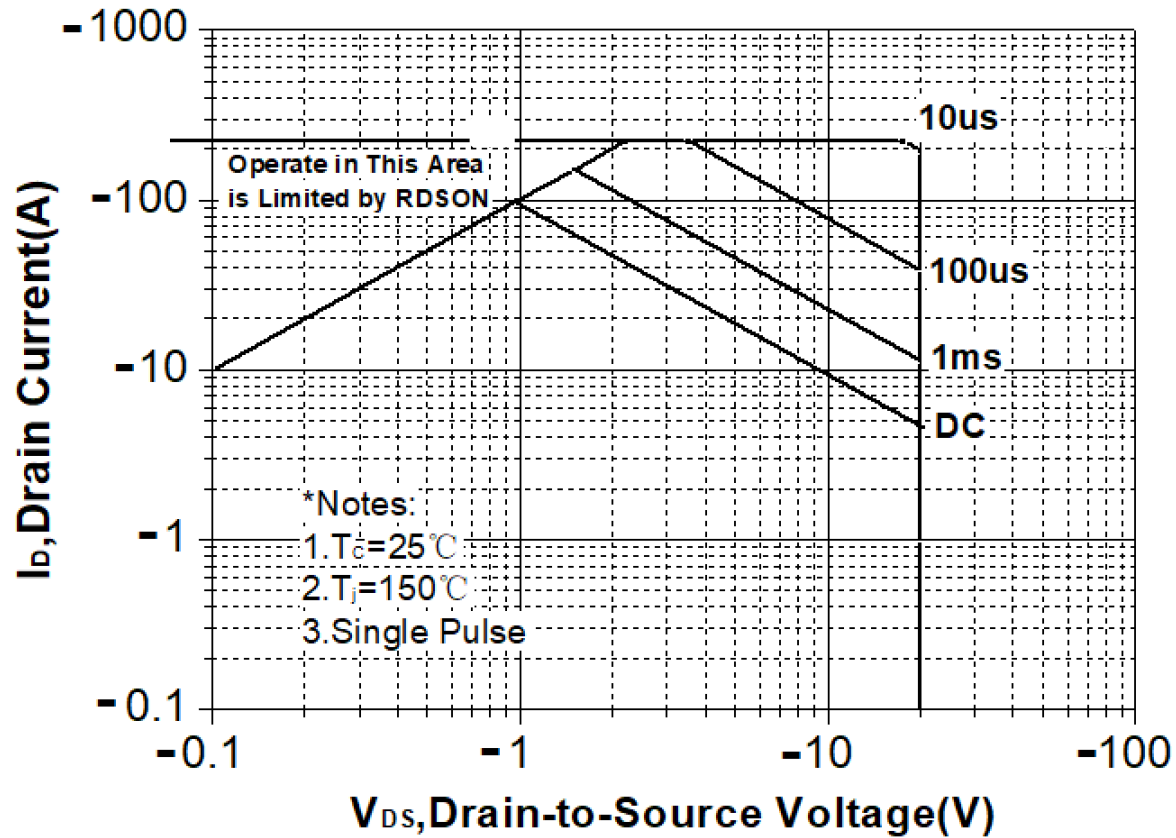
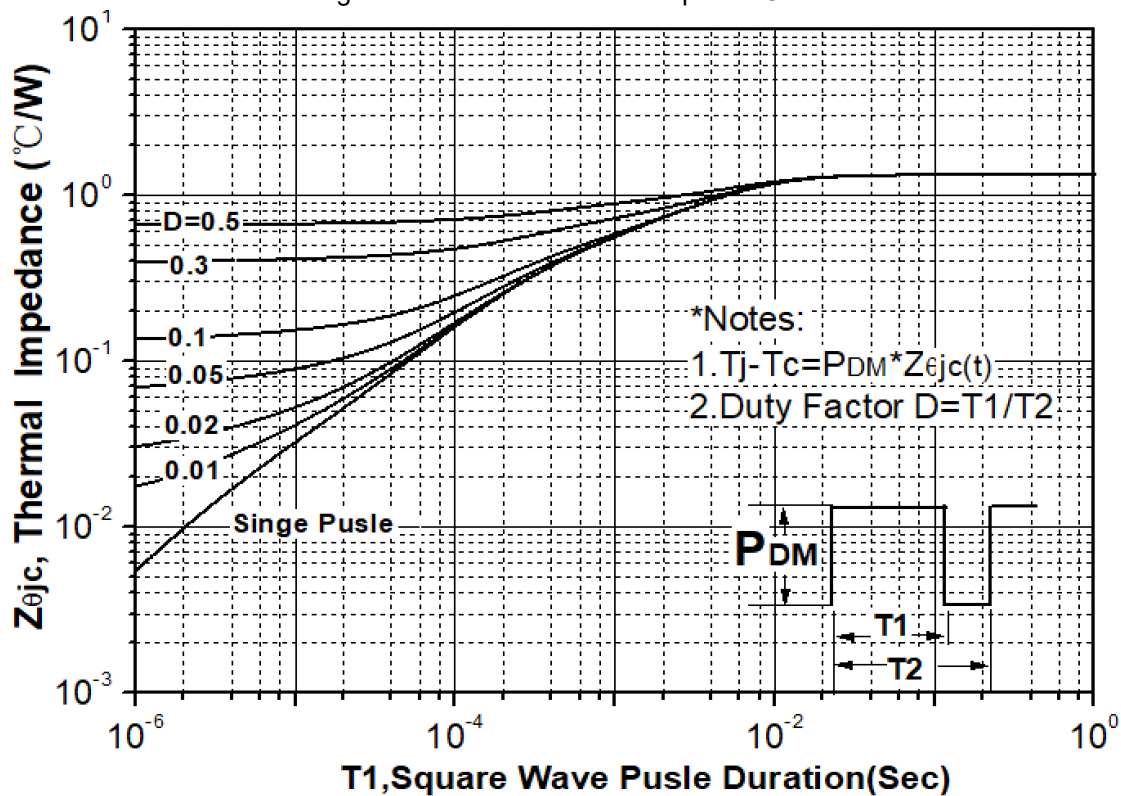
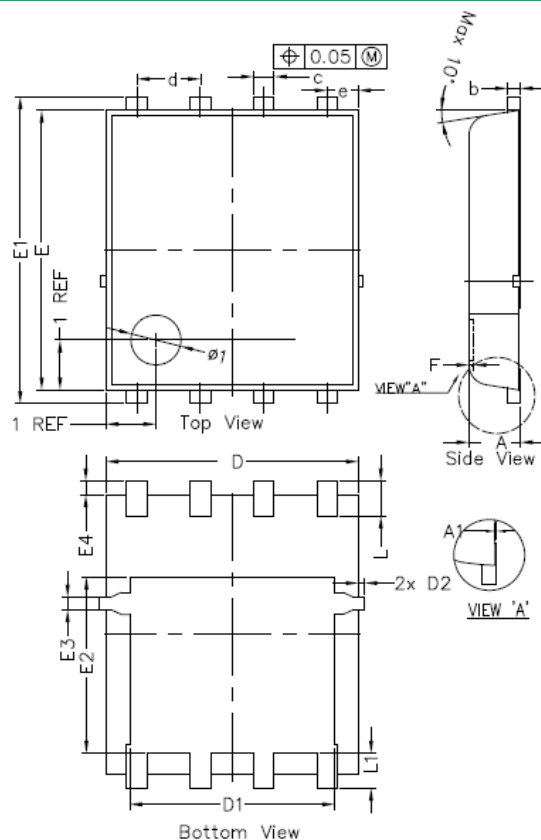


Fig. 17 Transient Thermal Response Curve



Package outline dimensions PDFN5060



Dim	Millimeters		
	Min	Nom	Max
A	0.900	1.000	1.100
A1	0.000	---	0.050
b	0.246	0.254	0.312
c	0.310	0.410	0.510
d	1.27BSC		
D	4.950	5.050	5.150
D1	4.000	4.100	4.200
D2	---	---	0.125
e	0.62BSC		
E	5.500	5.600	5.700
E1	6.050	6.150	6.250
E2	3.425	3.525	3.625
E3	0.150	0.250	0.350
E4	0.175	0.275	0.375
F	---	---	0.100
L	0.500	0.600	0.700
L1	0.600	0.700	0.800

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