

Product Summary

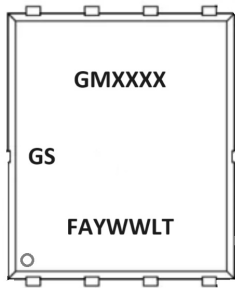
V_{DS} (V)	$R_{DS(on),max}$ (mΩ)	I_D (A)
30	1.7 @ $V_{GS} = 10V$	180 ⁽¹⁾

Features

- Low $R_{DS(on)}$ trench technology
- Low thermal impedance
- Fast switching speed
- 100% avalanche tested

Application

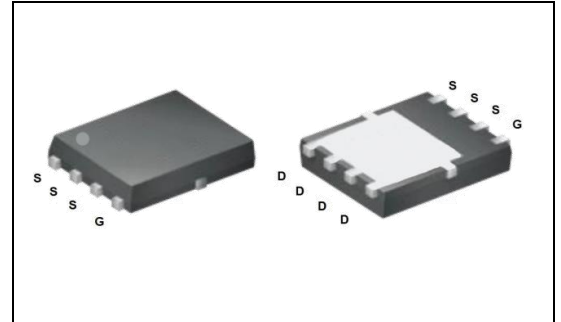
- DC/DC conversion
- Power switch
- Motor drives
- Li- Battery Protection



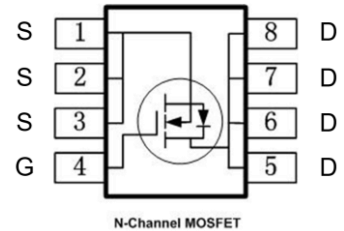
PDFN5X6

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

PDFN5X6



Equivalent circuit



Absolute maximum rating@25°C

Parameter	Symbol	Limit	Unit
Drain-source voltage	V_{DS}	30	V
Gate-source voltage	V_{GS}	± 20	
Continuous drain current	I_D	180	A
	I_D	114	
Pulsed drain current ⁽²⁾	$I_{D,pulse}$	540	
Avalanche energy, single pulse ⁽³⁾	E_{AS}	328	mJ
Power dissipation	P_D	83	W
	P_D	33	
Operating junction and storage temperature range	T_J, T_{stg}	-55 to 150	°C

Thermal Characteristic

Parameter	Symbol	Max.	Unit
Thermal resistance, junction-to-case	$R_{\theta JC}$	1.5	°C/W
Thermal resistance, junction-to-ambient ⁽⁴⁾	$R_{\theta JA}$	20	

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

Parameter	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Static parameter						
Drain to source breakdown voltage	V _{(BR)DSS}	V _{GS} = 0, I _D = 250 μA	30			V
Gate-source threshold voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	1.2	1.7	2.5	V
Gate-body leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ±20 V			±100	nA
Zero gate voltage drain current	I _{DSS}	V _{DS} = 24 V, V _{GS} = 0 V			1	μA
Drain-source on-resistance	R _{DS(on)}	V _{GS} = 10 V, I _D = 30 A		1.36	1.6	mΩ
	R _{DS(on)}	V _{GS} = 4.5 V, I _D = 30 A		2.1	2.5	mΩ
Forward transconductance ⁽⁵⁾	g _{fs}	V _{DS} = 5 V, I _D = 30 A		69		S
Gate resistance	R _g	f = 1 MHz		3.2		Ω
Dynamic ⁽⁵⁾						
Total gate charge V _{GS} = 10V	Q _g	V _{DS} = 15 V, I _D = 20 A, V _{GS} = 10 V		51		nC
Gate-source charge	Q _{gs}			10.4		
Gate-drain charge	Q _{gd}			10.6		
Turn-on delay time	t _{d(on)}	V _{DS} = 15 V, I _D = 20 A, V _{GS} = 10 V, R _{GEN} = 3 Ω		16		ns
Rise time	t _r			14.8		
Turn-off delay time	t _{d(off)}			60.4		
Fall time	t _f			17		
Input capacitance	C _{iss}	V _{DS} = 15 V, V _{GS} = 0 V, f = 1 MHz		3231		pF
Output capacitance	C _{oss}			2186		
Reverse transfer capacitance	C _{rss}			154		
Reverse Diode Characteristics ⁽⁵⁾						
Diode forward voltage	V _{SD}	V _{GS} = 0 V, I _F = 2 A		0.7	1.2	V
Reverse recovery time	t _{rr}	I _F = 20 A, di/dt = 100 A/μs		49		ns
Reverse recovery charge	Q _{rr}			58		nC

Notes

- (1) Limited by maximum junction temperature.
- (2) Pulse width limited by maximum junction temperature.
- (3) V_{DS} = 15 V, V_{GS} = 10 V, L = 1.0 mH.
- (4) Device mounted on FR-4 substrate PC board with 2oz copper in 1inch square cooling area.
- (5) Guaranteed by design, not subject to production testing.

Typical Performance Characteristics

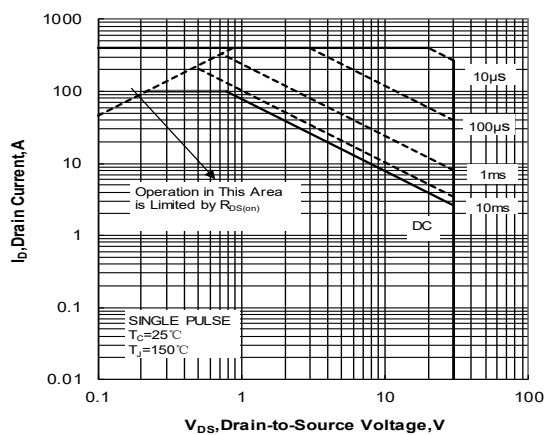


Figure 1 . Maximum Safe Operating Area

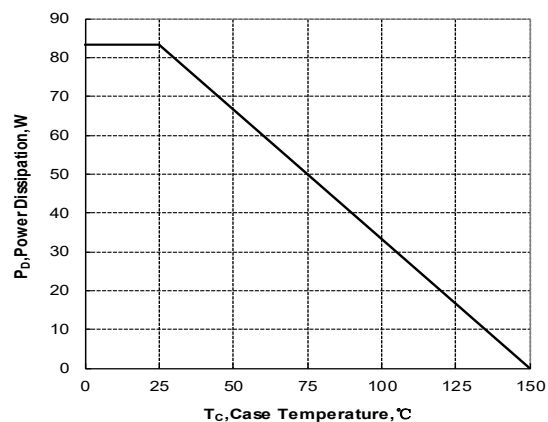


Figure 2. Maximum Power Dissipation vs Case Temperature

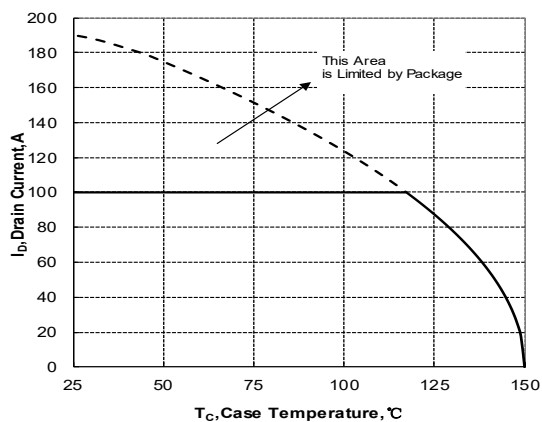


Figure 3. Maximum Continuous Drain Current vs Case Temperature

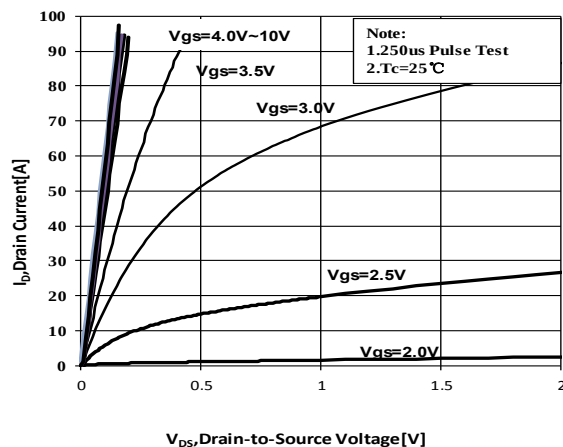


Figure 4. Typical output Characteristics

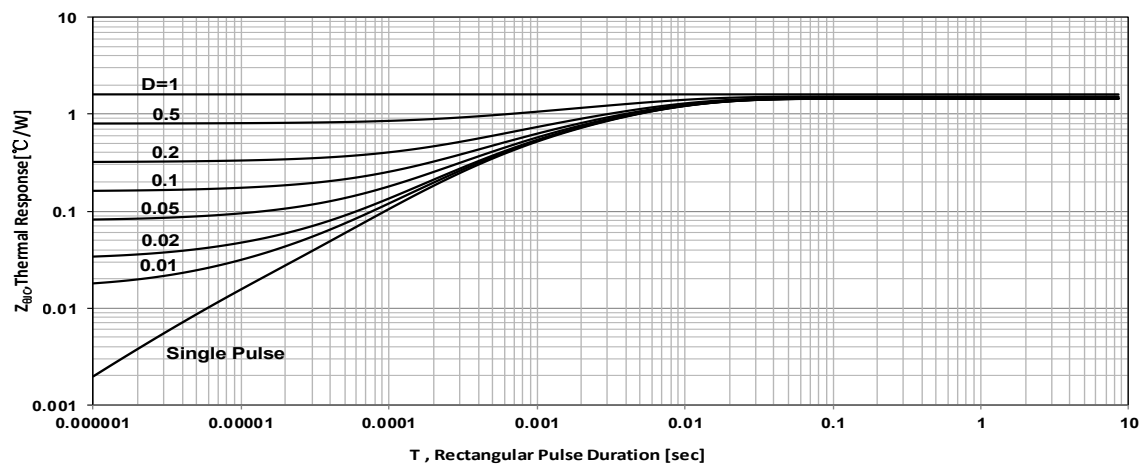


Figure 5 Maximum Effective Thermal Impedance , Junction to Case

Typical Performance Characteristics

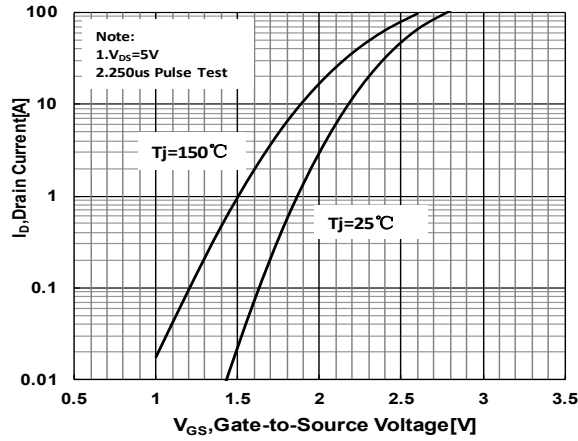


Figure 6 Typical Transfer Characteristics

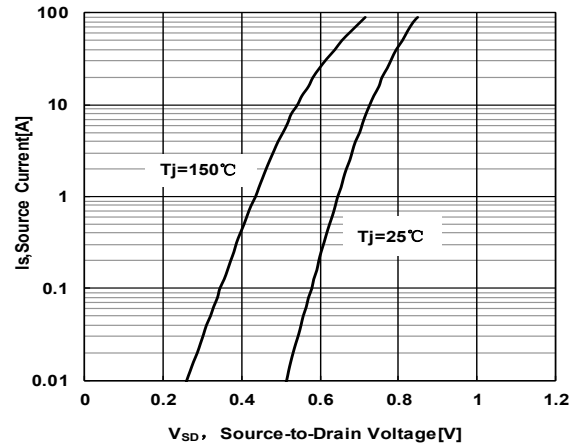


Figure 7 Typical Body Diode Transfer Characteristics

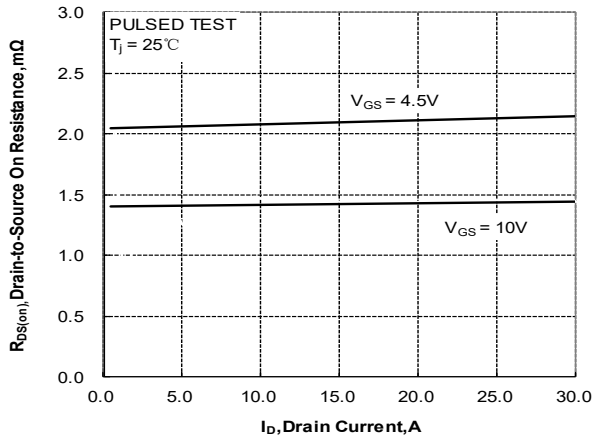


Figure 8. Drain-to-Source On Resistance vs Drain Current

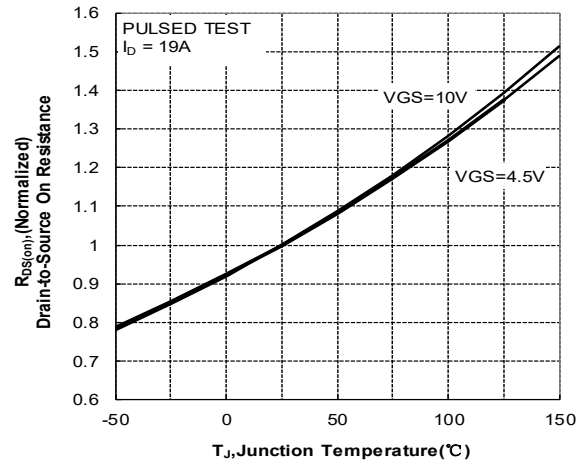


Figure 9. Normalized On Resistance vs Junction Temperature

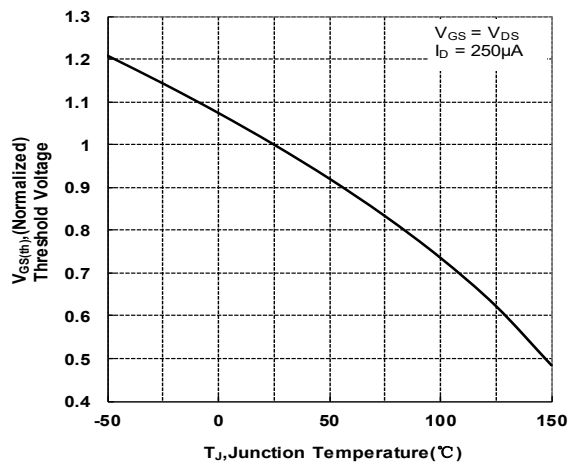


Figure10. Normalized Threshold Voltage vs Junction Temperature

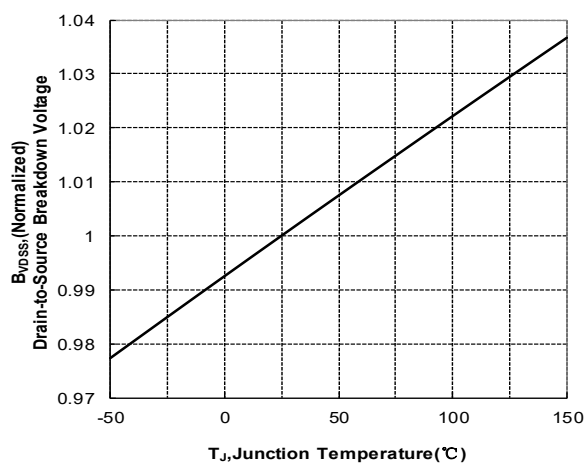


Figure 11. Normalized Breakdown Voltage vs Junction Temperature

Typical Performance Characteristics

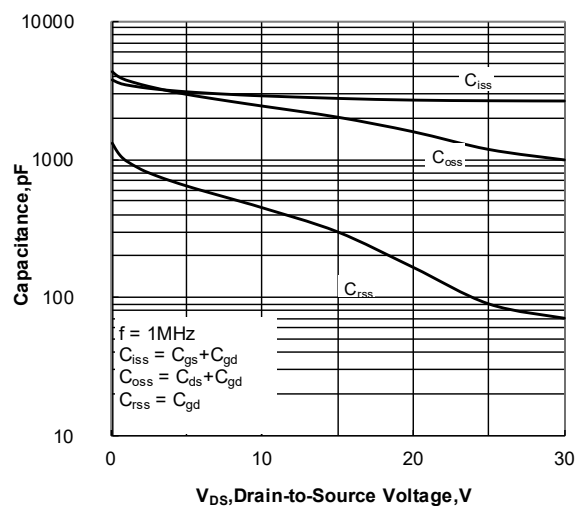


Figure 12. Capacitance Characteristics

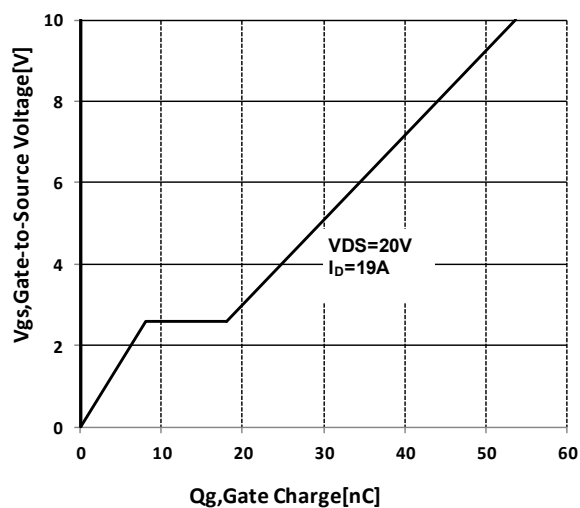
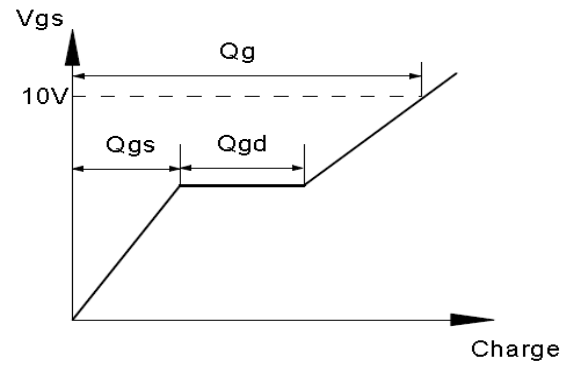
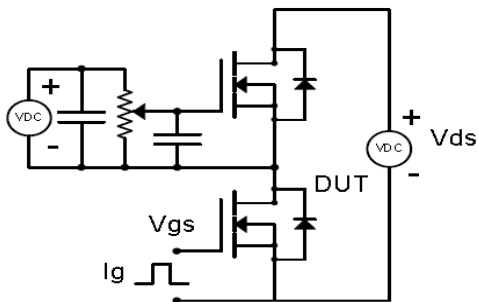


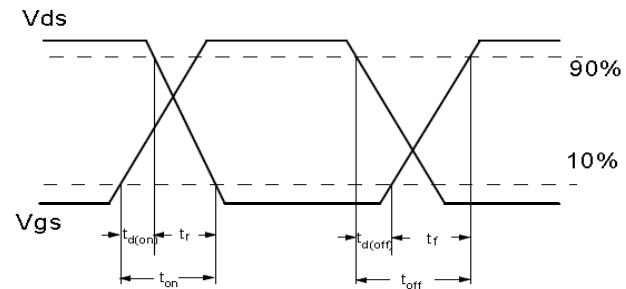
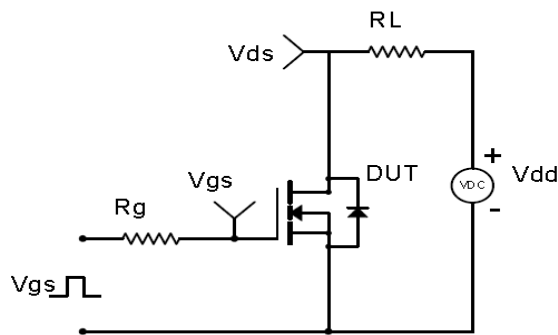
Figure 13 Typical Gate Charge vs Gate to Source Voltage

Test Circuit & Waveform

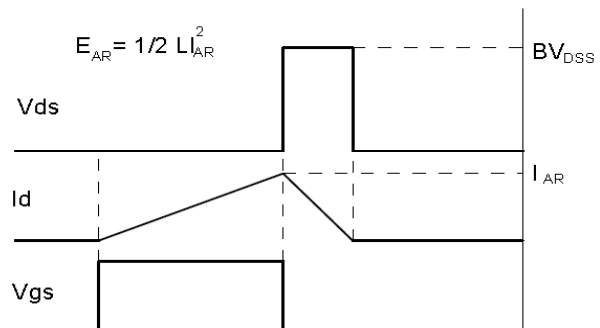
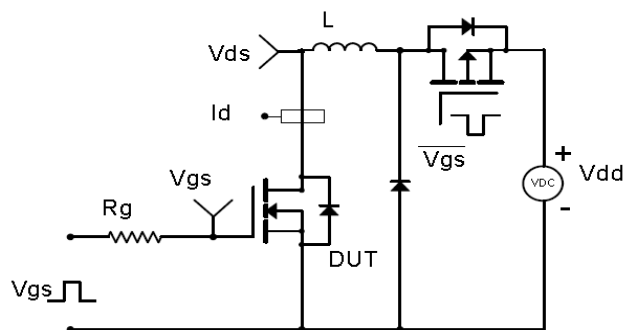
Gate Charge Test Circuit & Waveform



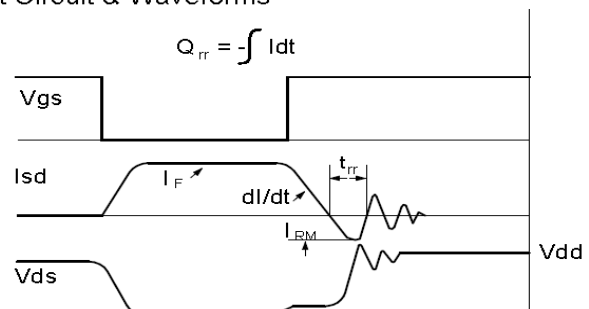
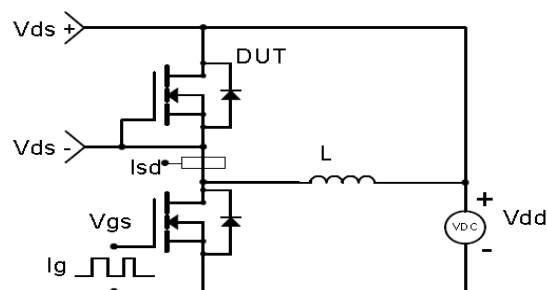
Resistive Switching Test Circuit & Waveforms

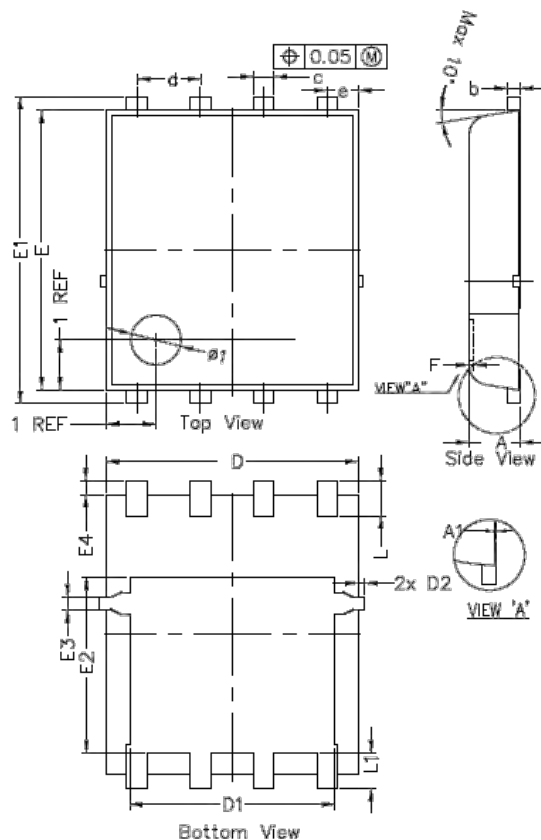


Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



Outline Drawing PDFN5X6


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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