

SDM010P03K

-30V P-Channel MOSFETs

Rev A.1

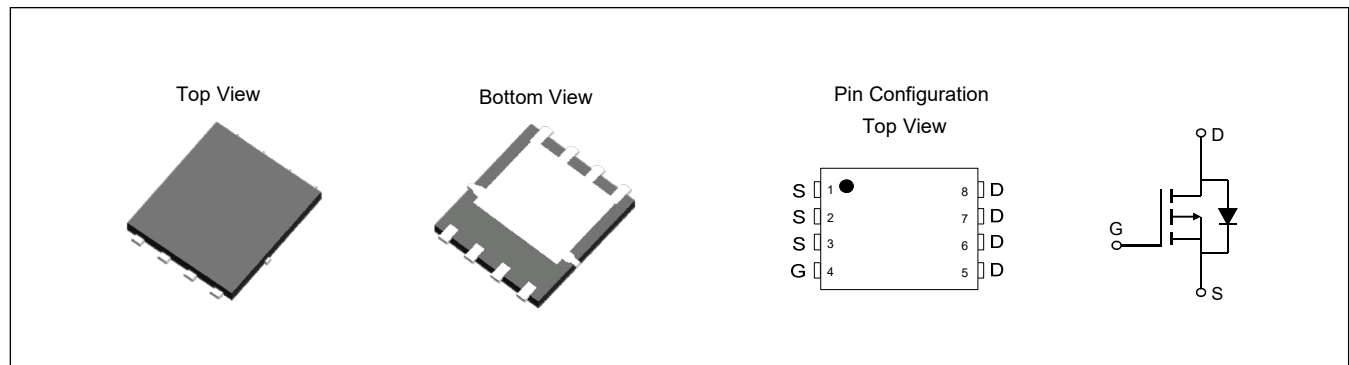
Feature

- ✧ Low $R_{DS(ON)}$
- ✧ Low Gate Charge
- ✧ High current Capability
- ✧ Green product (RoHS compliant), lead free
- ✧ 100% UIS Tested

Product Summary

V_{DS}	-30	V
V_{GS_Typ}	-1.6	V
$R_{DS(ON)_Typ}$ (at $V_{GS} = -10V$)	7.6	m Ω
I_D (at $V_{GS} = 10V$) ⁽¹⁾	-45	A

Type	Package	Marking	OUTLINE	Media	Quantity (pcs)
SDM010P03K	PDFN5x6-8L	M010P03	Tape	13" Reel	5000



Absolute Maximum Ratings (Rating at $T_C=25^\circ C$ unless otherwise noted)

Parameter	Symbol	Maximum	Unit
Drain-Source Voltage	V_{DS}	-30	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current	I_D	$T_C=25^\circ C$	-45
		$T_C=100^\circ C$	-29
Pulsed Drain Current ⁽²⁾	I_{DM}	-180	A
Maximum Body-Diode Continuous Current	I_S	-45	A
Avalanche Energy ⁽³⁾	E_{AS}	113	mJ
Power Dissipation ⁽⁴⁾	P_D	34.4	W
Junction and Storage Temperature Range	T_J, T_{STG}	-55 to +150	$^\circ C$

Electrical Characteristics (Rating at $T_J=25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
STATIC PARAMETERS						
BV_{DSS}	Drain-Source Breakdown Voltage	$I_D=-250\mu\text{A}$, $V_{GS}=0\text{V}$	-30	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=-30\text{V}$, $V_{GS}=0\text{V}$ $T_J=55^\circ\text{C}$	-	-	-1	μA
			-	-	-5	
I_{GSS}	Gate-Body Leakage Current	$V_{DS}=0\text{V}$, $V_{GS}=\pm 20\text{V}$	-	-	± 100	nA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}$, $I_D=-250\mu\text{A}$	-1.0	-1.6	-2.5	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=-10\text{V}$, $I_D=-30\text{A}$	-	7.6	9.5	$\text{m}\Omega$
		$V_{GS}=-4.5\text{V}$, $I_D=-20\text{A}$	-	12	15.6	$\text{m}\Omega$
V_{SD}	Diode Forward Voltage	$I_S=-15\text{A}$, $V_{GS}=0\text{V}$	-	-	-1.2	V
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	$V_{GS}=0\text{V}$, $V_{DS}=-15\text{V}$, $f=1\text{MHz}$	-	3565	-	pF
C_{oss}	Output Capacitance		-	417	-	pF
C_{rss}	Reverse Transfer Capacitance		-	375	-	pF
SWITCHING PARAMETERS ⁽⁵⁾						
Q_g	Total Gate Charge	$V_{GS}=-10\text{V}$, $V_{DS}=-15\text{V}$, $I_D=-20\text{A}$	-	39	-	nC
Q_{gs}	Gate Source Charge		-	6.7	-	nC
Q_{gd}	Gate Drain Charge		-	9.5	-	nC
$t_{D(on)}$	Turn-On Delay Time	$V_{GS}=-10\text{V}$, $V_{DD}=-15\text{V}$, $I_D=-30\text{A}$, $R_{GEN}=2.5\Omega$	-	17	-	ns
t_r	Turn-On Rise Time		-	23	-	ns
$t_{D(off)}$	Turn-Off Delay Time		-	69	-	ns
t_f	Turn-Off Fall Time		-	53	-	ns

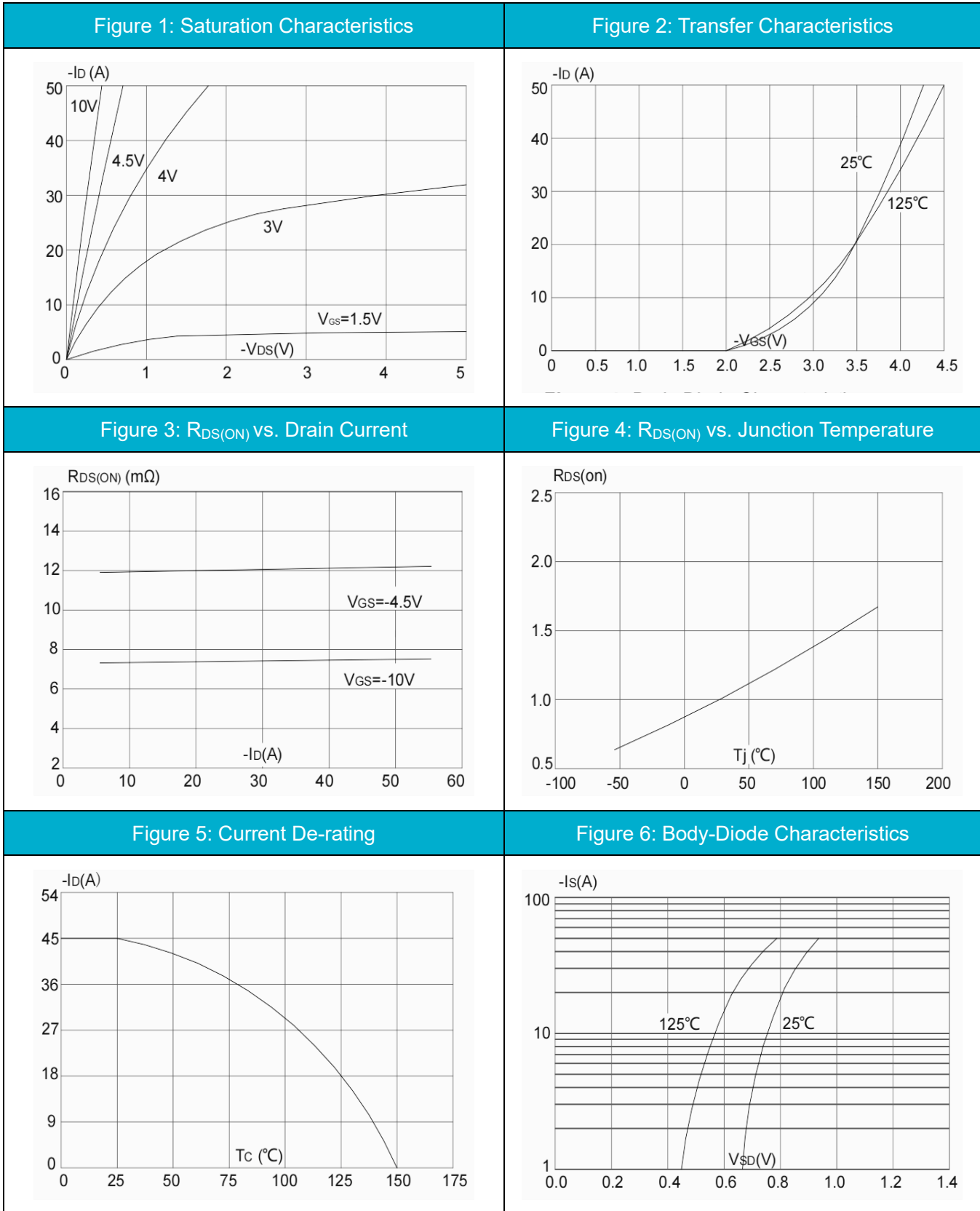
Thermal Resistances

Symbol	Parameter	Typ	Max	Unit
$R_{\theta JC}$	Thermal resistance from junction to case	-	3.6	$^{\circ}\text{C}/\text{W}$

Notes:

1. Computed continuous current assumes the condition of T_{J_Max} while the actual continuous depends on the thermal & electro-mechanical application board design.
2. This single-pulse measurement was taken under $T_{J_Max}=150^{\circ}\text{C}$.
3. This single-pulse measurement was taken under the following condition [$L=0.5\text{mH}$, $V_{GS}=-10\text{V}$, $V_{DD}=-20\text{V}$] while its value is limited by $T_{J_Max}=150^{\circ}\text{C}$.
4. The power dissipation P_D is based on $T_{J_Max}=150^{\circ}\text{C}$.
5. This value is guaranteed by design hence it is not included in the production test.

Typical Electrical and Thermal Characteristics



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Figure 7: Gate-Charge characteristics

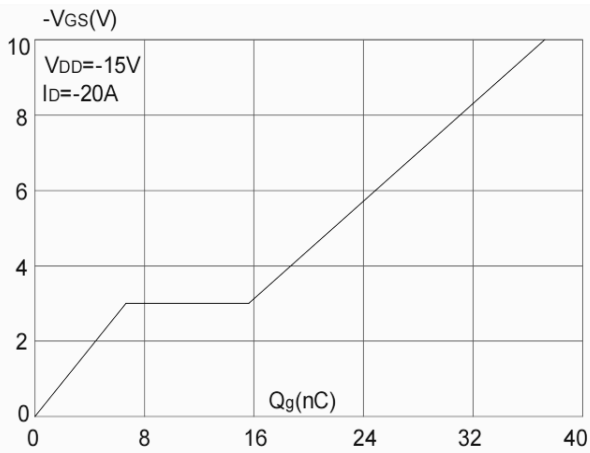


Figure 8: Capacitance characteristics

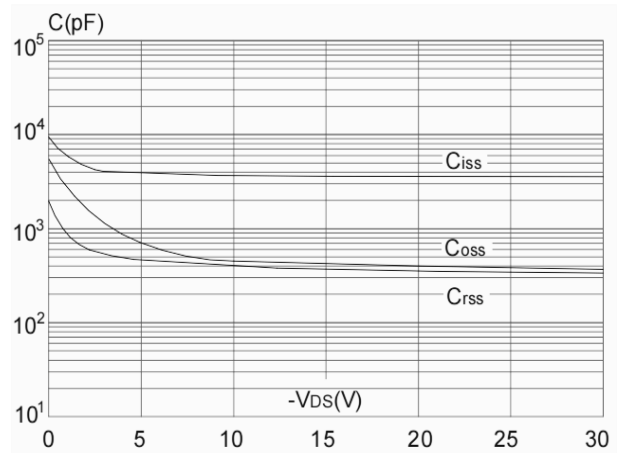


Figure 9: Maximum Safe Operating Area

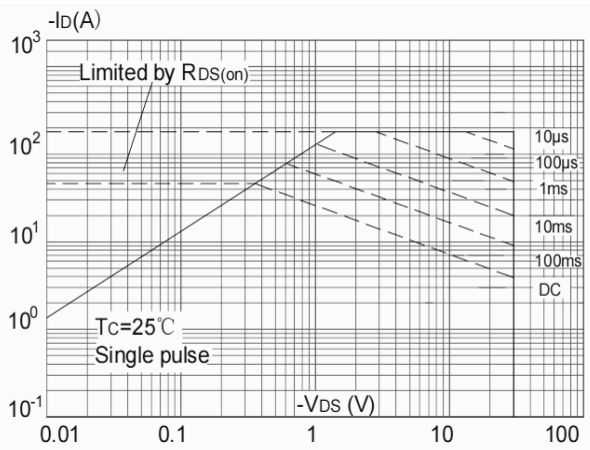
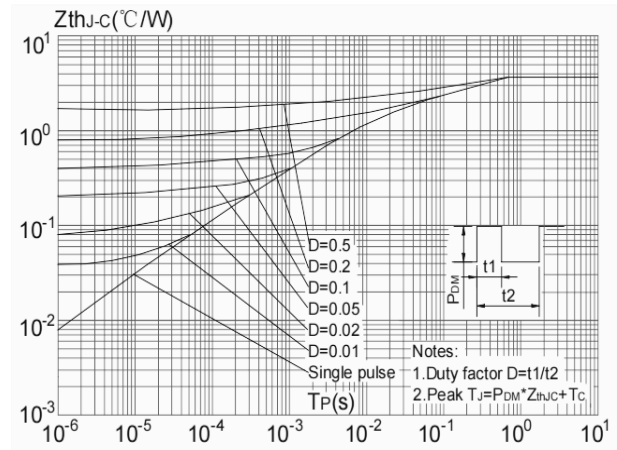


Figure 10: Normalized Maximum Transient Thermal Impedance



Test Circuit

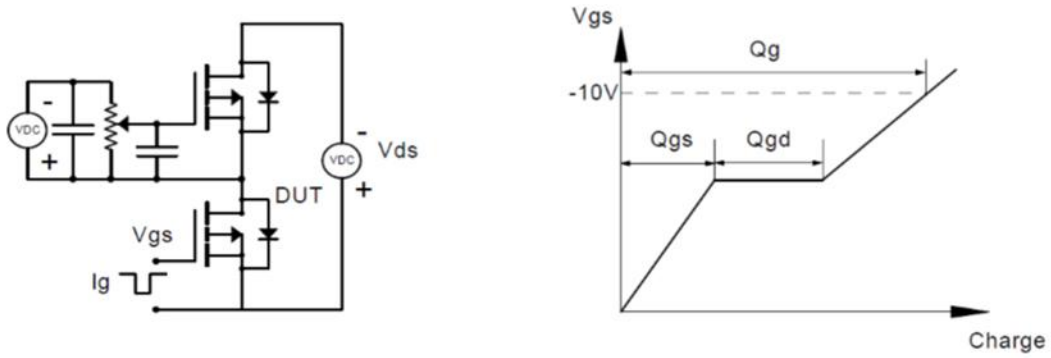


Figure1: Gate Charge Test Circuit & Waveforms

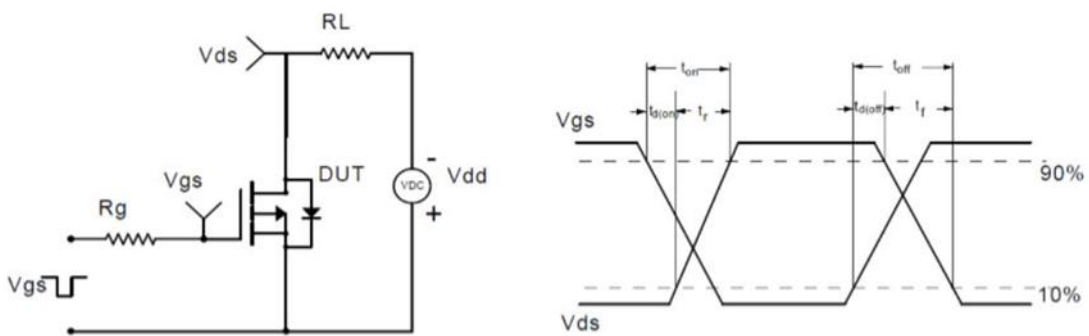


Figure2: Resistive Switching Test Circuit & Waveforms

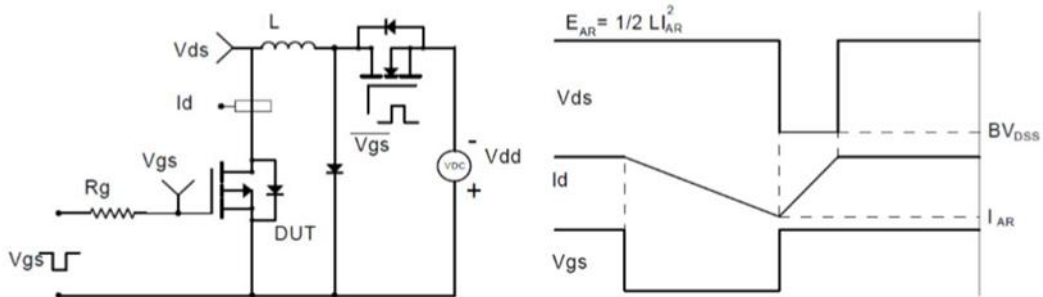


Figure3: Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

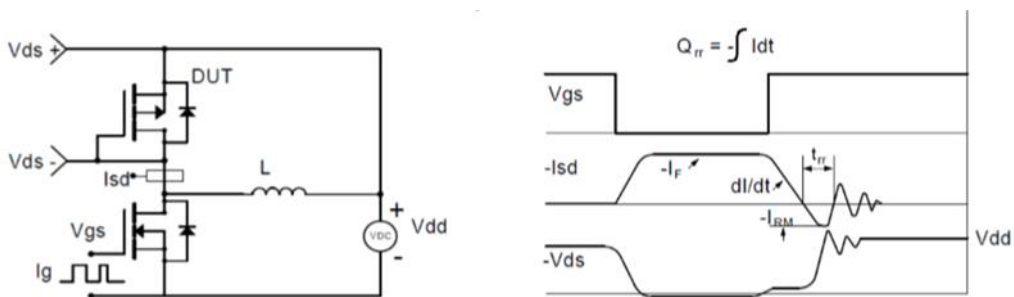
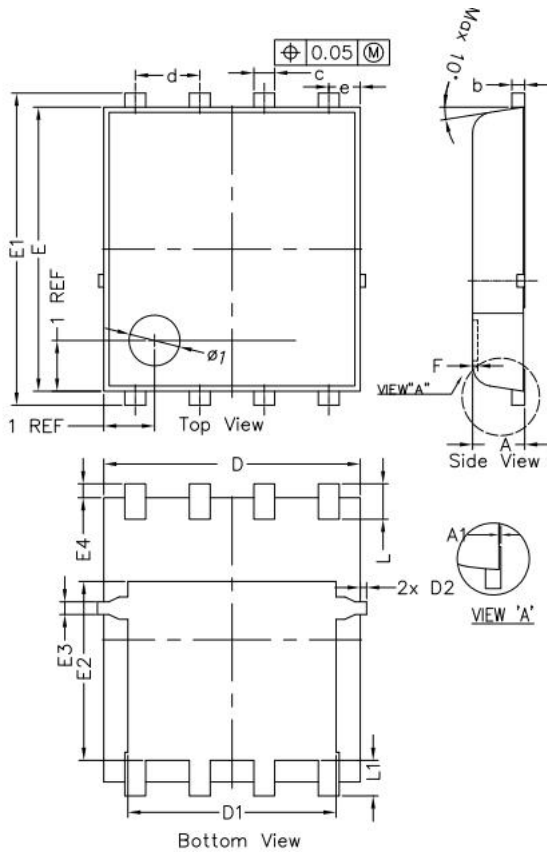


Figure4: Diode Recovery Test Circuit & Waveforms

PDFN5x6-8L Package Information



SYMBOLS	DIMENSION IN MM			DIMENSION IN INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
* A	0.900	1.000	1.100	0.035	0.039	0.043
A1	0.000	---	0.050	0.000	----	0.002
b	0.246	0.254	0.312	0.010	0.010	0.012
* c	0.310	0.410	0.510	0.012	0.016	0.020
d	1.27 BSC			0.050 BSC		
* D	4.950	5.050	5.150	0.195	0.199	0.203
D1	4.000	4.100	4.200	0.157	0.161	0.165
* D2	---	---	0.125	---	---	0.005
e	0.62 BSC			0.024 BSC		
* E	5.500	5.600	5.700	0.217	0.220	0.224
* E1	6.050	6.150	6.250	0.238	0.242	0.246
E2	3.425	3.525	3.625	0.135	0.139	0.143
E3	0.150	0.250	0.350	0.006	0.010	0.014
* E4	0.175	0.275	0.375	0.007	0.011	0.015
F	-	-	0.100	-	-	0.004
* L	0.500	0.600	0.700	0.02	0.02	0.03
L1	0.600	0.700	0.800	0.02	0.03	0.03

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