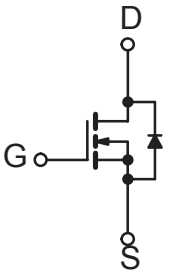
N-Channel MOSFET

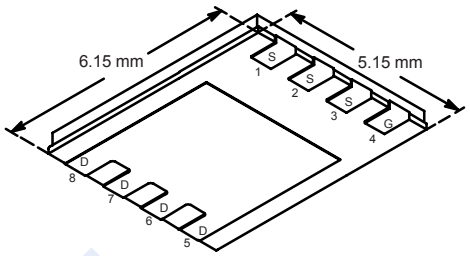
SIR422DP (KIR422DP)

■ Features

- V_{DS} (V) = 40V
- I_D = 40 A (V_{GS} = 10V)
- $R_{DS(ON)}$ < 7.5 mΩ (V_{GS} = 10V)
- $R_{DS(ON)}$ < 9 mΩ (V_{GS} = 4.5V)



PowerPAK® SO-8 (DFN5X6)



Bottom View

■ Absolute Maximum Ratings Ta = 25℃

Parameter		Symbol	Rating	Unit
Drain-Source Voltage		V_{DS}	40	V
Gate-Source Voltage		V_{GS}	±20	
Continuous Drain Current	Tc=25℃	I_D	40	A
	Tc=70℃		40	
	Ta=25℃		20.5	
	Ta=70℃		16.4	
Pulsed Drain Current		I_{DM}	70	
Avalanche Current	L = 0.1 mH	I_{AS}	30	
Avalanche Energy		E_{AS}	45	mJ
Power Dissipation	Tc=25℃	P_D	34.7	W
	Tc=70℃		22.2	
	Ta=25℃		5	
	Ta=70℃		3.2	
Thermal Resistance.Junction- to-Ambient	t ≤ 10 s	R_{thJA}	25	℃/W
Thermal Resistance.Junction- to-Case		R_{thJC}	3.6	
Junction Temperature		T_J	150	℃
Storage Temperature Range		T_{stg}	-55 to 150	

N-Channel MOSFET

SIR422DP (KIR422DP)

■ Electrical Characteristics Ta = 25℃

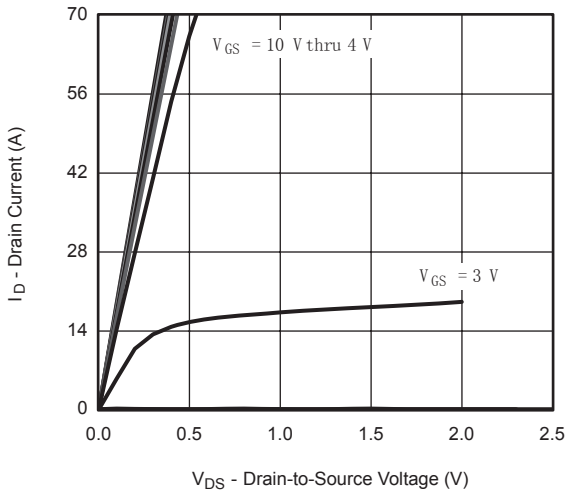
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	V_{DSS}	I_D=250μA, V_{GS}=0V	40			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=40V, V_{GS}=0V			1	uA
		V_{DS}=40V, V_{GS}=0V, T_J=55℃			5	
Gate-Body Leakage Current	I_{GSS}	V_{DS}=0V, V_{GS}=±20V			±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250μA	1.2		2.5	V
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=20A (Note.1)			7.5	mΩ
		V_{GS}=4.5V, I_D=15A (Note.1)			9	
On State Drain Current	$I_{D(ON)}$	V_{GS}=10V, V_{DS}=5 V (Note.1)	50			A
Forward Transconductance	g_{FS}	V_{DS}=15V, I_D=20A (Note.1)		70		S
Input Capacitance	C_{iss}	V_{GS}=0V, V_{DS}=20V, f=1MHz		1785		pF
Output Capacitance	C_{oss}			264		
Reverse Transfer Capacitance	C_{rss}			120		
Gate Resistance	R_g	V_{GS}=0V, V_{DS}=0V, f=1MHz	0.2		1.6	Ω
Total Gate Charge	Q_g	V_{GS}=10V, V_{DS}=20V, I_D=20A			48	nC
		V_{GS}=4.5V, V_{DS}=20V, I_D=20A			25	
Gate Source Charge	Q_{gs}			4.5		
Gate Drain Charge	Q_{gd}			5.6		
Turn-On DelayTime	$t_{d(on)}$	V_{DD} = 20 V, R_L = 2 Ω I_D ≅ 10 A, V_{GEN} = 4.5 V, R_g = 1 Ω			35	ns
Turn-On Rise Time	t_r				145	
Turn-Off DelayTime	$t_{d(off)}$				55	
Turn-Off Fall Time	t_f				22	
Turn-On DelayTime	$t_{d(on)}$	V_{DD} = 20 V, R_L = 2 Ω I_D ≅ 10 A, V_{GEN} = 10 V, R_g = 1 Ω			18	
Turn-On Rise Time	t_r				20	
Turn-Off DelayTime	$t_{d(off)}$				40	
Turn-Off Fall Time	t_f				16	
Body Diode Reverse Recovery Time	t_{rr}	I_F = 10 A, dI/dt = 100 A/μs, T_J = 25 °C			40	
Body Diode Reverse Recovery Charge	Q_{rr}				25	nC
Reverse Recovery Fall Time	t_a			13		ns
Reverse Recovery Rise Time	t_b			9		
Maximum Body-Diode Continuous Current	I_S	Tc = 25 °C			40	A
Pulse Diode Forward Current	I_{SM}				70	
Diode Forward Voltage	V_{SD}	I_S=4A,V_{GS}=0V			1.2	V

Note.1: Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2 %.

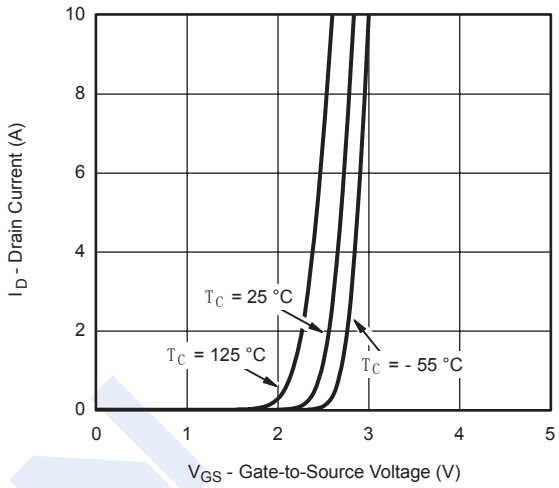
N-Channel MOSFET

SIR422DP (KIR422DP)

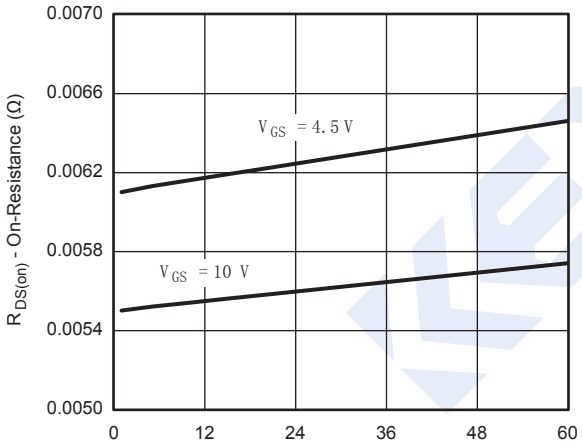
■ Typical Characterisitics



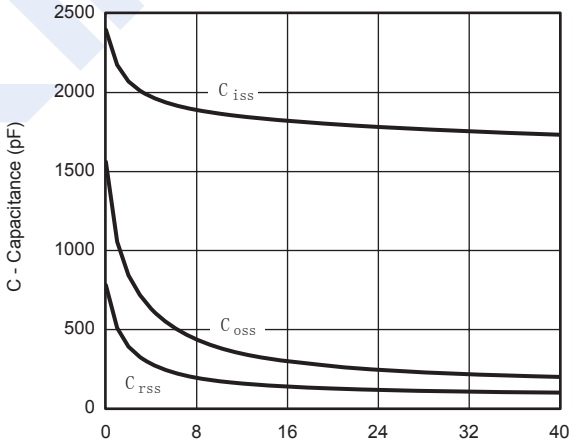
Output Characteristics



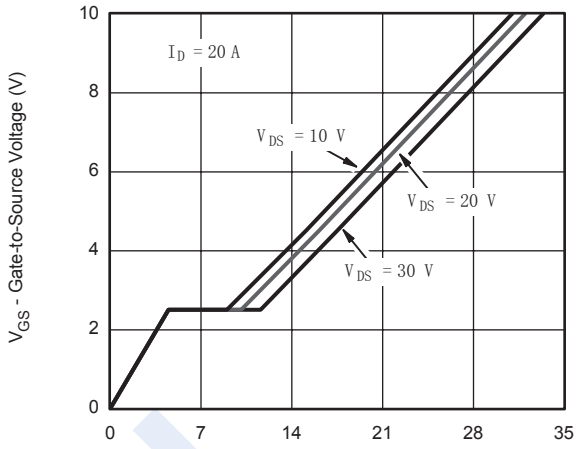
Transfer Characteristics



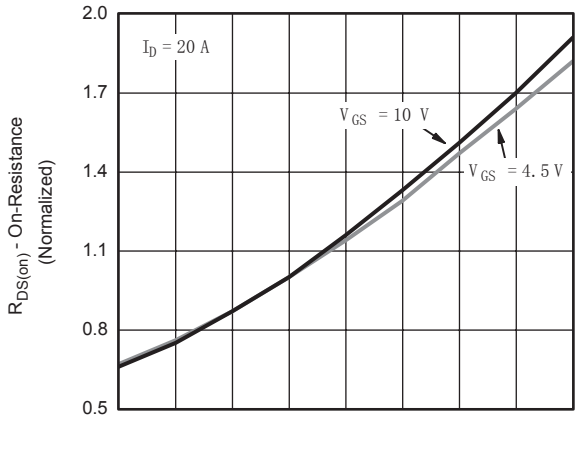
On-Resistance vs. Drain Current and Gate Voltage



Capacitance



Gate Charge

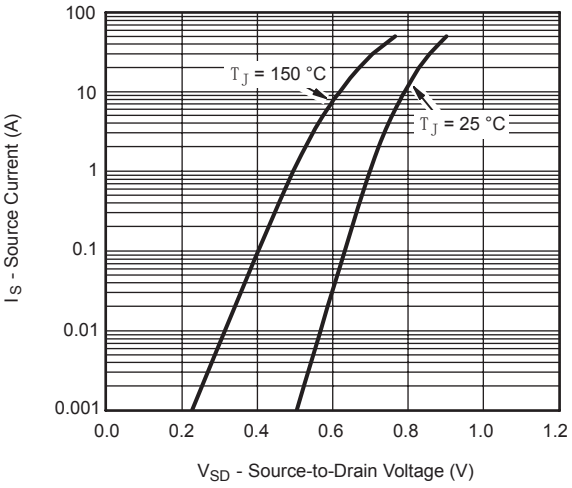


On-Resistance vs. Junction Temperature

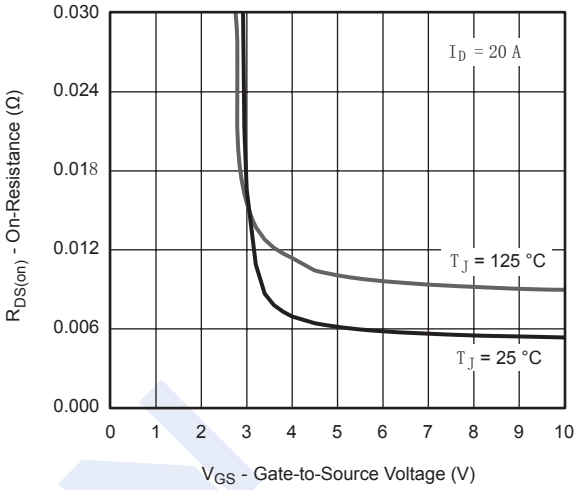
N-Channel MOSFET

SIR422DP (KIR422DP)

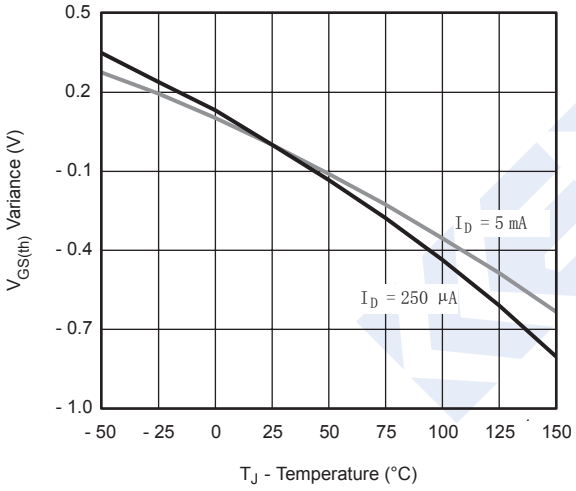
■ Typical Characterisitics



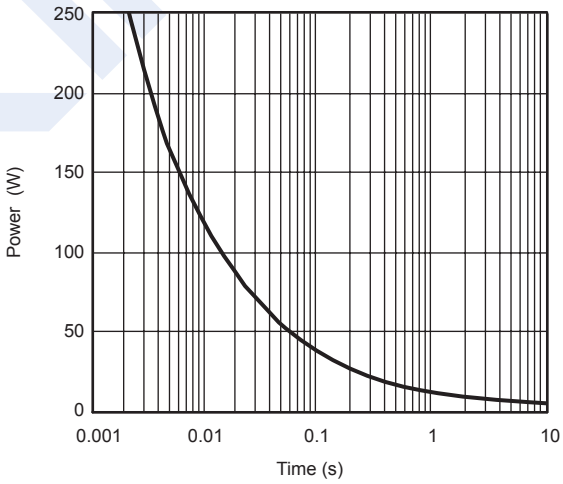
Source-Drain Diode Forward Voltage



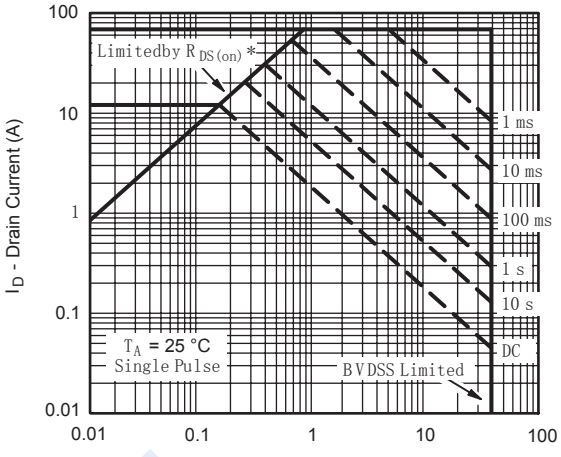
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage

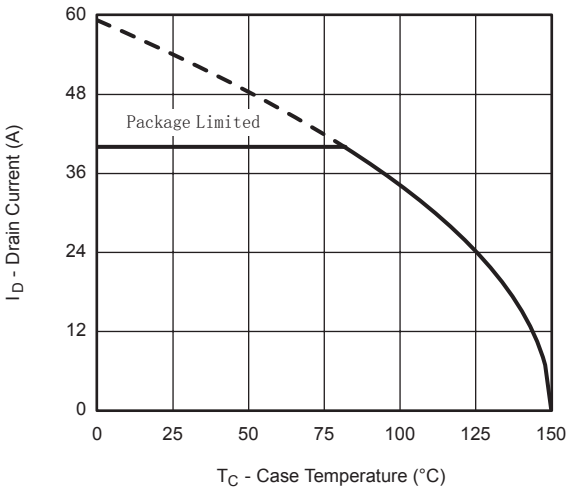


Single Pulse Power (Junction-to-Ambient)



* V_{GS} > minimum V_{GS} at which $R_{DS(on)}$ is specified

Safe Operating Area, Junction-to-Ambient

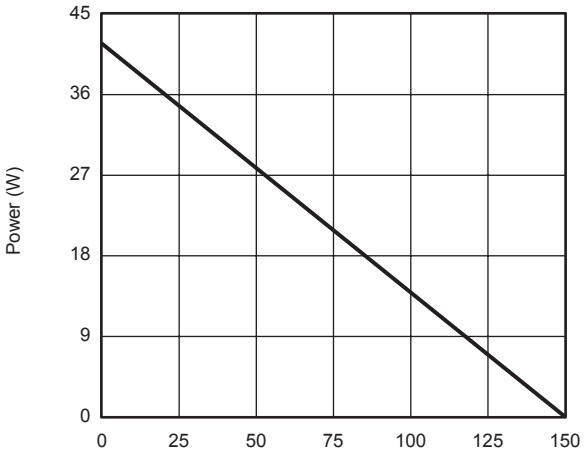


Current Derating*

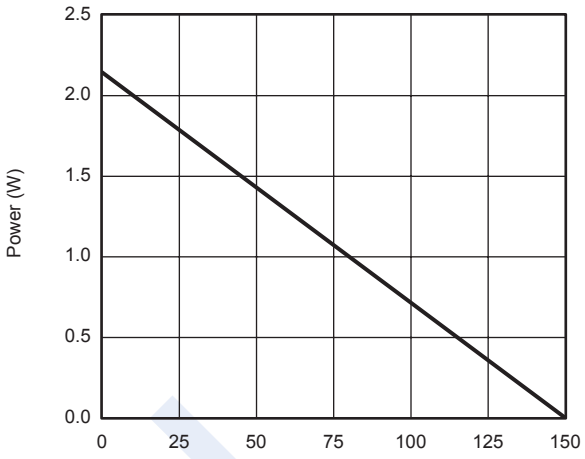
N-Channel MOSFET

SIR422DP (KIR422DP)

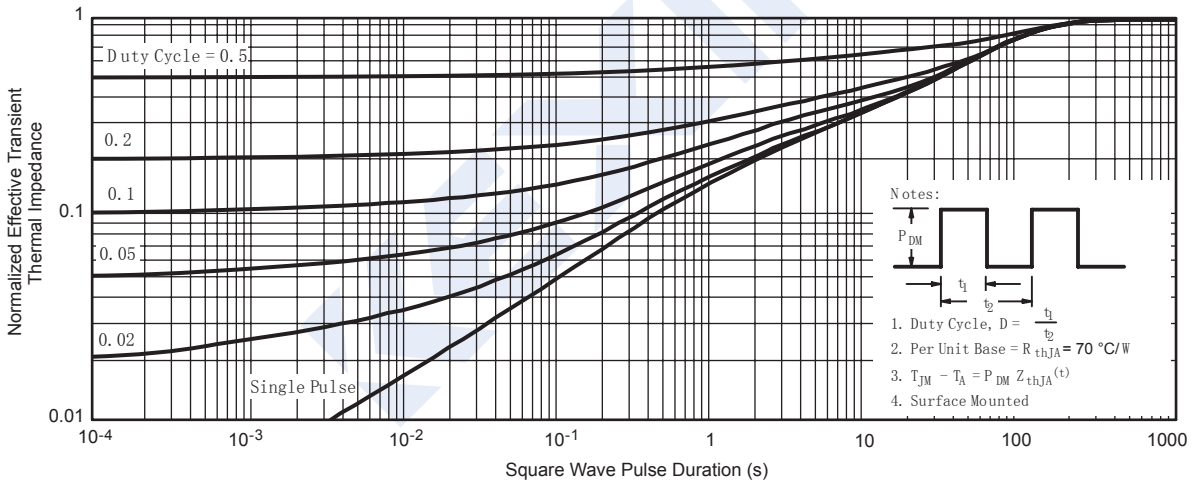
■ Typical Characterisitics



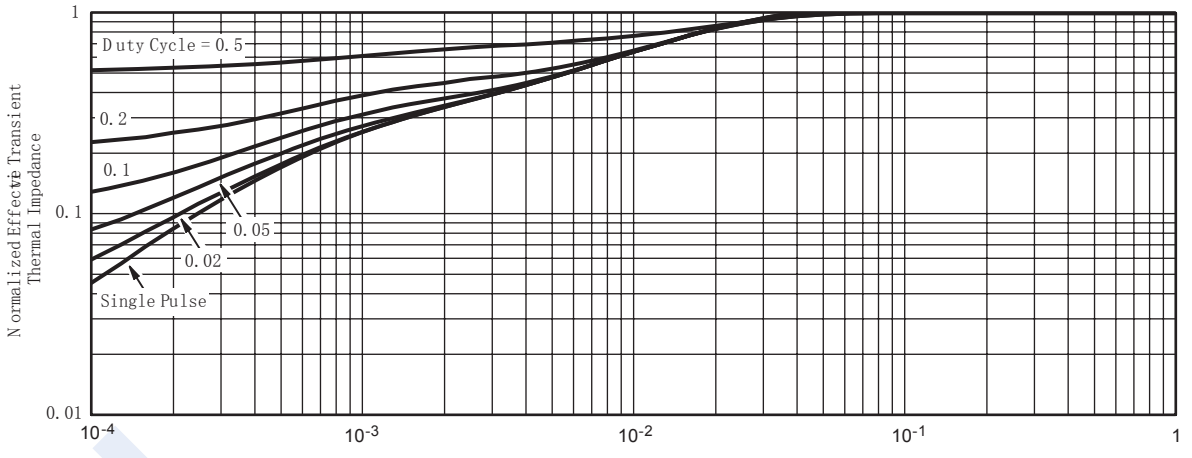
Power, Junction-to-Case



Power, Junction-to-Ambient

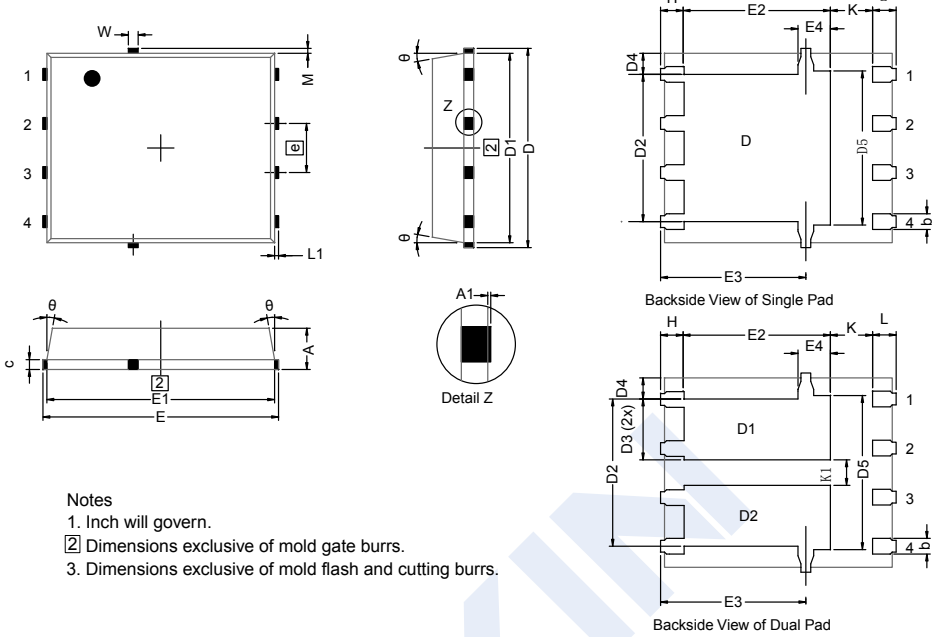


Normalized Thermal Transient Im pedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Case

PowerPAK ® SO-8(DFN5X6), (Single/Dual)



Notes
1. Inch will govern.
2 Dimensions exclusive of mold gate burrs.
3. Dimensions exclusive of mold flash and cutting burrs.

DIM.	MILLIMETERS			INCHES		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A	0.97	1.04	1.12	0.038	0.041	0.044
A1		–	0.05	0	–	0.002
b	0.33	0.41	0.51	0.013	0.016	0.020
c	0.23	0.28	0.33	0.009	0.011	0.013
D	5.05	5.15	5.26	0.199	0.203	0.207
D1	4.80	4.90	5.00	0.189	0.193	0.197
D2	3.56	3.76	3.91	0.140	0.148	0.154
D3	1.32	1.50	1.68	0.052	0.059	0.066
D4	0.57 typ.			0.0225 typ.		
D5	3.98 typ.			0.157 typ.		
E	6.05	6.15	6.25	0.238	0.242	0.246
E1	5.79	5.89	5.99	0.228	0.232	0.236
E2 (for AL product)	3.30	3.48	3.66	0.130	0.137	0.144
E2 (for other product)	3.48	3.66	3.84	0.137	0.144	0.151
E3	3.68	3.78	3.91	0.145	0.149	0.154
E4 (for AL product)	0.58 typ.			0.023 typ.		
E4 (for other product)	0.75 typ.			0.030 typ.		
e	1.27 BSC			0.050 BSC		
K (for AL product)	1.45 typ.			0.057 typ.		
K (for other product)	1.27 typ.			0.050 typ.		
K1	0.56	-	-	0.022	-	-
H	0.51	0.61	0.71	0.020	0.024	0.028
L	0.51	0.61	0.71	0.020	0.024	0.028
L1	0.06	0.13	0.20	0.002	0.005	0.008
θ	0°	-	12°	0°	-	12°
W	0.15	0.25	0.36	0.006	0.010	0.014
M	0.125 typ.			0.005 typ.		