

Product Summary

BV_{DSS}	$R_{DS(ON)} \text{ Max}$	I_D $T_C = +25^\circ\text{C}$
60V	10m Ω @ $V_{GS} = 10\text{V}$	74.5A
	12.8m Ω @ $V_{GS} = 4.5\text{V}$	65.8A

Description and Applications

This new generation MOSFET is designed to minimize the on-state resistance ($R_{DS(ON)}$) yet maintain superior switching performance, making it ideal for high-efficiency power-management applications.

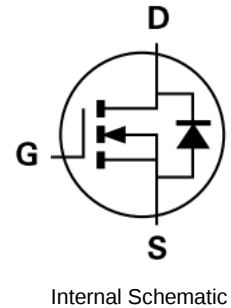
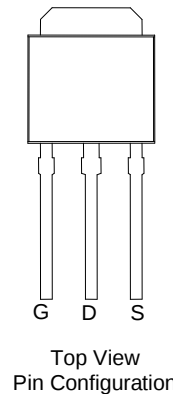
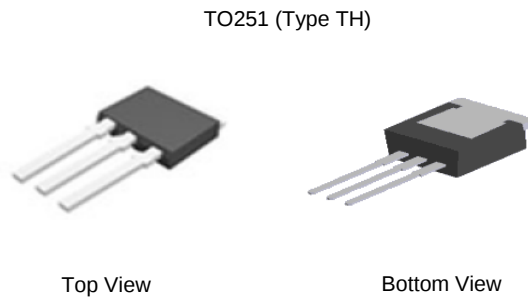
- Power Management Functions
- DC-DC Converters
- Backlighting

Features and Benefits

- 100% Unclamped Inductive Switching – Ensures More Reliable and Robust End Application
- Low $R_{DS(ON)}$ —Ensures On State Losses Are Minimized
- Excellent $Q_{gd} \times R_{DS(ON)}$ Product (FOM)
- Advanced Technology for DC-DC Converters
- Small Form Factor Thermally Efficient Package Enables Higher Density End Products
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

Mechanical Data

- Case: TO251 (Type TH)
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram
- Terminals: Finish – Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 
- Weight: 0.33 grams (Approximate)

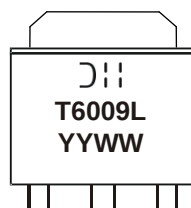


Ordering Information (Note 4)

Part Number	Case	Packaging
DMT6009LJ3	TO251 (Type TH)	75 Pieces / Tube

- Notes:
1. EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3).compliant. All applicable RoHS exemptions applied.
 2. See <https://www.diodes.com/quality/lead-free/> for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
 3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
 4. For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

Marking Information



 = Manufacturer's Marking
T6009L = Product Type Marking Code
YYWW = Date Code Marking
YY = Last Two Digits of Year (ex: 18 = 2018)
WW or **WW** = Week Code (01 to 53)

Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Drain-Source Voltage	V _{DSS}	60	V
Gate-Source Voltage	V _{GSS}	±16	V
Continuous Drain Current (Note 7)	I _D	74.5 59.6	A
Maximum Body Diode Forward Current (Note 7)	I _S	50	A
Pulsed Drain Current (10μs Pulse, Duty Cycle = 1%)	I _{DM}	280	A
Pulsed Body Diode Forward Current (10μs Pulse, Duty Cycle = 1%)	I _{SM}	280	A
Avalanche Current, L=0.1mH	I _{AS}	28.2	A
Avalanche Energy, L=0.1mH	E _{AS}	39.8	mJ

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 6)	P _D	2.9	W
Thermal Resistance, Junction to Ambient (Note 6)	R _{θJA}	43	°C/W
Thermal Resistance, Junction to Ambient (Note 5)	R _{θJA}	80	°C/W
Total Power Dissipation (Note 7)	P _D	83.3	W
Thermal Resistance, Junction to Case (Note 7)	R _{θJC}	1.5	°C/W
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +150	°C

Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 8)						
Drain-Source Breakdown Voltage	BV _{DSS}	60	—	—	V	V _{GS} = 0V, I _D = 1mA
Zero Gate Voltage Drain Current	I _{DSS}	—	—	1	μA	V _{DS} = 48V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±100	nA	V _{GS} = ±16V, V _{DS} = 0V
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	V _{GS(TH)}	0.7	—	2	V	V _{DS} = V _{GS} , I _D = 250μA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	8	10	mΩ	V _{GS} = 10V, I _D = 13.5A
		—	9.8	12.8		V _{GS} = 4.5V, I _D = 11.5A
Diode Forward Voltage	V _{SD}	—	0.8	1.2	V	V _{GS} = 0V, I _S = 5A
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C _{iss}	—	1925	—	pF	V _{DS} = 30V, V _{GS} = 0V, f = 1MHz
Output Capacitance	C _{oss}	—	438	—		
Reverse Transfer Capacitance	C _{rss}	—	41	—		
Gate Resistance	R _g	—	1.7	—	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1MHz
Total Gate Charge (V _{GS} = 4.5V)	Q _g	—	15.6	—	nC	V _{DS} = 30V, I _D = 13.5A
Total Gate Charge (V _{GS} = 10V)	Q _g	—	33.5	—		
Gate-Source Charge	Q _{gs}	—	4.7	—		
Gate-Drain Charge	Q _{gd}	—	5.3	—		
Turn-On Delay Time	t _{D(ON)}	—	4.5	—	ns	V _{DD} = 30V, V _{GS} = 10V, R _g = 6Ω, I _D = 13.5A
Turn-On Rise Time	t _r	—	8.6	—		
Turn-Off Delay Time	t _{D(OFF)}	—	35.9	—		
Turn-Off Fall Time	t _f	—	15.7	—		
Body Diode Reverse Recovery Time	t _{RR}	—	18.2	—	ns	I _F = 13.5A, di/dt = 400A/μs
Body Diode Reverse Recovery Charge	Q _{RR}	—	33.1	—	nC	

- Notes:
- Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
 - Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1-inch square copper plate.
 - Thermal resistance from junction to soldering point (on the exposed drain pad).
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to production testing.

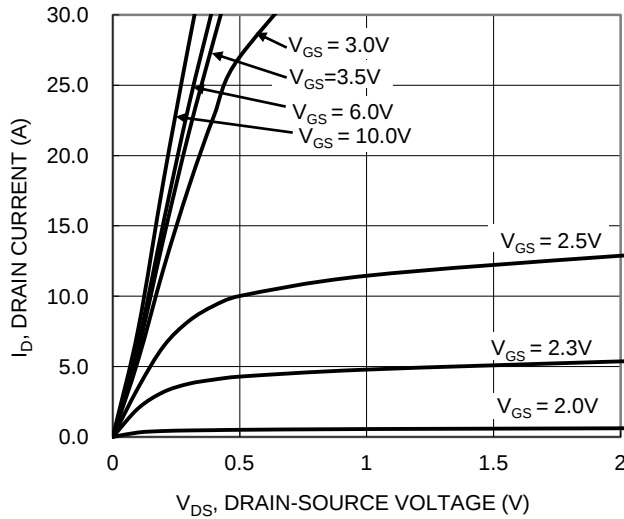


Figure 1. Typical Output Characteristic

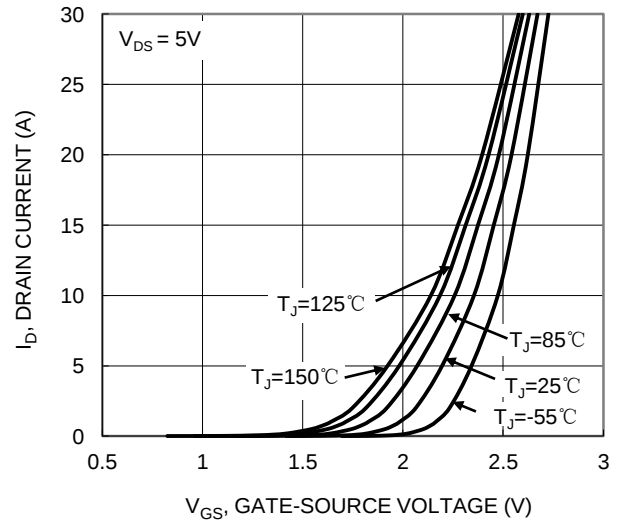


Figure 2. Typical Transfer Characteristic

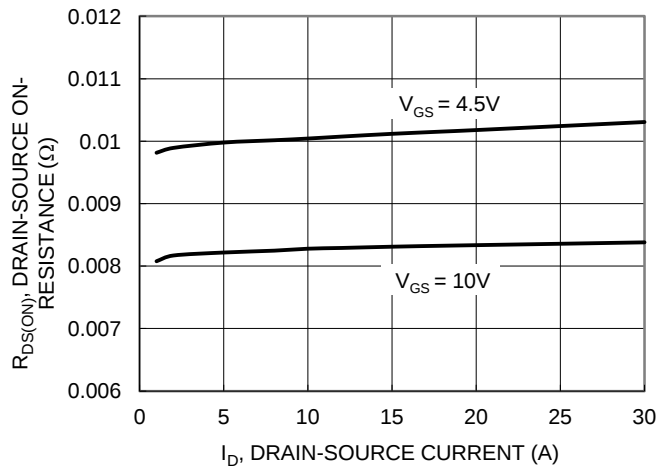


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

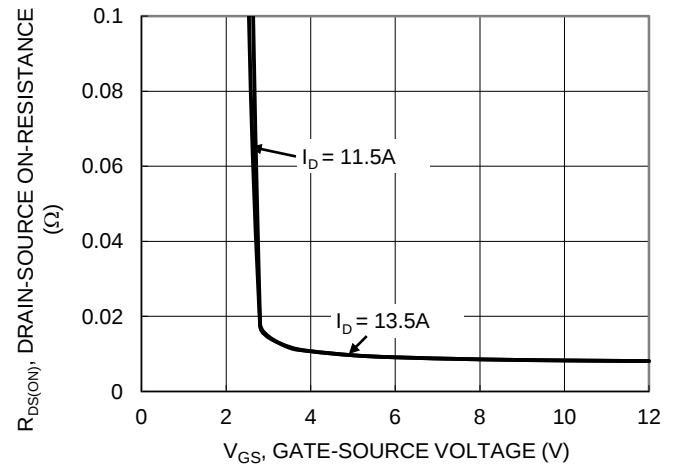


Figure 4. Typical Transfer Characteristic

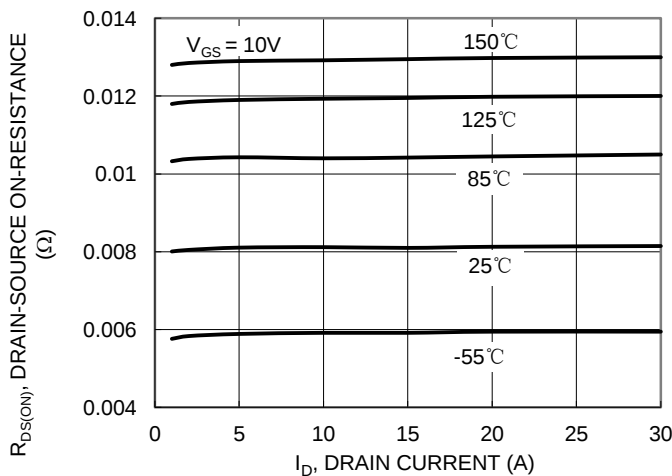


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

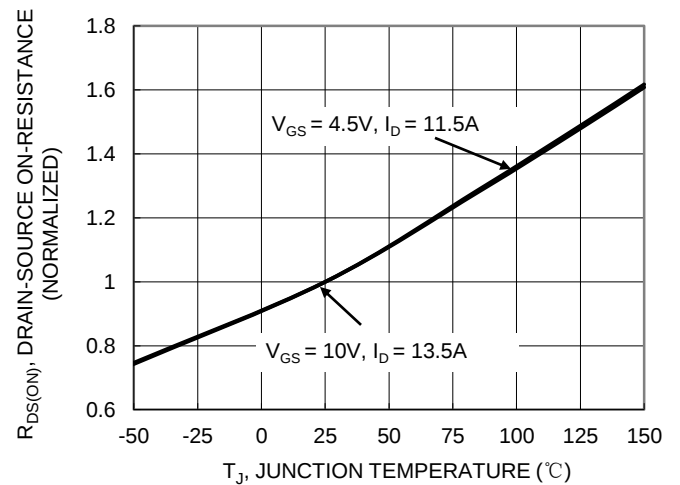
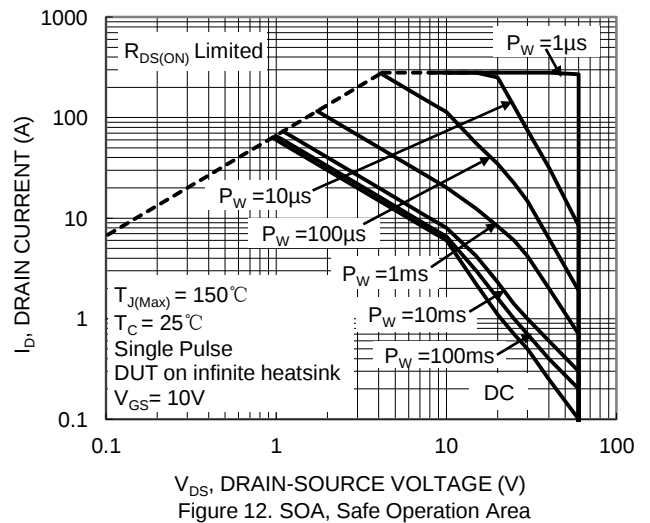
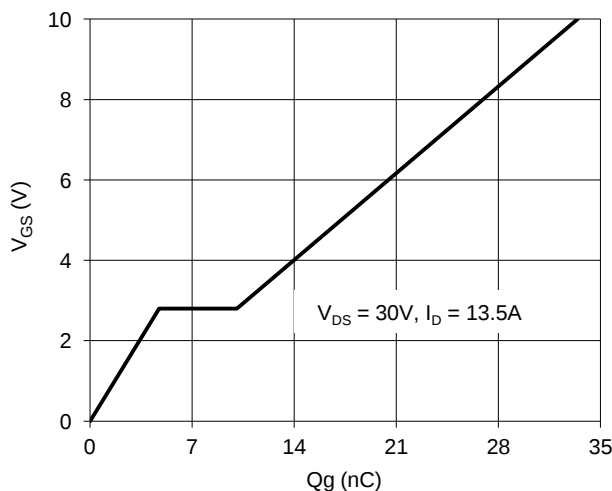
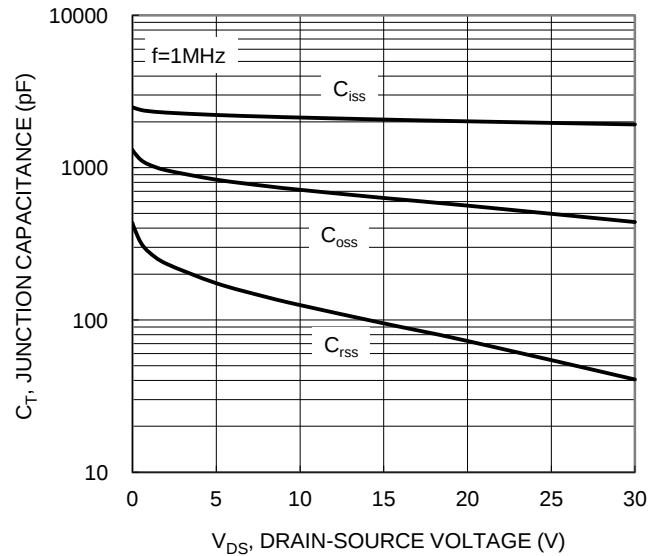
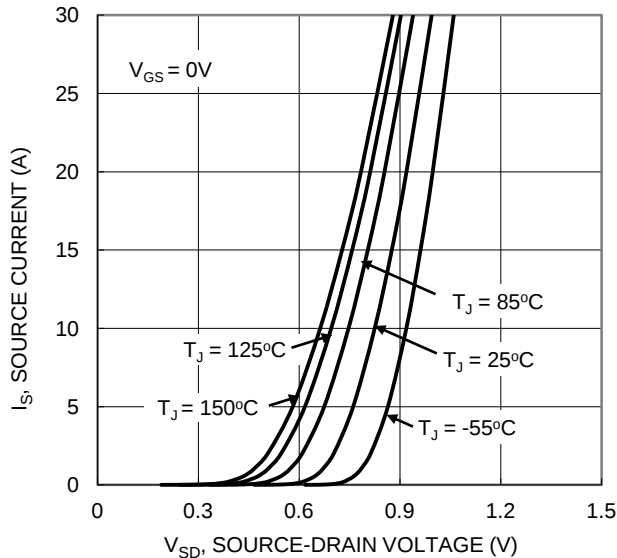
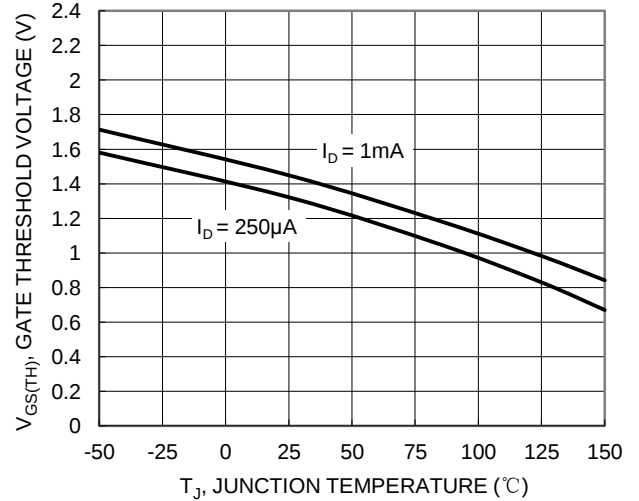
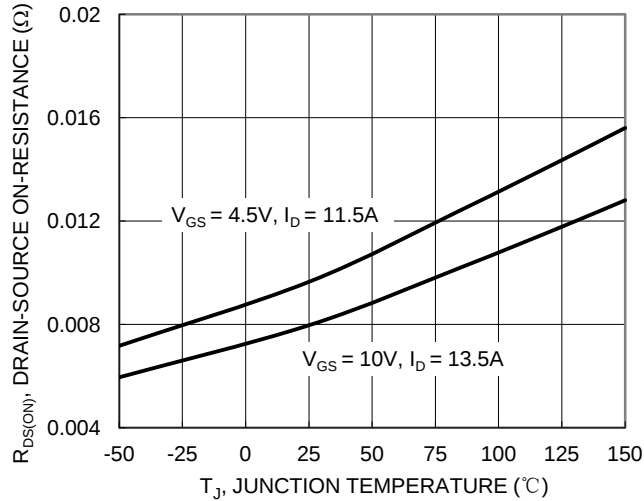
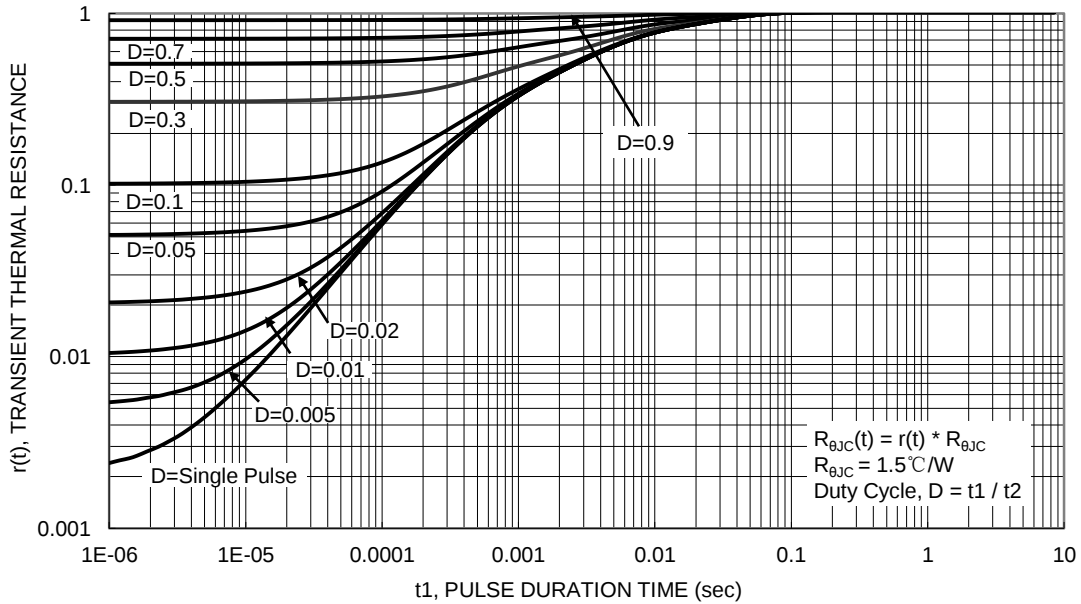


Figure 6. On-Resistance Variation with Junction Temperature

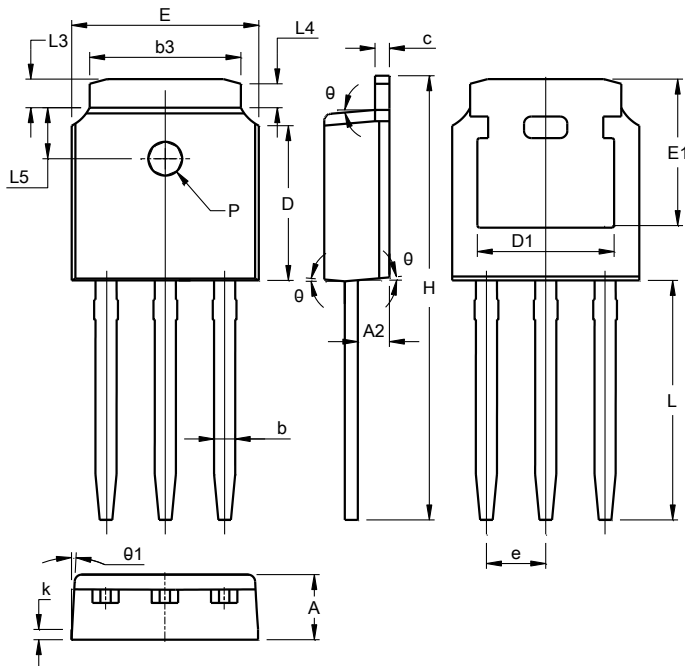




Package Outline Dimensions

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

TO251 (Type TH)



TO251 (Type TH)			
Dim	Min	Max	Typ
A	2.20	2.40	2.30
A2	0.97	1.17	1.07
b	0.68	0.90	0.78
b3	5.20	5.50	5.33
c	0.43	0.63	0.53
D	5.98	6.22	6.10
D1	5.30 REF		
e	2.286 BSC		
E	6.40	6.80	6.60
E1	4.63	5.03	4.83
H	16.22	16.82	16.52
k	0.40 REF		
L	9.15	9.65	9.40
L3	0.88	1.28	1.02
L4	0.75 REF		
L5	1.65	1.95	1.80
PØ	1.20		
θ	5°	9°	7°
θ1	5°	9°	7°
All Dimensions in mm			

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