

Product Summary

BV _{DSS}	R _{DS(ON)} Max	I _D T _C = +25°C
60V	12mΩ @ V _{GS} = 10V	37.2A
	14.5mΩ @ V _{GS} = 4.5V	33.9A

Description and Applications

This new generation MOSFET features low on-resistance and fast switching, making it ideal for high-efficiency power management applications.

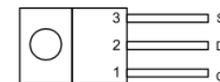
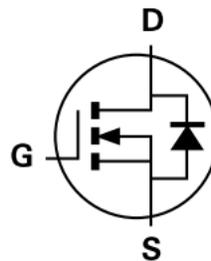
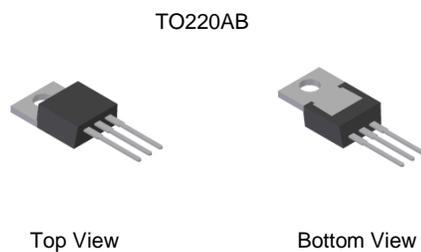
- DC-DC Converters
- Power Management Functions
- Load Switch

Features

- Excellent Q_{GD} x R_{DS(ON)} Product (FOM)
- Advanced Technology for DC-DC Converts
- Low Input/Output Leakage
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

Mechanical Data

- Case: TO220AB
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Terminals: Matte Tin Finish Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 ⁽³⁾
- Terminal Connections: See Diagram Below
- Weight: 1.85 grams (Approximate)



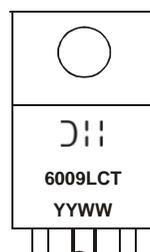
Top View
Pin-Out Configuration

Ordering Information (Note 4)

Part Number	Case	Packaging
DMT6009LCT	TO220AB	50 Pieces/Tube

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
 2. See http://www.diodes.com/quality/lead_free.html 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 <http://www.diodes.com/products/packages.html>.

Marking Information



= Manufacturer's Marking
 6009LCT = Product Type Marking Code
 YYWW = Date Code Marking
 YY or YY = Last Digit of Year (ex: 16 = 2016)
 WW or WW = Week Code (01 to 53)

Maximum Ratings (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic	Symbol	Value	Units
Drain-Source Voltage	V_{DSS}	60	V
Gate-Source Voltage	V_{GSS}	± 16	V
Continuous Drain Current (Note 6) $V_{GS} = 10\text{V}$	I_D	$T_C = +25^\circ\text{C}$ 37.2	A
		$T_C = +100^\circ\text{C}$ 29.8	
Pulsed Drain Current (10 μs Pulse, Duty Cycle = 1%)	I_{DM}	80	A
Maximum Body Diode Forward Current (Note 6)	I_S	80	A
Avalanche Current, L = 0.1mH	I_{AS}	19.8	A
Avalanche Energy, L = 0.1mH	E_{AS}	19.6	mJ

Thermal Characteristics

Characteristic	Symbol	Value	Units
Total Power Dissipation (Note 5) $T_A = +25^\circ\text{C}$	P_D	2.2	W
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	55	$^\circ\text{C}/\text{W}$
Total Power Dissipation (Note 6) $T_C = +25^\circ\text{C}$	P_D	25	W
Thermal Resistance, Junction to Case (Note 6)	$R_{\theta JC}$	5	$^\circ\text{C}/\text{W}$
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	$^\circ\text{C}$

Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 7)						
Drain-Source Breakdown Voltage	BV_{DSS}	60	—	—	V	$V_{GS} = 0\text{V}, I_D = 250\mu\text{A}$
Zero Gate Voltage Drain Current	I_{DSS}	—	—	1	μA	$V_{DS} = 48\text{V}, V_{GS} = 0\text{V}$
Gate-Source Leakage	I_{GSS}	—	—	± 100	nA	$V_{GS} = \pm 16\text{V}, V_{DS} = 0\text{V}$
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	$V_{GS(TH)}$	0.7	—	2	V	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	9.4	12	m Ω	$V_{GS} = 10\text{V}, I_D = 13.5\text{A}$
		—	7.6	14.5		$V_{GS} = 4.5\text{V}, I_D = 11.5\text{A}$
Diode Forward Voltage	V_{SD}	—	—	1.2	V	$V_{GS} = 0\text{V}, I_S = 20\text{A}$
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C_{ISS}	—	1,925	—	pF	$V_{DS} = 30\text{V}, f = 1\text{MHz}, V_{GS} = 0\text{V}$
Output Capacitance	C_{OSS}	—	438	—		
Reverse Transfer Capacitance	C_{RSS}	—	41	—		
Gate Resistance	R_G	—	1.7	—	Ω	$V_{DS} = 0\text{V}, V_{GS} = 0\text{V}, f = 1\text{MHz}$
Total Gate Charge ($V_{GS} = 4.5\text{V}$)	Q_G	—	15.6	—	nC	$V_{DD} = 30\text{V}, I_D = 13.5\text{A}$
Total Gate Charge ($V_{GS} = 10\text{V}$)	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	$V_{DS} = 30\text{V}, V_{GS} = 10\text{V}, R_G = 6\Omega, I_D = 13.5\text{A}$
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	—		
Reverse Recovery Time	t_{RR}	—	18.2	—	ns	$I_F = 13.5\text{A}, di/dt = 100\text{A}/\mu\text{s}$
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 an infinite heat sink.
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to production testing.

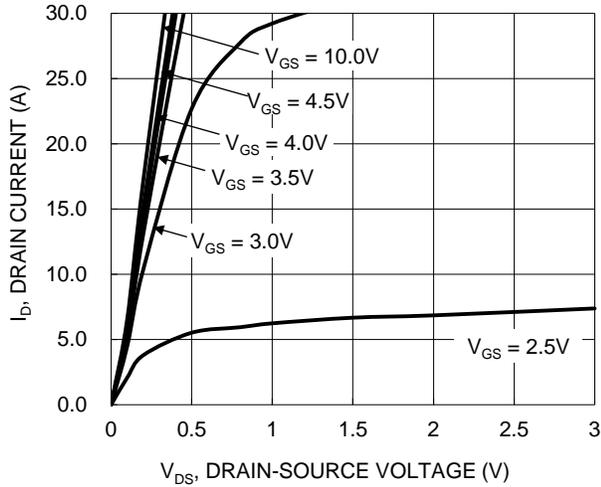


Figure 1. Typical Output Characteristic

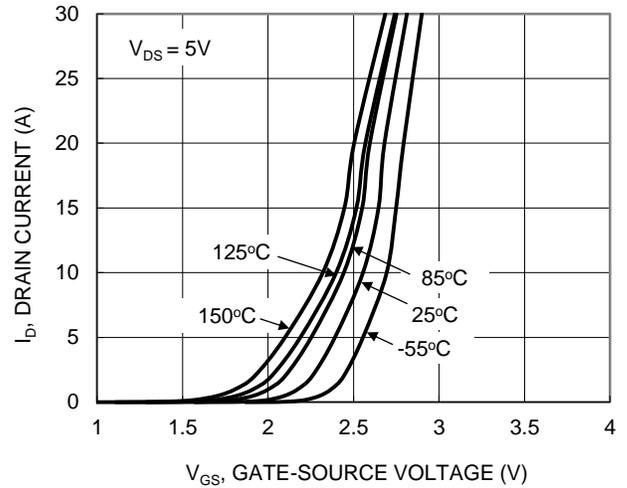


Figure 2. Typical Transfer Characteristic

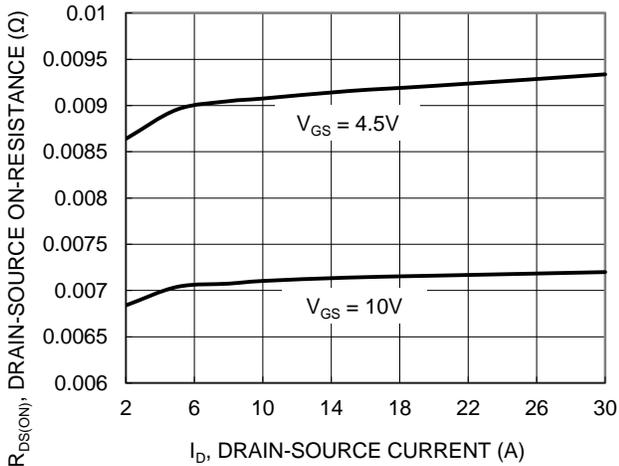


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

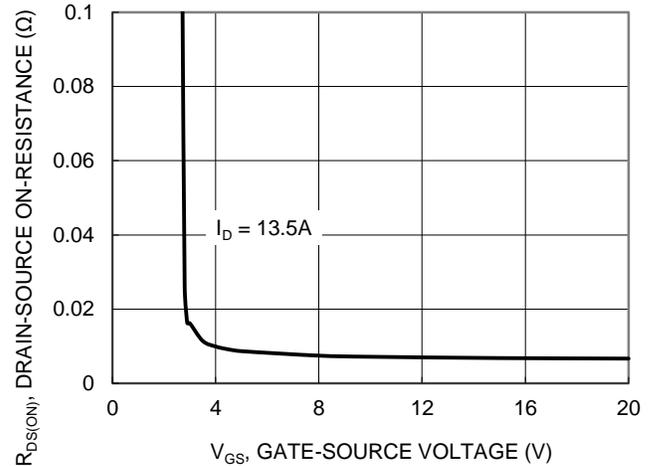


Figure 4. Typical Transfer Characteristic

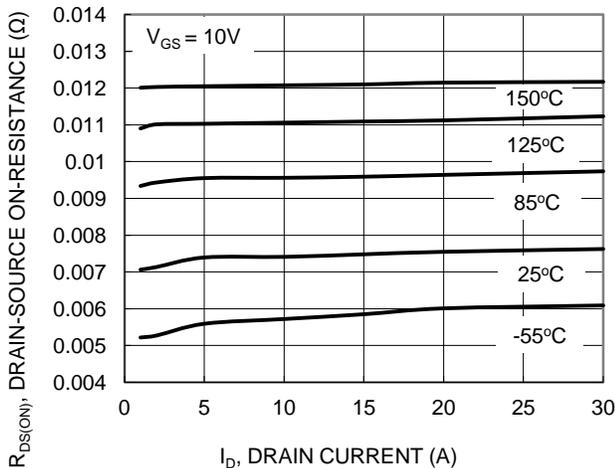


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

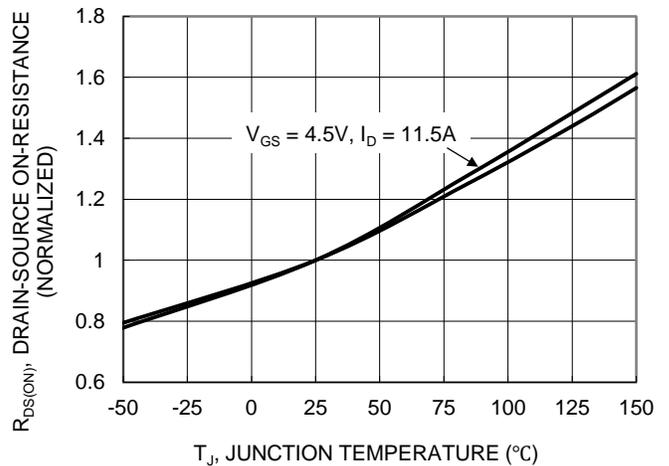


Figure 6. On-Resistance Variation with Junction Temperature

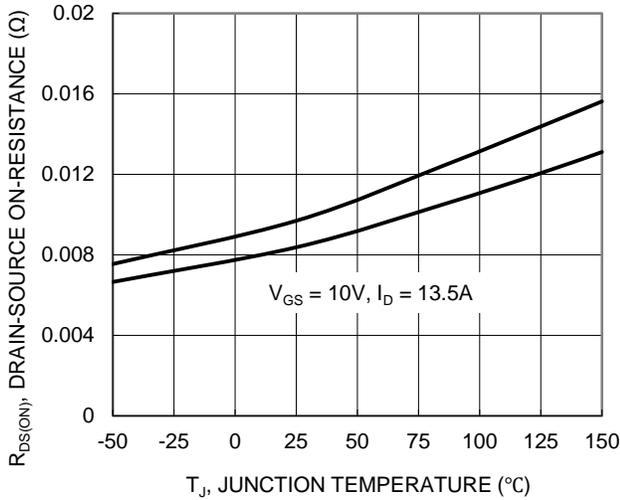


Figure 7. On-Resistance Variation with Junction Temperature

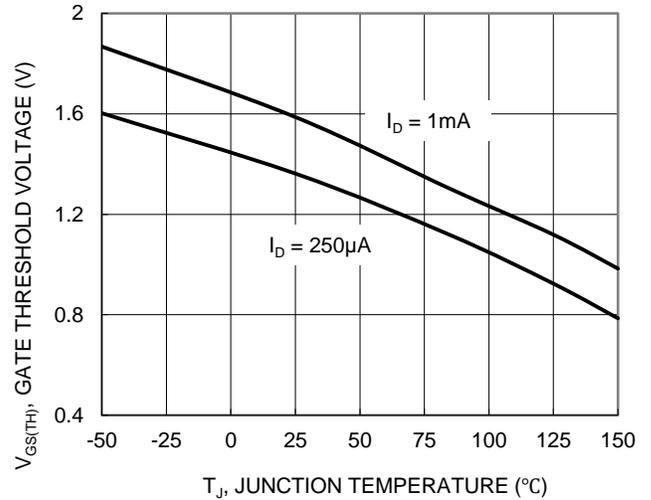


Figure 8. Gate Threshold Variation vs. Junction Temperature

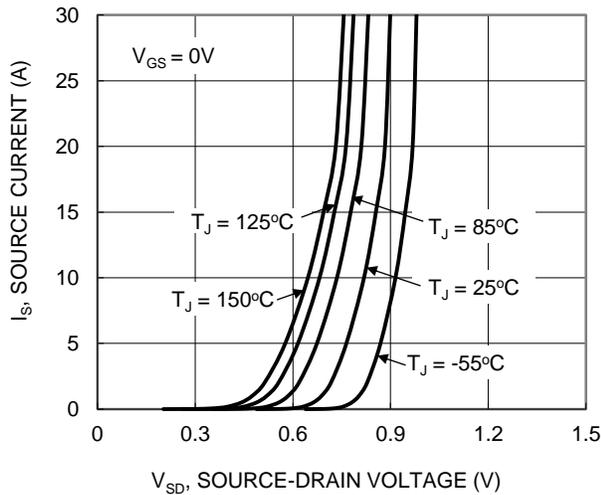


Figure 9. Diode Forward Voltage vs. Current

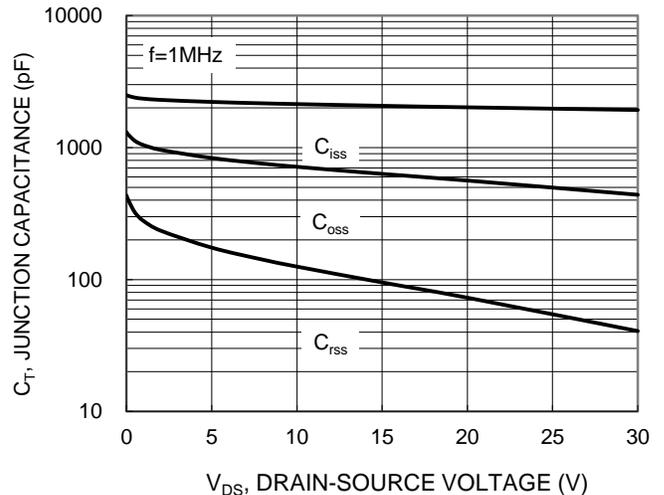


Figure 10. Typical Junction Capacitance

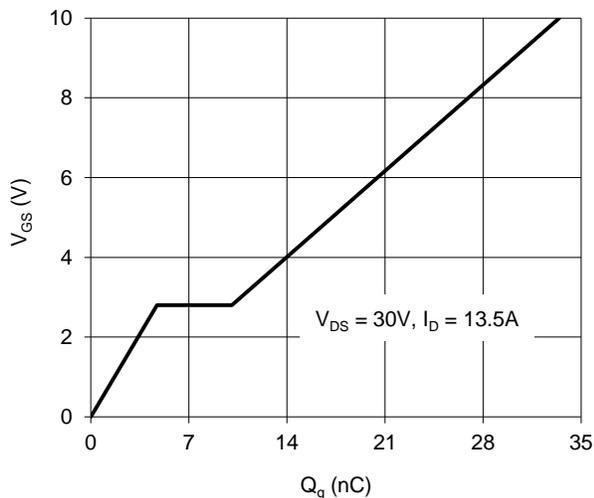


Figure 11. Gate Charge

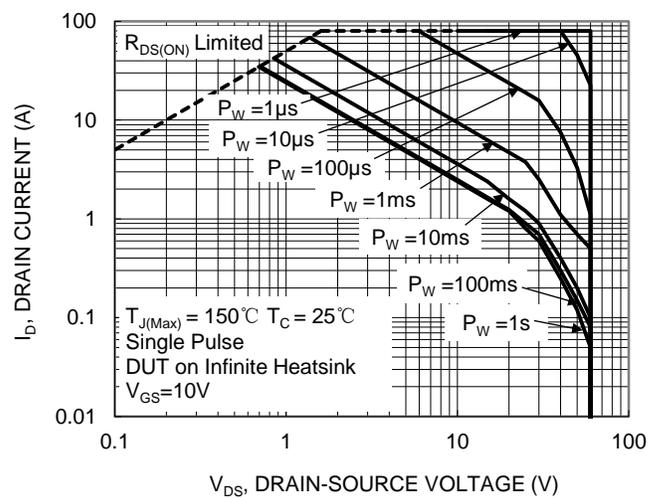


Figure 12. SOA, Safe Operation Area

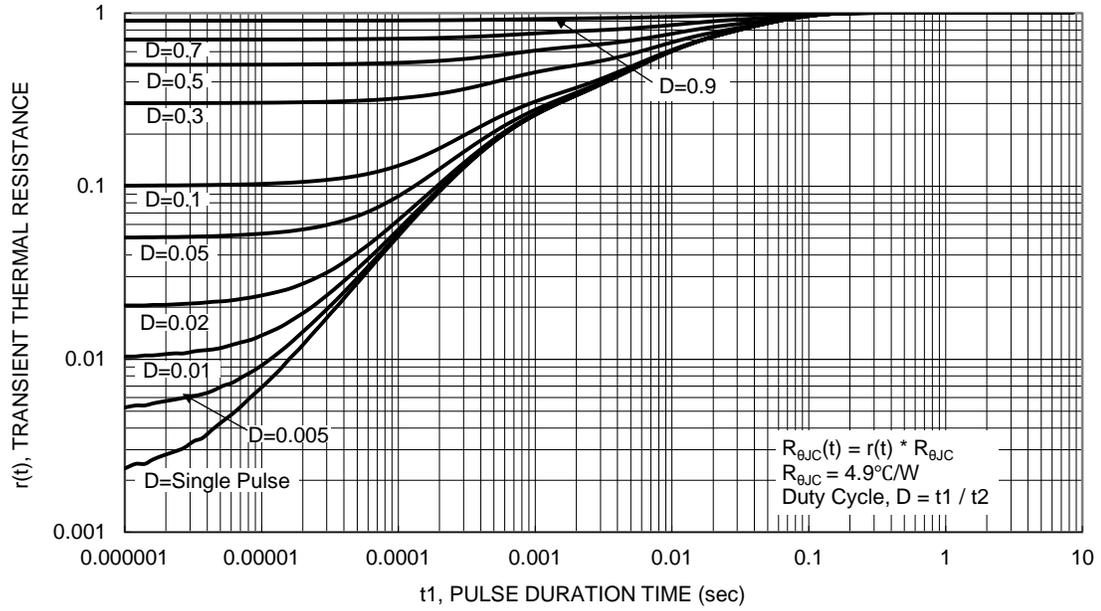
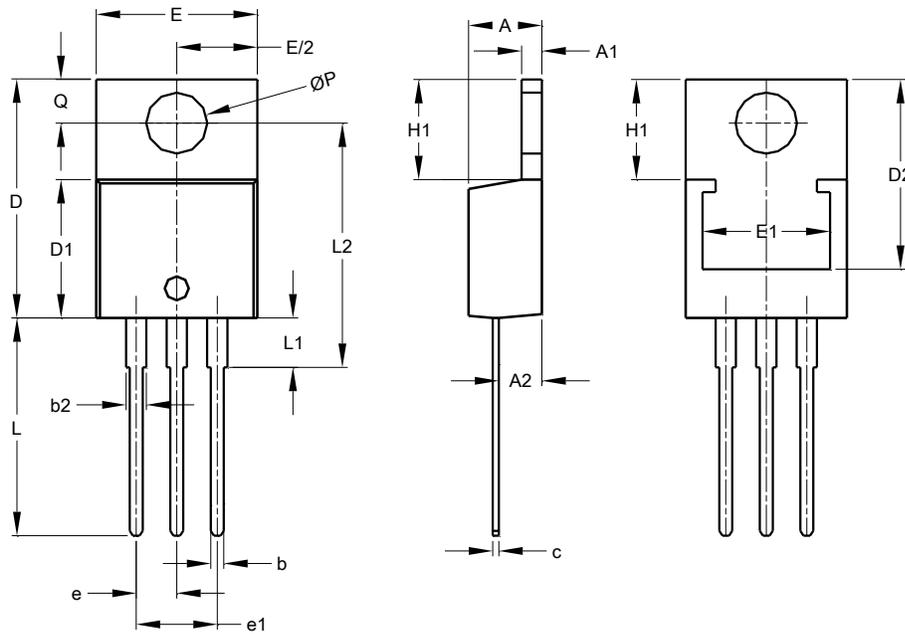


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

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

TO220AB



TO220AB			
Dim	Min	Max	Typ
A	3.56	4.82	—
A1	0.51	1.39	—
A2	2.04	2.92	—
b	0.39	1.01	0.81
b2	1.15	1.77	1.24
c	0.356	0.61	—
D	14.22	16.51	—
D1	8.39	9.01	—
D2	11.45	12.87	—
e	—	—	2.54
e1	—	—	5.08
E	9.66	10.66	—
E1	6.86	8.89	—
H1	5.85	6.85	—
L	12.70	14.73	—
L1	—	6.35	—
L2	15.80	16.20	16.00
P	3.54	4.08	—
Q	2.54	3.42	—
All Dimensions in mm			

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