60V N-CHANNEL ENHANCEMENT MODE MOSFET

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

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)**

Description and Applications

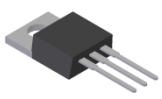
This new generation MOSFET features low on-resistance and fast switching, making it ideal for high-efficiency power management applications.

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

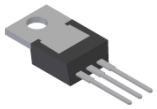
Mechanical Data

- 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 e3
- Terminal Connections: See Diagram Below
- Weight: 1.85 grams (Approximate)

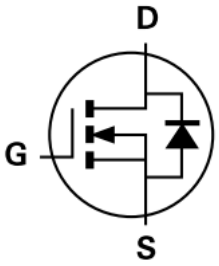
TO220AB



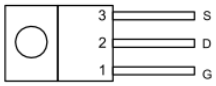
Top View



Bottom View



Equivalent Circuit



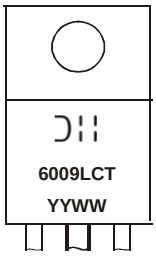
Top View
Pin-Out Configuration

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°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} = 10V	T_C = +25°C T_C = +100°C	I_D	37.2 29.8	A
Pulsed Drain Current (10µs 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°C	P_D	2.2	W
Thermal Resistance, Junction to Ambient (Note 5)		$R_{\theta JA}$	55	°C/W
Total Power Dissipation (Note 6)	T_C = +25°C	P_D	25	W
Thermal Resistance, Junction to Case (Note 6)		$R_{\theta JC}$	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 7)						
Drain-Source Breakdown Voltage	BV_{DSS}	60	—	—	V	V_{GS} = 0V, I_D = 250µA
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 7)						
Gate Threshold Voltage	$V_{GS(TH)}$	0.7	—	2	V	V_{DS} = V_{GS}, I_D = 250µA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	9.4	12	mΩ	V_{GS} = 10V, I_D = 13.5A
		—	7.6	14.5		V_{GS} = 4.5V, I_D = 11.5A
Diode Forward Voltage	V_{SD}	—	—	1.2	V	V_{GS} = 0V, I_S = 20A
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C_{ISS}	—	1,925	—	pF	V_{DS} = 30V, f = 1MHz, V_{GS} = 0V
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_{DD} = 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_{DS} = 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	—		
Reverse Recovery Time	t_{RR}	—	18.2	—	ns	I_F = 13.5A, di/dt = 100A/µs
Reverse Recovery Charge	Q_{RR}	—	33.1	—	nC	

Notes:
5. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
6. Device mounted on an infinite heat sink.
7. Short duration pulse test used to minimize self-heating effect.
8. Guaranteed by design. Not subject to production testing.

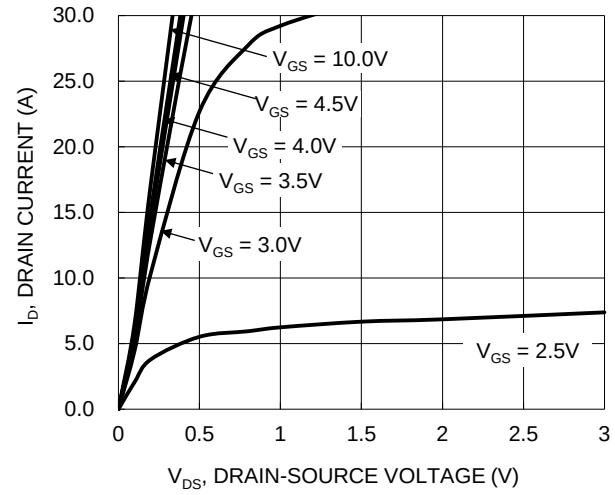


Figure 1. Typical Output Characteristic

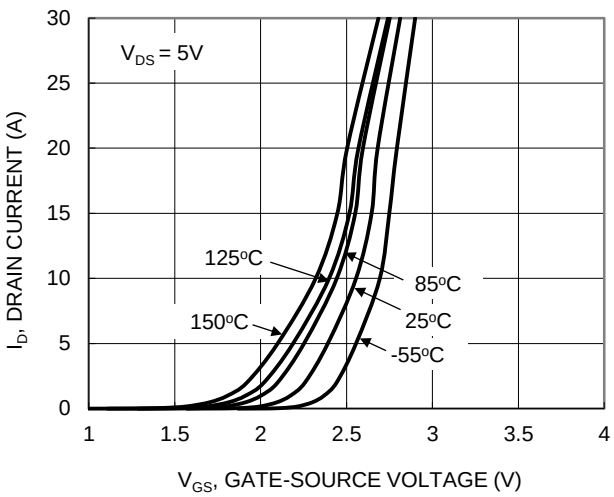


Figure 2. Typical Transfer Characteristic

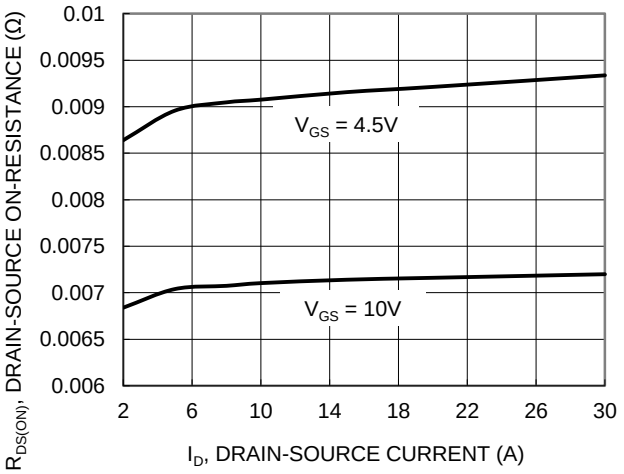


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

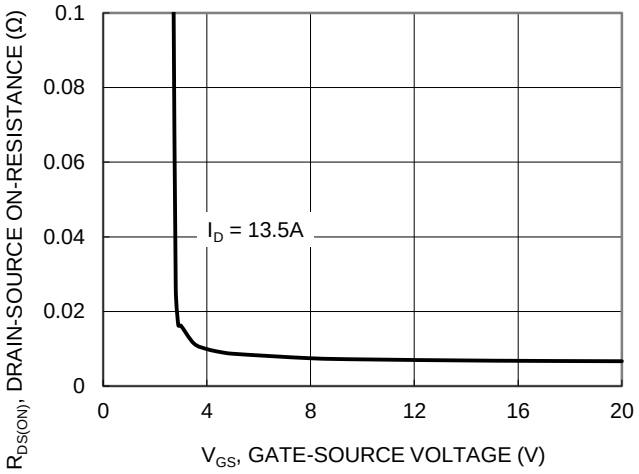


Figure 4. Typical Transfer Characteristic

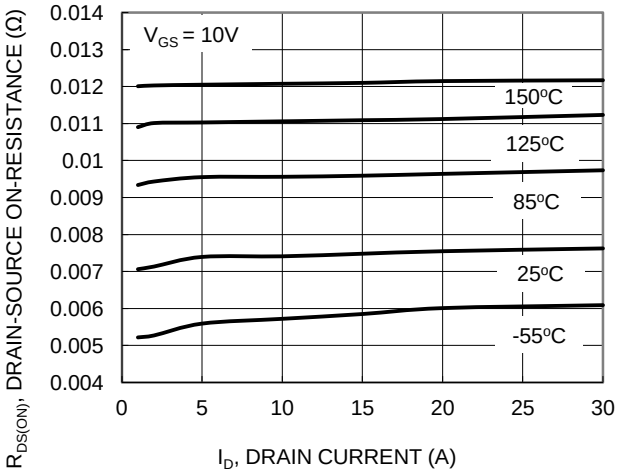


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

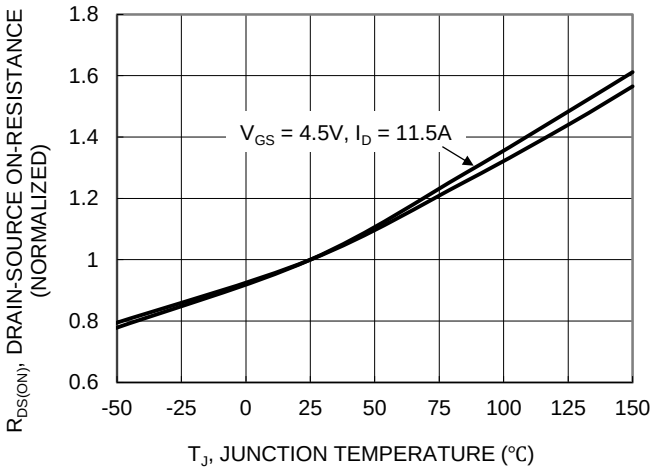


Figure 6. On-Resistance Variation with Junction Temperature

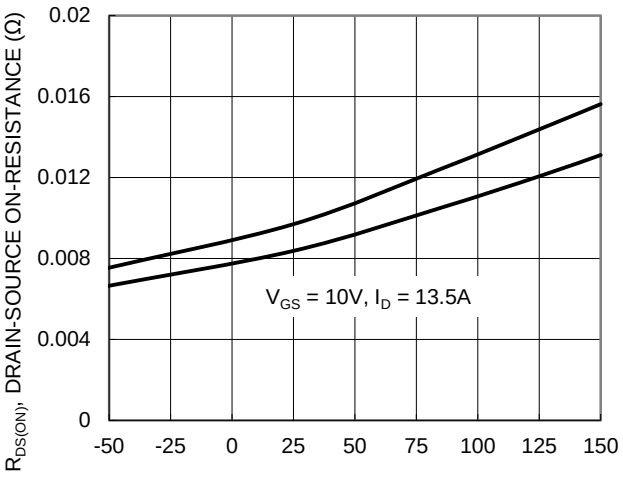


Figure 7. On-Resistance Variation with Junction Temperature

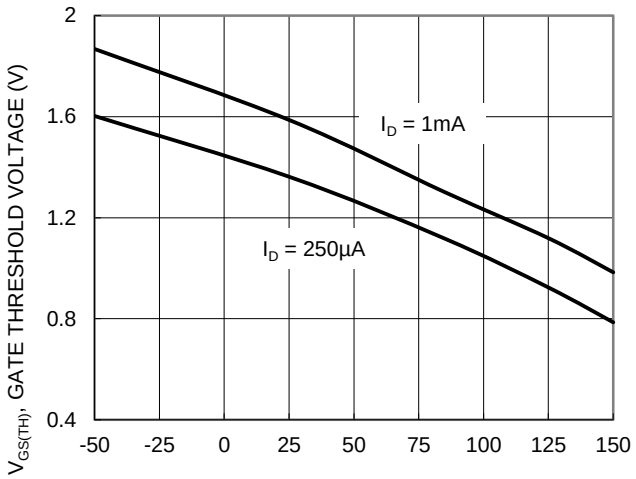


Figure 8. Gate Threshold Variation vs. Junction Temperature

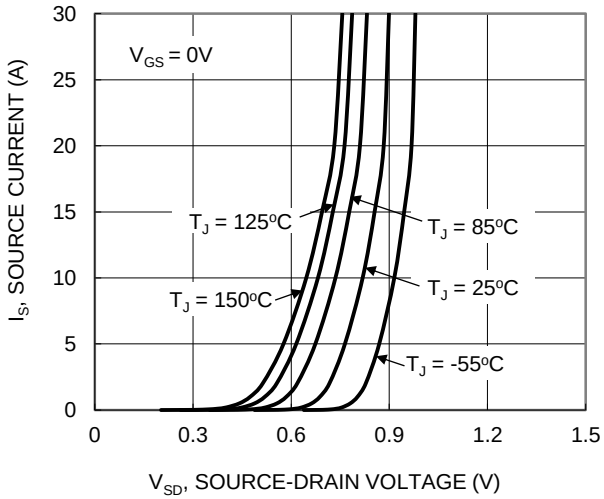


Figure 9. Diode Forward Voltage vs. Current

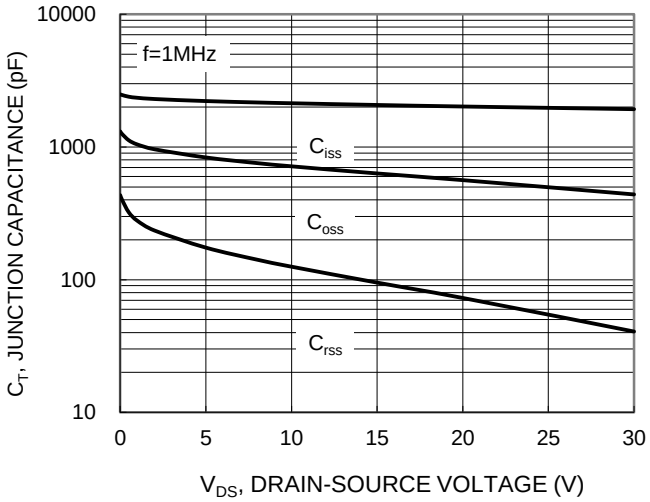


Figure 10. Typical Junction Capacitance

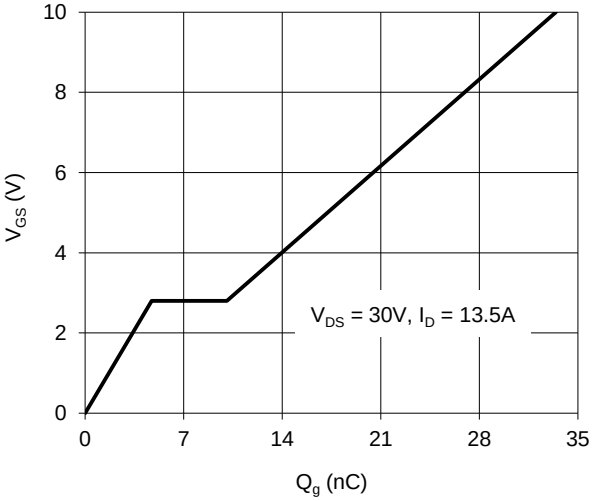


Figure 11. Gate Charge

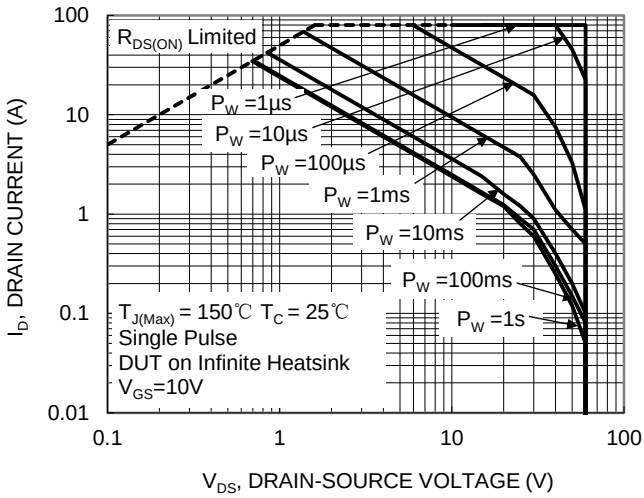


Figure 12. SOA, Safe Operation Area

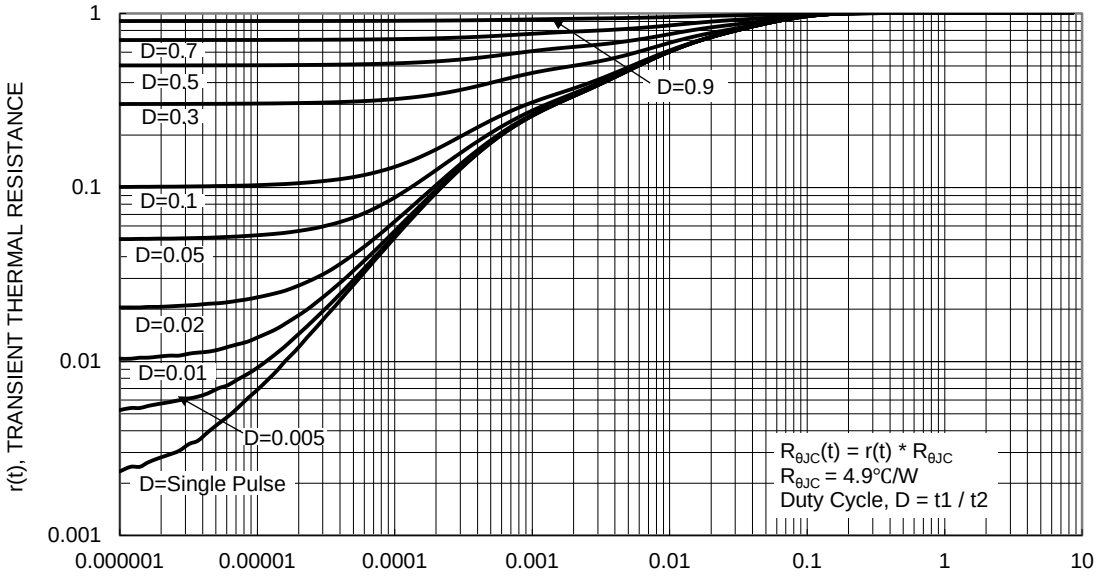
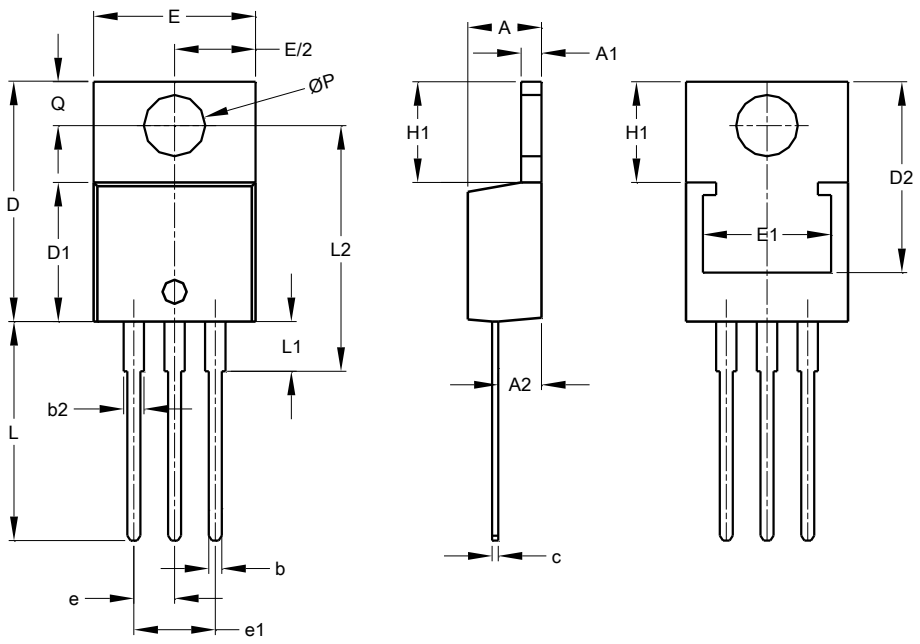


Figure 13. Transient Thermal Resistance

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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