60V N-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

BV_{DSS}	$R_{DS(ON)}$ Max	I_D T_C = +25°C
60V	6mΩ @ V_{GS} = 10V	100A
	10mΩ @ V_{GS} = 4.5V	85A

Features

- 100% Unclamped Inductive Switching – Ensures More Reliable and Robust End Application
- Low Input Capacitance
- Low Input/Output Leakage
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

Description and Applications

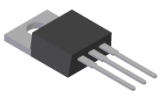
This new generation MOSFET features low on-resistance and fast switching, making it ideal for high-efficiency power management applications.

- Engine Management Systems
- Body Control Electronics
- DC-DC Converters

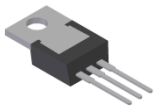
Mechanical Data

- Case: TO220-3
- 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)

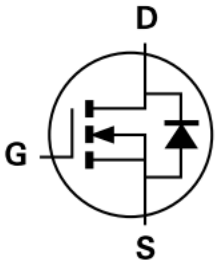
TO220-3



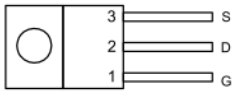
Top View



Bottom View



Equivalent Circuit



Top View
Pin Out Configuration

Ordering Information (Note 4)

Part Number	Case	Packaging
DMT6005LCT	TO220-3	50 Pieces/Tube

Notes:
1. EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant. All applicable RoHS exemptions applied.
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.

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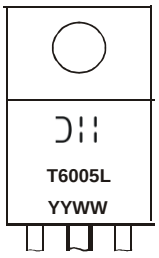

=Manufacturer's Marking
T6005L = Product Type Marking Code
YYWW = Date Code Marking
YY or YY = Last Digit of Year (ex: 16 = 2016)
WW or WW = Week Code (01 to 53)

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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}	±20	V
Continuous Drain Current (Note 6)	T_C = +25°C	I_D	100	A
	T_C = +70°C		80	
Maximum Continuous Body Diode Forward Current (Note 6)	T_C = +25°C	I_S	83	A
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)		I_{DM}	130	A
Avalanche Current, L=0.1mH		I_{AS}	29.5	A
Avalanche Energy, L=0.1mH		E_{AS}	43.5	mJ

Thermal Characteristics

Characteristic		Symbol	Value	Units
Total Power Dissipation (Note 5)	T_A = +25°C	P_D	2.3	W
Thermal Resistance, Junction to Ambient (Note 5)		$R_{\theta JA}$	52.8	°C/W
Total Power Dissipation (Note 6)	T_C = +25°C	P_D	104	W
Thermal Resistance, Junction to Case (Note 6)		$R_{\theta JC}$	1.2	°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 = 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} = ±20V, V_{DS} = 0V
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	$V_{GS(TH)}$	1	—	3	V	V_{DS} = V_{GS}, I_D = 250µA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	4.5	6	mΩ	V_{GS} = 10V, I_D = 20A
		—	8.8	10	mΩ	V_{GS} = 4.5V, I_D = 12.5A
Diode Forward Voltage	V_{SD}	—	—	1.2	V	V_{GS} = 0V, I_S = 20A
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C_{ISS}	—	2,962	—	pF	V_{DS} = 30V, V_{GS} = 0V, f = 1MHz
Output Capacitance	C_{OSS}	—	965	—		
Reverse Transfer Capacitance	C_{RSS}	—	60	—		
Gate Resistance	R_G	—	0.66	—	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1MHz
Total Gate Charge (V_{GS} = 10V)	Q_G	—	47.1	—	nC	V_{DD} = 30V, I_D = 50A
Total Gate Charge (V_{GS} = 4.5V)	Q_G	—	23.1	—		
Gate-Source Charge	Q_{GS}	—	10.2	—		
Gate-Drain Charge	Q_{GD}	—	12.5	—		
Turn-On Delay Time	$t_{D(ON)}$	—	8.3	—	ns	V_{DD} = 30V, V_{GS} = 10V, I_D = 30A, R_G = 3.3Ω
Turn-On Rise Time	t_R	—	9.4	—		
Turn-Off Delay Time	$t_{D(OFF)}$	—	22	—		
Turn-Off Fall Time	t_F	—	8.9	—		
Reverse Recovery Time	t_{RR}	—	40.4	—	ns	I_F = 30A, di/dt = 100A/µs
Reverse Recovery Charge	Q_{RR}	—	49.7	—	nC	

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

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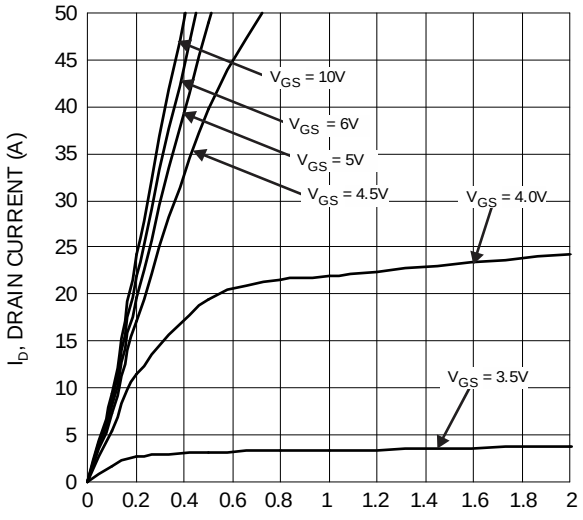

Figure 1 Typical Output Characteristics

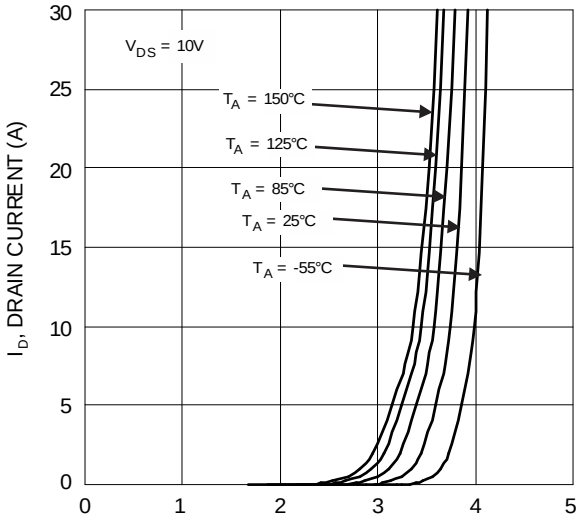

Figure 2 Typical Transfer Characteristics

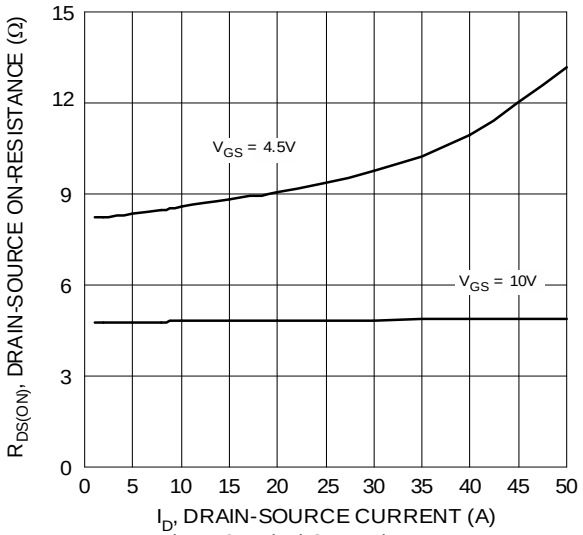

Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

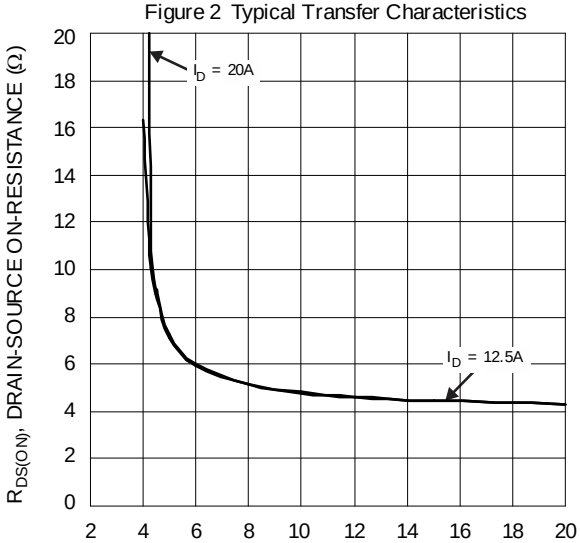

Figure 4 Typical Transfer Characteristics

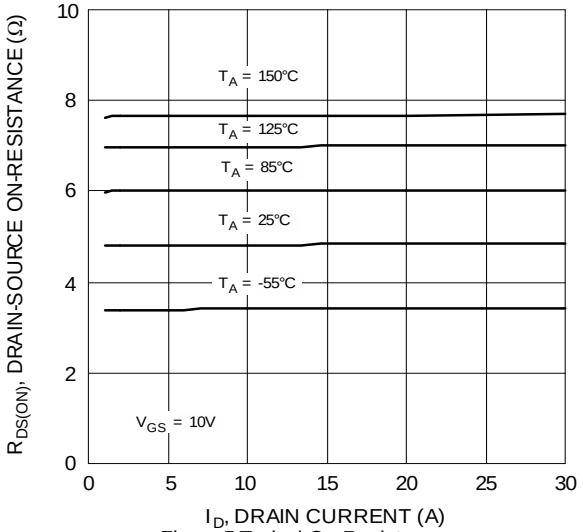

Figure 5 Typical On-Resistance vs. Drain Current and Temperature

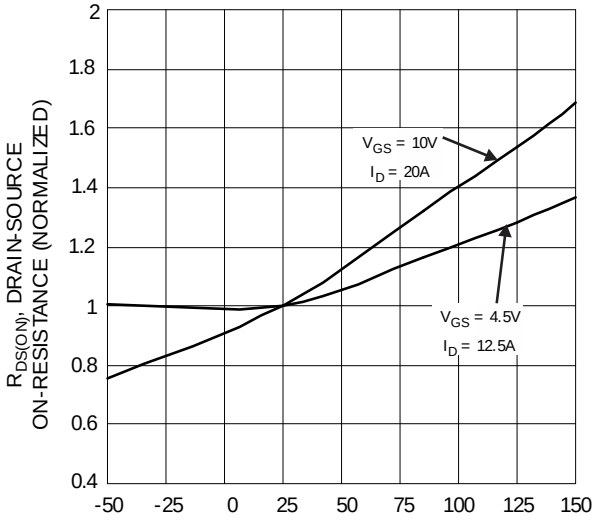

Figure 6 On-Resistance Variation with Temperature

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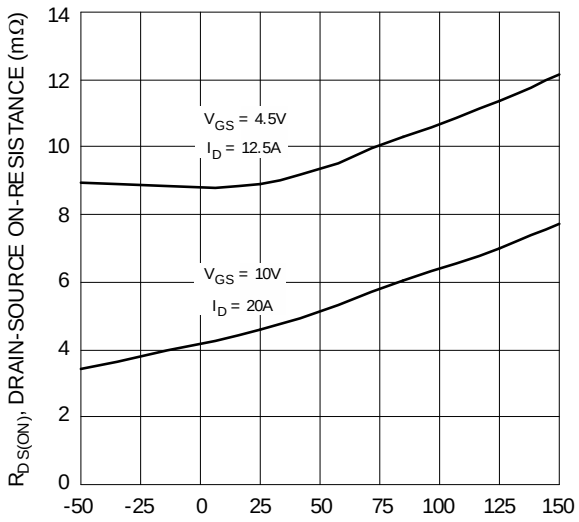

Figure 7 On-Resistance Variation with Temperature

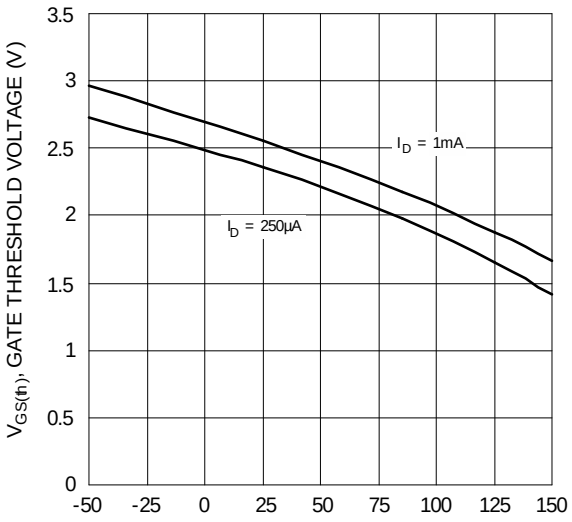

Figure 8 Gate Threshold Variation vs. Junction Temperature

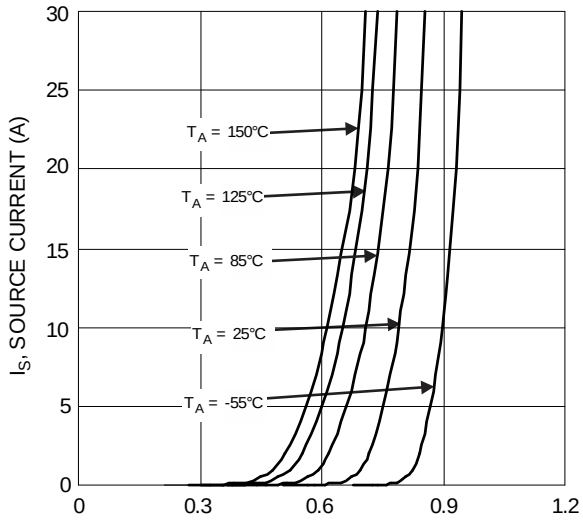

Figure 9 Diode Forward Voltage vs. Current

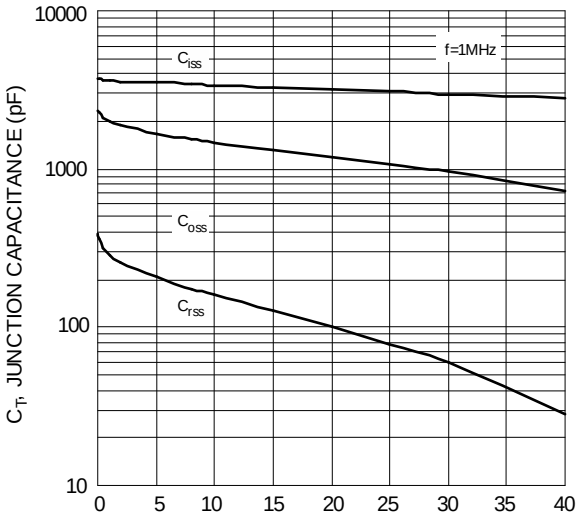

Figure 10 Typical Junction Capacitance

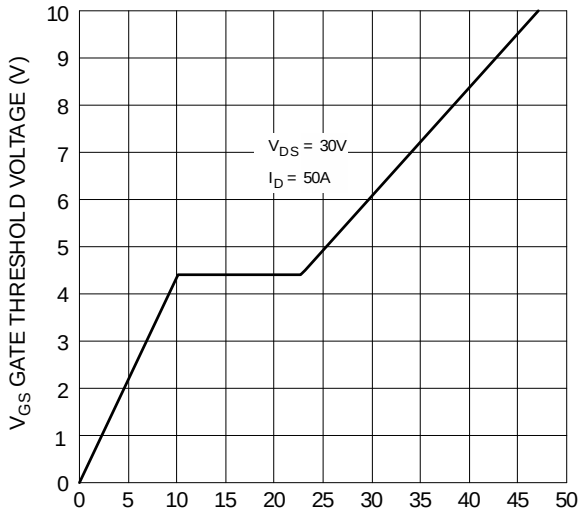

Figure 11 Gate Charge

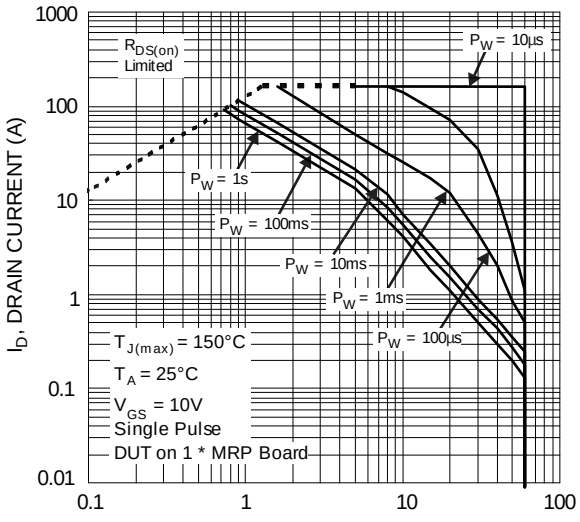

Figure 12 SOA, Safe Operation Area

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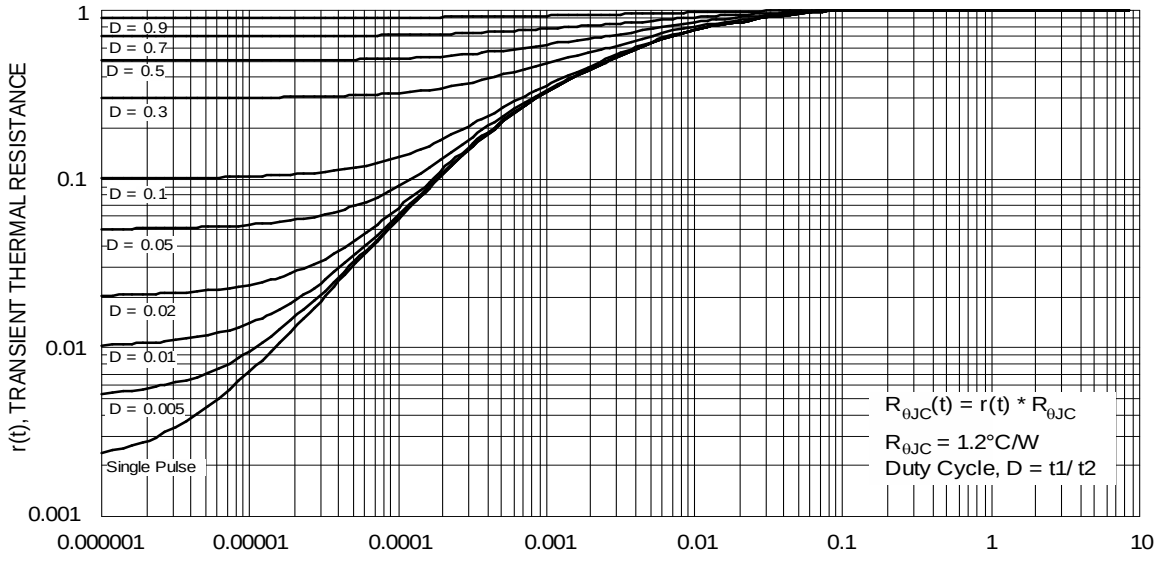
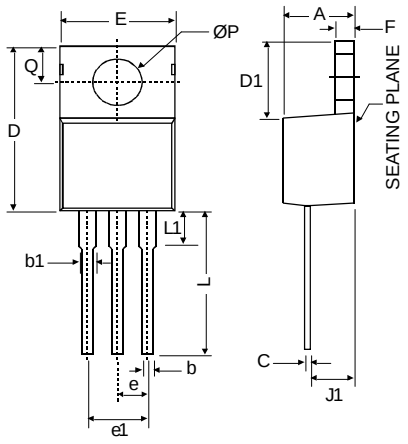


Figure 13 Transient Thermal Resistance

Package Outline Dimensions

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

TO220-3



TO220-3		
Dim	**Min**	**Max**
A	3.55	4.85
b	0.51	1.14
b1	1.14	1.78
C	0.31	1.14
D	14.20	16.50
D1	5.84	6.86
E	9.70	10.70
e	2.79	2.99
e1	4.83	5.33
F	0.51	1.40
J1	2.03	2.92
L	12.72	14.72
L1	3.66	6.35
P	3.53	4.09
Q	2.54	3.43
All Dimensions in mm		

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