

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

Description and Applications

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

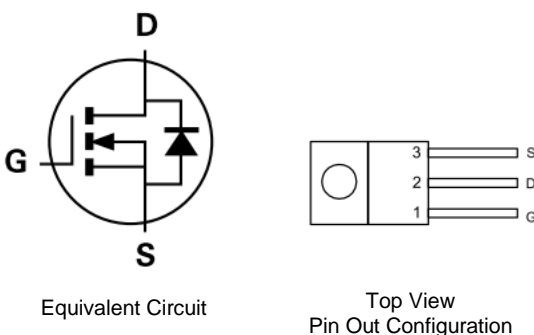
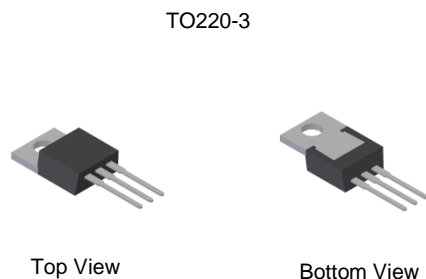
- Engine Management Systems
- Body Control Electronics
- DC-DC Converters

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**

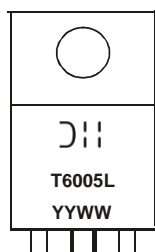
Mechanical Data

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


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>.

Marking Information


D I I = 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)

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 _{θJA}	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 _{θJC}	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.

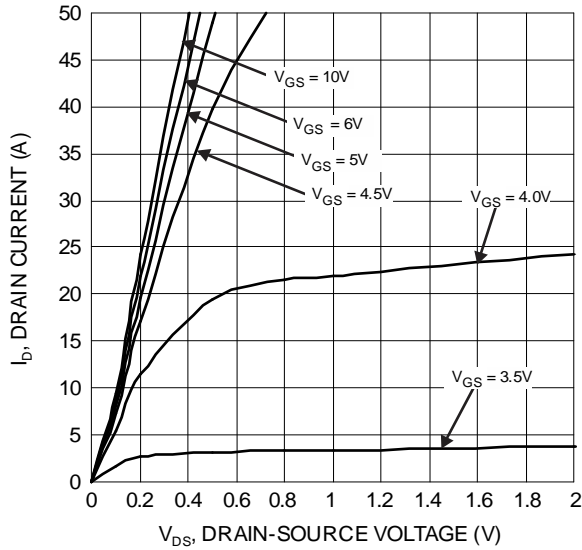


Figure 1 Typical Output Characteristics

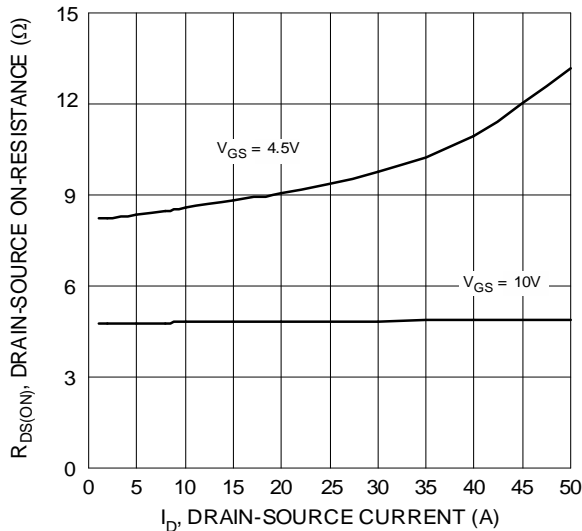


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

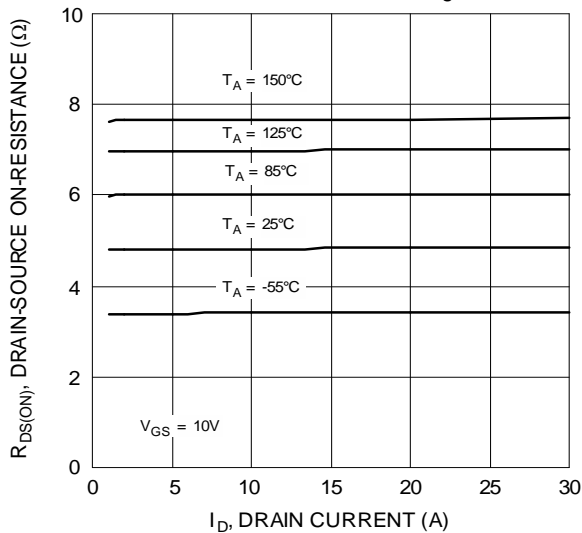


Figure 5 Typical On-Resistance vs. Drain Current and Temperature

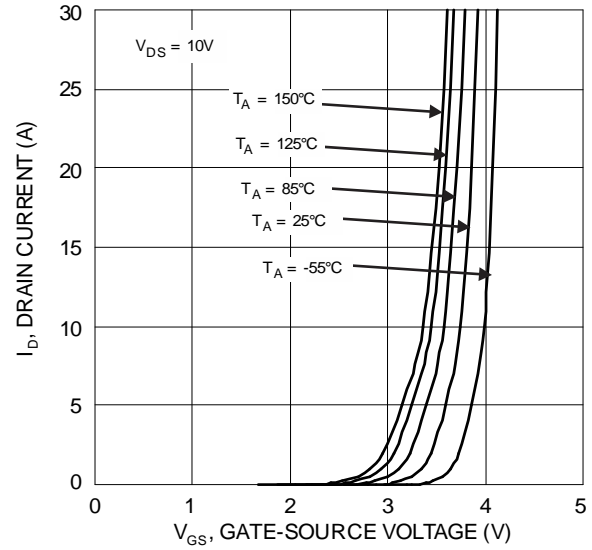


Figure 2 Typical Transfer Characteristics

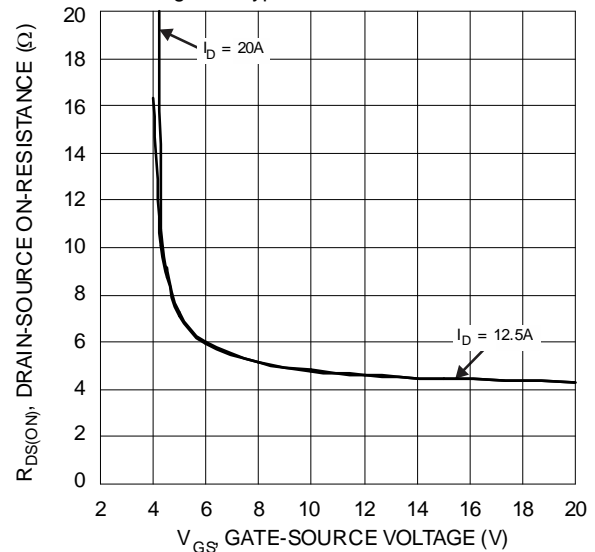


Figure 4 Typical Transfer Characteristics

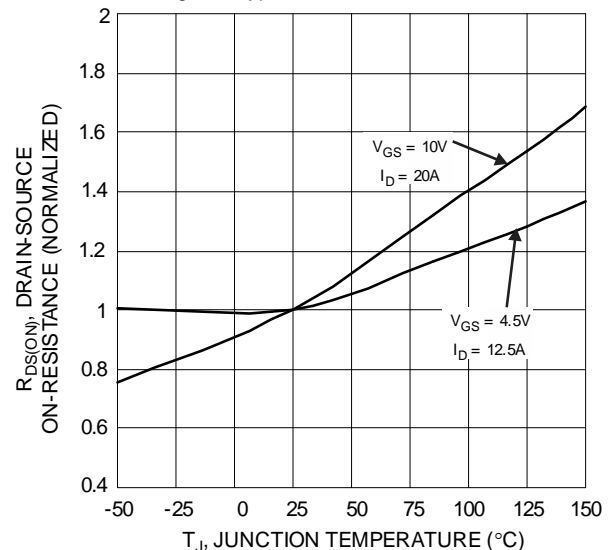


Figure 6 On-Resistance Variation with Temperature

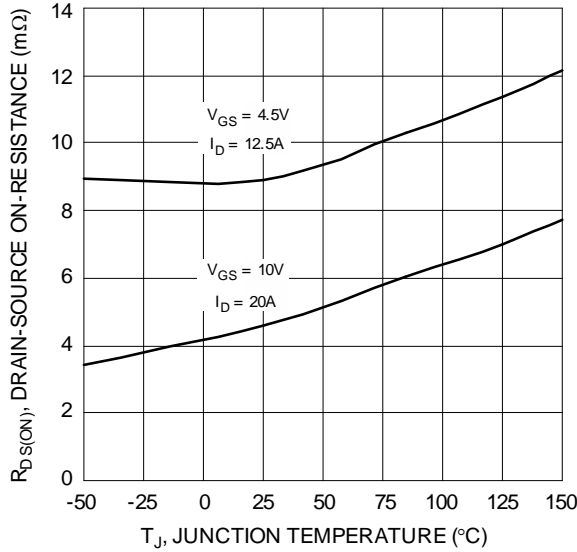


Figure 7 On-Resistance Variation with Temperature

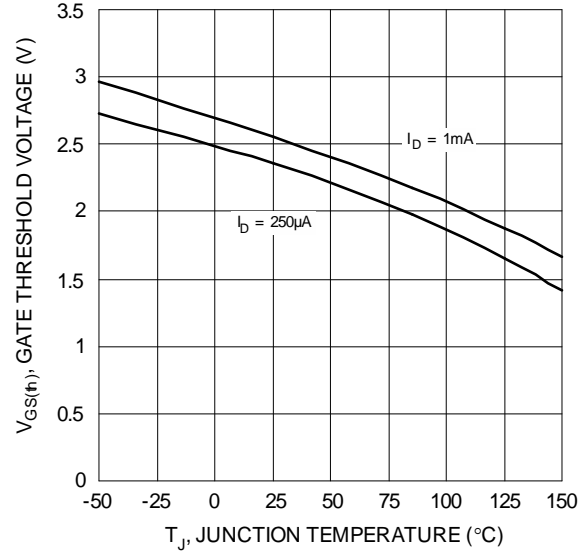


Figure 8 Gate Threshold Variation vs. Junction Temperature

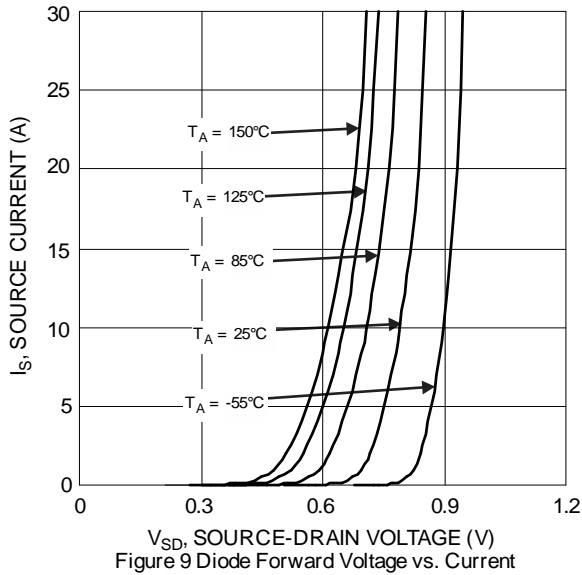


Figure 9 Diode Forward Voltage vs. Current

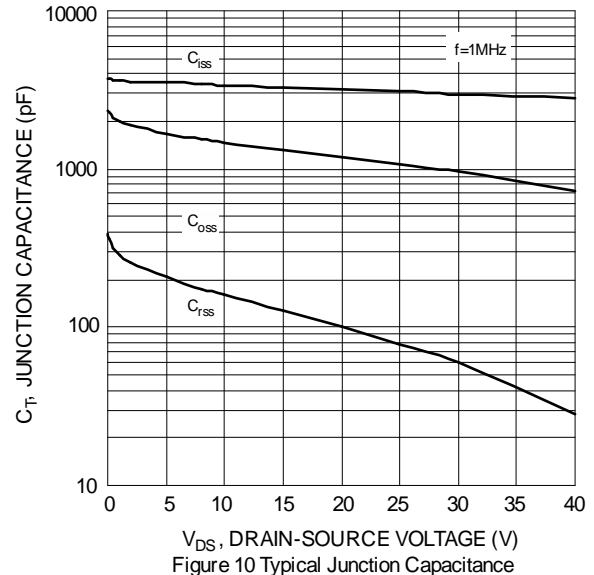


Figure 10 Typical Junction Capacitance

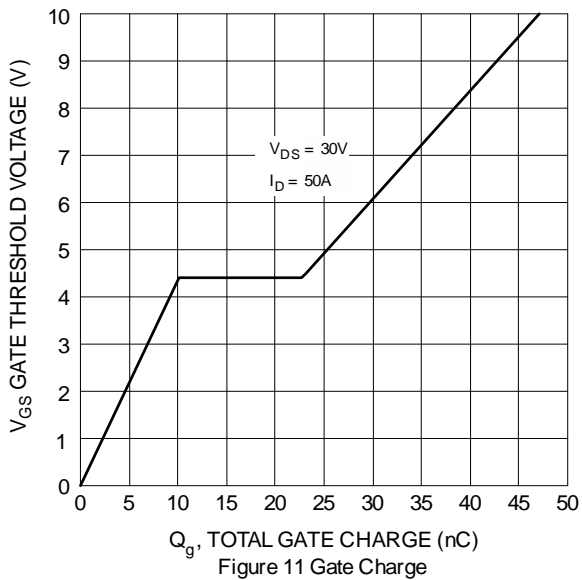


Figure 11 Gate Charge

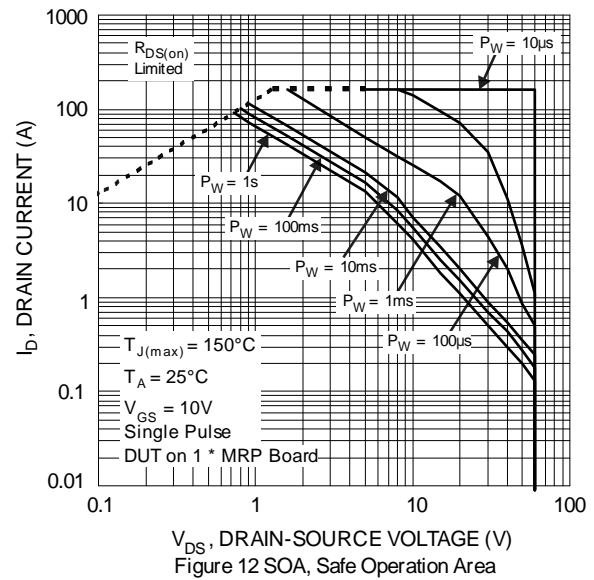
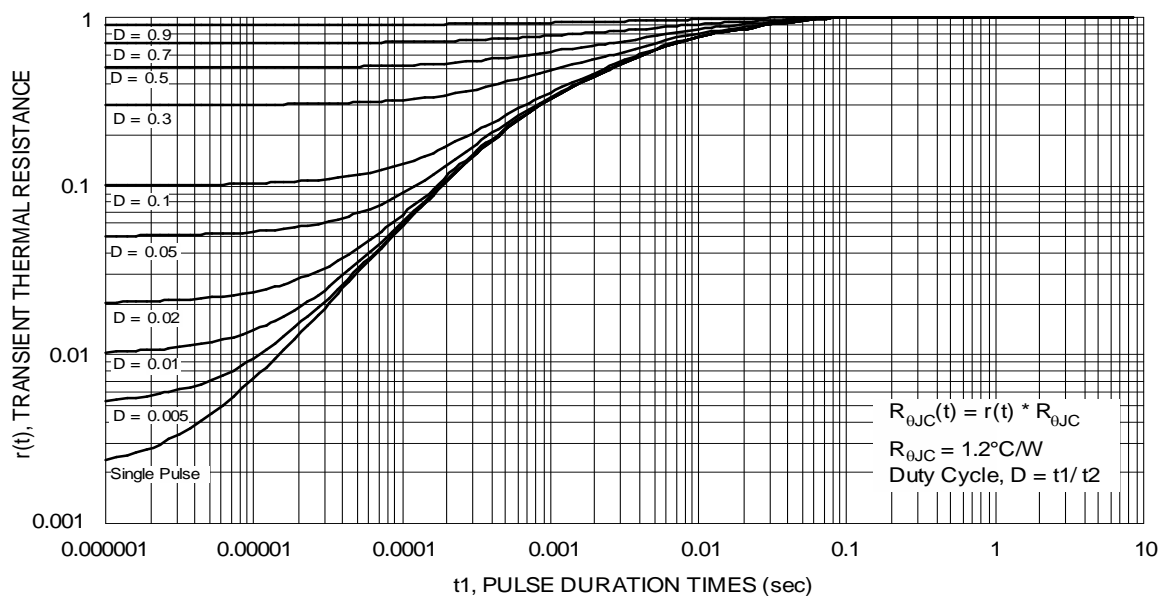


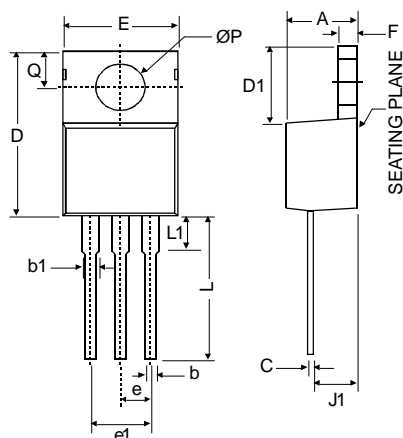
Figure 12 SOA, Safe Operation Area



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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