



40V +175°C N-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

V _{(BR)DSS}	R _{DS(ON)}	I _D T _C = +25°C
40V	$4.0 \text{m}\Omega$ @ $V_{GS} = 10V$	150A

Features

- 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
- **PPAP Capable (Note 4)**

Description and Applications

This MOSFET is designed to meet the stringent requirements of automotive applications. It is qualified to AEC-Q101, supported by a PPAP and is ideal for use in:

- Motor Control
- Backlighting
- DC-DC Converters
- **Power Management Functions**

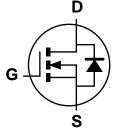
Mechanical Data

- 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)

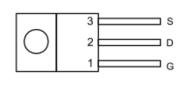


Top View

Bottom View



Equivalent Circuit



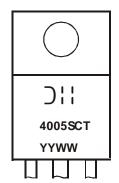
Top View Pin Out Configuration

Ordering Information (Note 5)

Part Number	Case	Packaging	
DMNH4005SCTQ	TO220AB	50 Pieces/Tube	

- 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. Automotive products are AEC-Q101 qualified and are PPAP capable. Refer to http://www.diodes.com/product_compliance_definitions.html.
- 5. For packaging details, go to our website at http://www.diodes.com/products/packages.html.

Marking Information



4005SCT = Product Type Marking Code YYWW = Date Code Marking YY = Last Two Digits of Year (ex: 16 = 2016) WW = Week (01 to 53)



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

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V_{DSS}	40	V
Gate-Source Voltage			V_{GSS}	20	V
Continuous Drain Current V _{GS} = 10V	Steady State	$T_{C} = +25^{\circ}C$ $T_{C} = +100^{\circ}C$	I _D	150 100	А
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)			I _{DM}	90	А
Maximum Continuous Body Diode Forward Current (Note 6) Avalanche Current (Note 7) L=1mH Avalanche Energy (Note 7) L=1mH			Is	80	А
			I _{AS}	30	А
			E _{AS}	500	mJ

Thermal Characteristics

Characteristic		Symbol	Value	Unit
war Dissination	$T_C = +25^{\circ}C$)	165	W
Power Dissipation	T _C = +70°C	P _D	100	
Thermal Resistance, Junction to Case		R ₀ JC	0.9	°C/W
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +175	°C

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

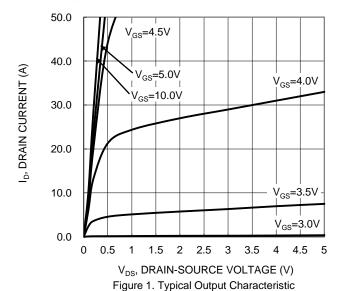
Characteristic	Symbol	Min	Тур	Max	Unit	Test Condition	
OFF CHARACTERISTICS (Note 8)							
Drain-Source Breakdown Voltage	BV _{DSS}	40	_	_	V	$V_{GS} = 0V, I_D = 250\mu A$	
Zero Gate Voltage Drain Current	I_{DSS}	_	_	1	μΑ	$V_{DS} = 32V, V_{GS} = 0V$	
Gate-Source Leakage	I _{GSS}	_	_	±100	nA	$V_{GS} = \pm 16V, V_{DS} = 0V$	
ON CHARACTERISTICS (Note 8)							
Gate Threshold Voltage	V _{GS(TH)}	1	_	3	V	$V_{DS} = V_{GS}$, $I_D = 250\mu A$	
Static Drain-Source On-Resistance	R _{DS(ON)}	_	3.4	4.0	mΩ	$V_{GS} = 10V, I_D = 20A$	
Diode Forward Voltage	V_{SD}	_	_	1.2	V	$V_{GS} = 0V, I_{S} = 1A$	
DYNAMIC CHARACTERISTICS (Note 9)							
Input Capacitance	Ciss		2,846	_		.,	
Output Capacitance	Coss	_	742	_	pF	$V_{DS} = 20V, V_{GS} = 0V$ f = 1.0MHz	
Reverse Transfer Capacitance	C_{rss}	_	242	_		I = 1.0IVINZ	
Gate Resistance	R_{G}	_	1.9	_	Ω	$V_{DS} = 0V, V_{GS} = 0V, f = 1.0MHz$	
Total Gate Charge (V _{GS} = 10V)	Q_g	_	48	_		V 00V I 00A	
Total Gate Charge (V _{GS} = 4.5V)	Qg	_	23	_	nC		
Gate-Source Charge	Q_{gs}	_	9.5	_	IIC	$V_{DD} = 20V, I_D = 20A$	
Gate-Drain Charge	Q_{gd}	_	11.5	_			
Turn-On Delay Time	t _{D(ON)}	_	6.6	_	ns	$V_{DD} = 20V, V_{GS} = 10V,$	
Turn-On Rise Time	t _R	_	12.1	_			
Turn-Off Delay Time	t _{D(OFF)}	_	18.3	_		$R_G = 1\Omega$, $I_D = 20A$	
Turn-Off Fall Time	t _F	_	4.9	_			
Reverse Recovery Time	t _{RR}	_	29	_	ns ,	1 450 41/44 4000///-	
Reverse Recovery Charge	Q_{RR}	_	24	_	nC	I _F = 15A, di/dt = 100A/μs	

6. Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided. 7. I_{AS} and E_{AS} ratings are based on low frequency and duty cycles to keep T_J = +25°C. Notes:

Short duration pulse test used to minimize self-heating effect.
 Guaranteed by design. Not subject to product testing.







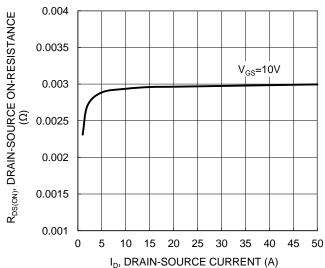


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

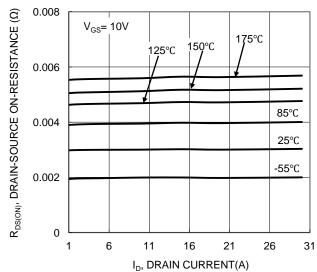


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

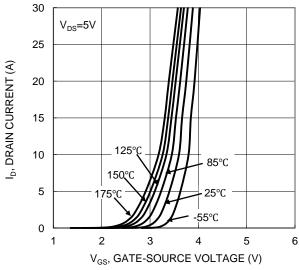


Figure 2. Typical Transfer Characteristic

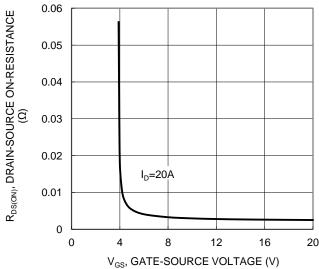
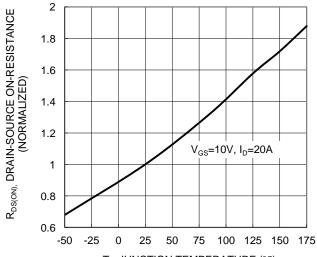


Figure 4. Typical Transfer Characteristic



T_J, JUNCTION TEMPERATURE (°C)
Figure 6. On-Resistance Variation with Junction
Temperature





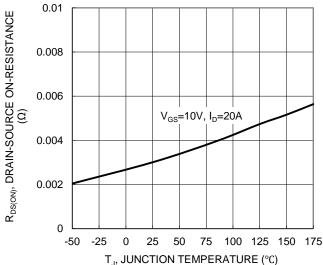


Figure 7. On-Resistance Variation with Junction Temperature

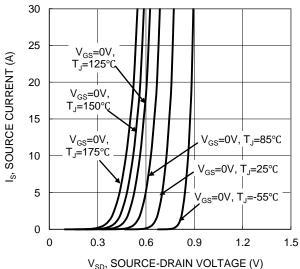
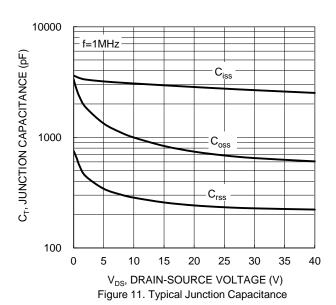


Figure 9. Diode Forward Voltage vs. Current



4 V_{GS(TH),} GATE THRESHOLD VOLTAGE (V) 3.5 3 2.5 $I_D=1mA$ 2 I_D=250μA 1.5 1 0.5 0 -25 75 100 125 150 175 -50 25 50 T., JUNCTION TEMPERATURE (°C)

Figure 8. Gate Threshold Variation vs. Junction Temperature

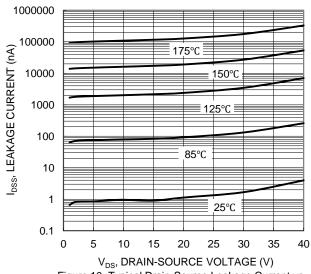


Figure 10. Typical Drain-Source Leakage Current vs. Voltage

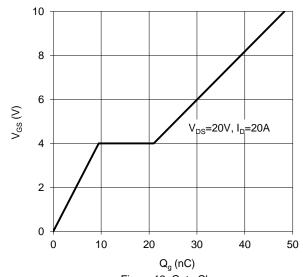


Figure 12. Gate Charge



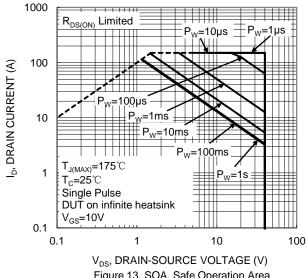


Figure 13. SOA, Safe Operation Area

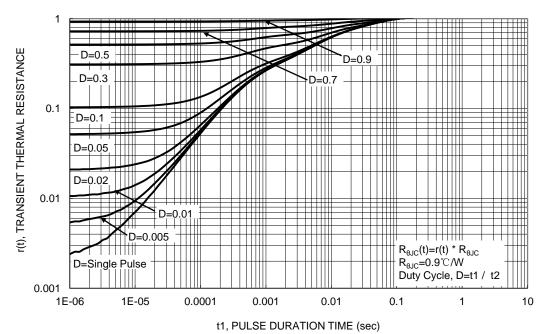


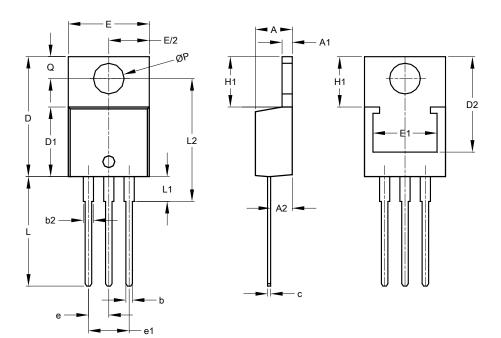
Figure 14. Transient Thermal Resistance



Package Outline Dimensions

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

TO220AB



TO220AB					
Dim	Min	Max	Тур		
Α	3.56	4.82	-		
A 1	0.51	1.39	-		
A2	2.04	2.92	-		
b	0.39	1.01	0.81		
b2	1.15	1.77	1.24		
С	0.356	0.61	-		
D	14.22	16.51	-		
D1	8.39	9.01	-		
D2	11.45	12.87	-		
е	-	-	2.54		
e1	-	-	5.08		
Е	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		
Р	3.54	4.08	-		
Q	2.54	3.42	-		
All Dimensions in mm					



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