NTHD5902T1

Power MOSFET
Dual N-Channel ChipFET™

2.9 Amps, 30 Volts

Features

- Low $R_{DS(on)}$ for Higher Efficiency
- Miniature ChipFET Surface Mount Package Saves Board Space

Applications

- Power Management in Portable and Battery−Powered Products; i.e., Cellular and Cordless Telephones and PCMCIA Cards

MAXIMUM RATINGS (T_A = 25°C unless otherwise noted)

Rating	Symbol	5 secs	Steady State	Unit
Drain−Source Voltage	V_{DS}	30		V
Gate−Source Voltage	V_{GS}	±20		V
Continuous Drain Current (T_J = 150°C) (Note 1) T_A = 25°C T_A = 85°C	I_D	 ±3.9 ±2.8	 ±2.9 ±2.1	A
Pulsed Drain Current	I_{DM}	±10		A
Continuous Source Current (Diode Conduction) (Note 1)	I_S	1.8	0.9	A
Maximum Power Dissipation (Note 1) T_A = 25°C T_A = 85°C	P_D	 2.1 1.1	 1.1 0.6	W
Operating Junction and Storage Temperature Range	T_J, T_{stg}	−55 to +150		°C

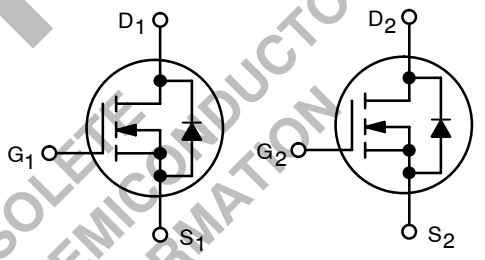
1. Surface Mounted on 1″ x 1″ FR4 Board.

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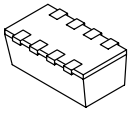
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DUAL N−CHANNEL
2.9 AMPS, 30 VOLTS
$R_{DS(on)}$ = 85 mΩ

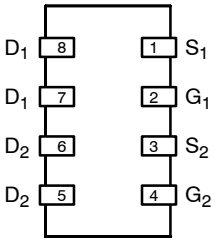


N−Channel MOSFET N−Channel MOSFET

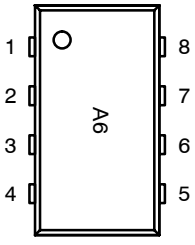


ChipFET
CASE 1206A
STYLE 2

PIN CONNECTIONS



MARKING DIAGRAM



A6 = Specific Device Code

ORDERING INFORMATION

Device	Package	Shipping
NTHD5902T1	ChipFET	3000/Tape & Reel

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THERMAL CHARACTERISTICS

Characteristic	Symbol	Typ	Max	Unit
Maximum Junction−to−Ambient (Note 2) $t \leq 5$ sec Steady State	R_{thJA}	 50 90	 60 110	°C/W
Maximum Junction−to−Foot Steady State	R_{thJF}	30	40	°C/W

ELECTRICAL CHARACTERISTICS (T_J = 25°C unless otherwise noted)

Characteristic	Symbol	Test Condition	Min	Typ	Max	Unit
Static						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, I_D = 250 μA	1.0	–	–	V
Gate−Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ±20 V	–	–	±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 24 V, V_{GS} = 0 V	–	–	1.0	μA
		V_{DS} = 24 V, V_{GS} = 0 V, T_J = 85°C	–	–	5.0	
On−State Drain Current (Note 3)	$I_{D(on)}$	$V_{DS} \geq 5.0$ V, V_{GS} = 10 V	10	–	–	A
Drain−Source On−State Resistance (Note 3)	$r_{DS(on)}$	V_{GS} = 10 V, I_D = 2.9 A	–	0.072	0.085	Ω
		V_{GS} = 4.5 V, I_D = 2.2 A	–	0.120	0.143	
Forward Transconductance (Note 3)	g_{fs}	V_{DS} = 15 V, I_D = 2.9 A	–	20	–	S
Diode Forward Voltage (Note 3)	V_{SD}	I_S = 0.9 A, V_{GS} = 0 V	–	0.8	1.2	V
Dynamic (Note 4)						
Total Gate Charge	Q_g	V_{DS} = 15 V, V_{GS} = 10 V, I_D = 2.9 A	–	5.0	7.5	nC
Gate−Source Charge	Q_{gs}		–	0.8	–	
Gate−Drain Charge	Q_{gd}		–	1.0	–	
Turn−On Delay Time	$t_{d(on)}$	V_{DD} = 15 V, R_L = 15 Ω, $I_D \cong$ 1.0 A, V_{GEN} = 10 V, R_G = 6 Ω	–	7.0	11	ns
Rise Time	t_r		–	12	18	
Turn−Off Delay Time	$t_{d(off)}$		–	12	18	
Fall Time	t_f		–	7.0	11	
Source−Drain Reverse Recovery Time	t_{rr}	I_F = 0.9 A, di/dt = 100 A/μs	–	40	80	

2. Surface Mounted on 1″ x 1″ FR4 Board.
3. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production testing.

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TYPICAL ELECTRICAL CHARACTERISTICS

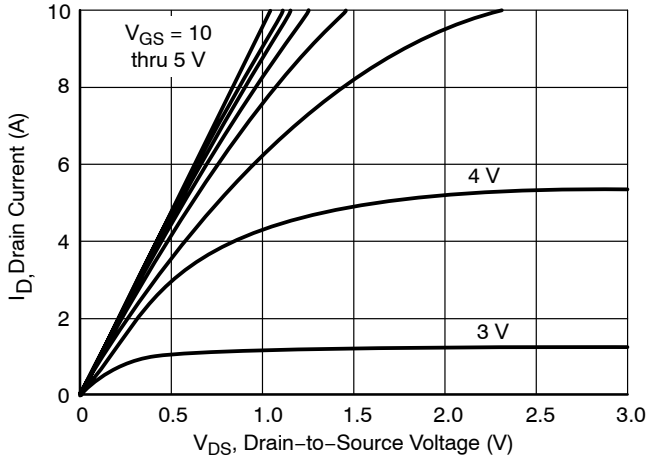


Figure 1. Output Characteristics

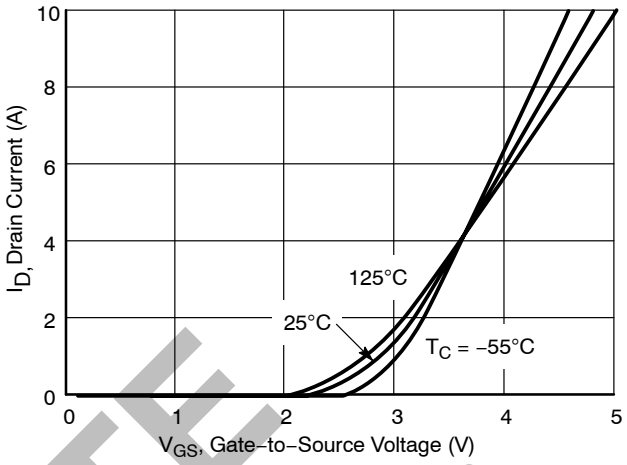


Figure 2. Transfer Characteristics

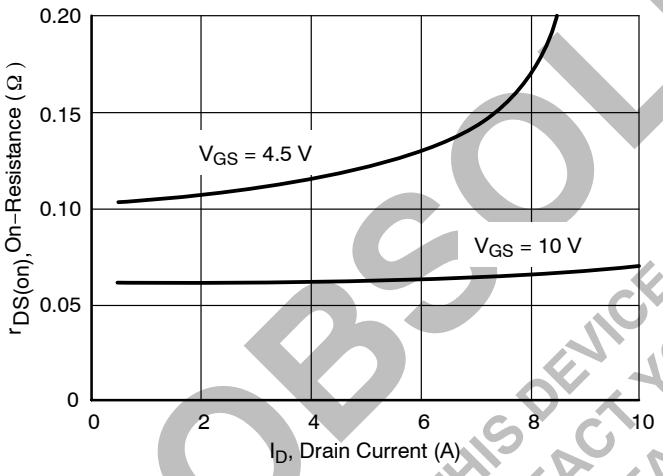


Figure 3. On−Resistance vs. Drain Current

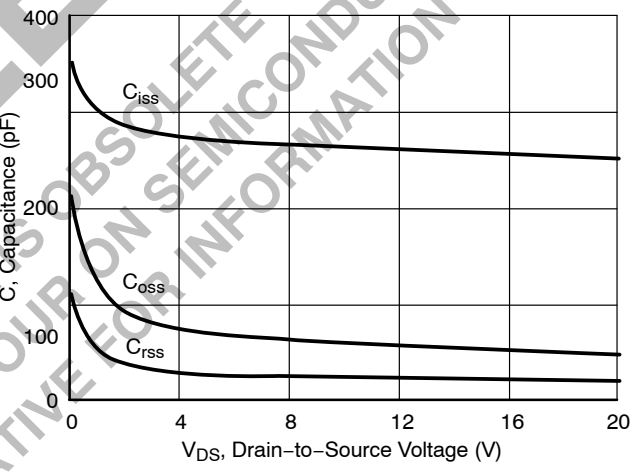


Figure 4. Capacitance

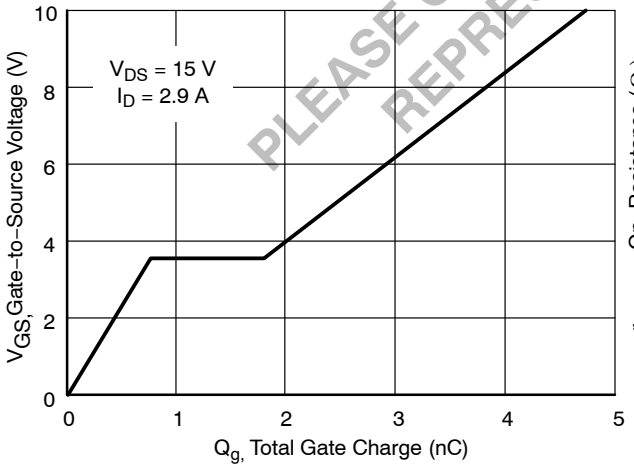


Figure 5. Gate Charge

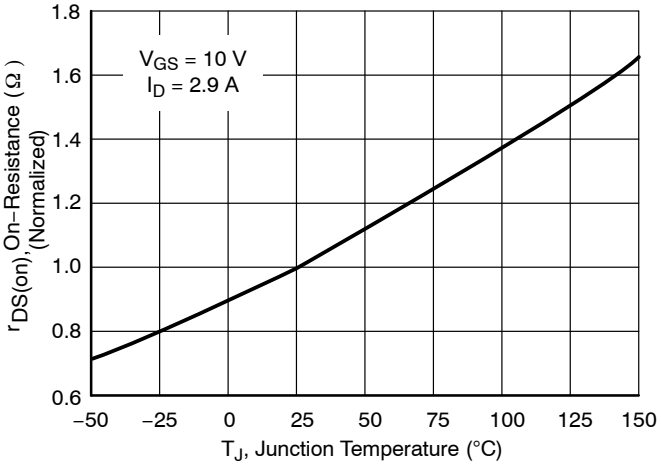


Figure 6. On−Resistance vs. Junction Temperature

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TYPICAL ELECTRICAL CHARACTERISTICS

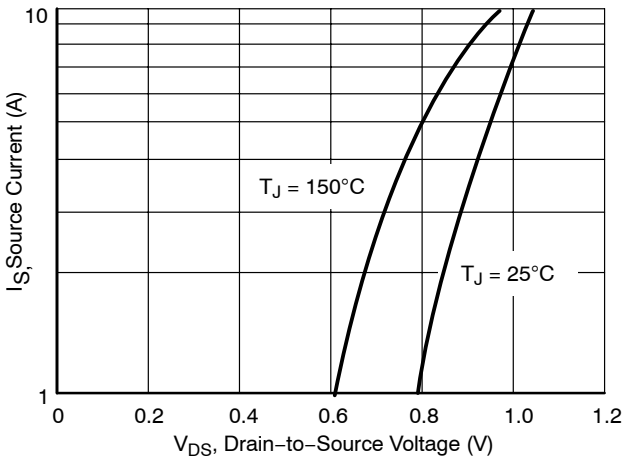


Figure 7. Source−Drain Diode Forward Voltage

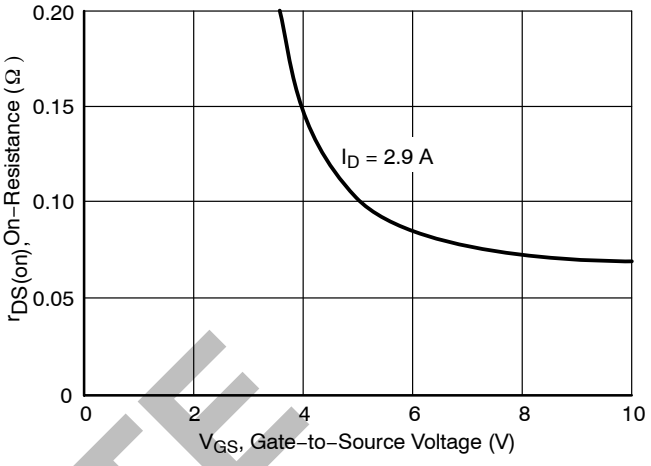


Figure 8. On−Resistance vs. Gate−to−Source Voltage

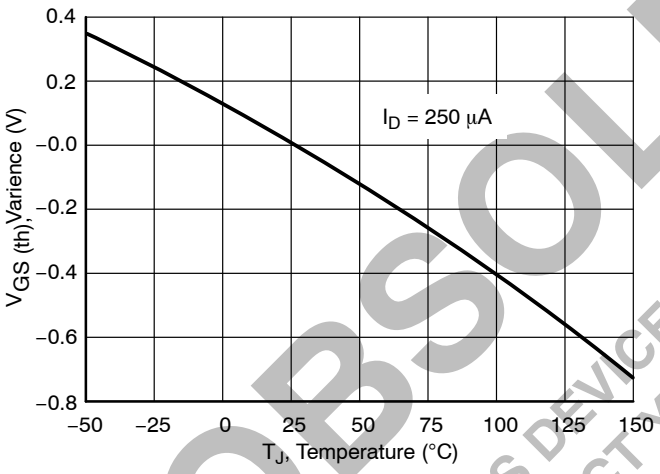


Figure 9. Threshold Voltage

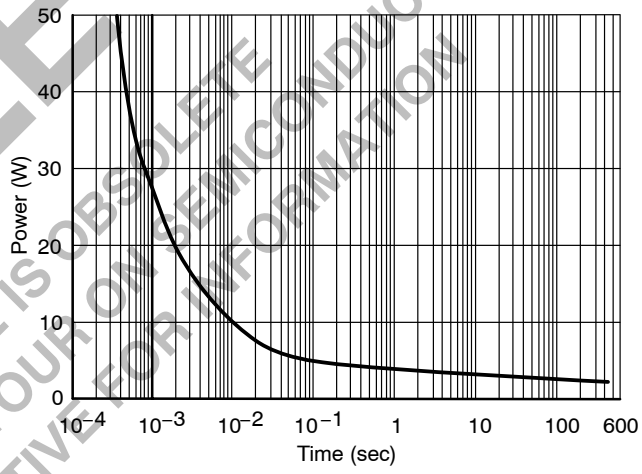


Figure 10. Single Pulse Power

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TYPICAL ELECTRICAL CHARACTERISTICS

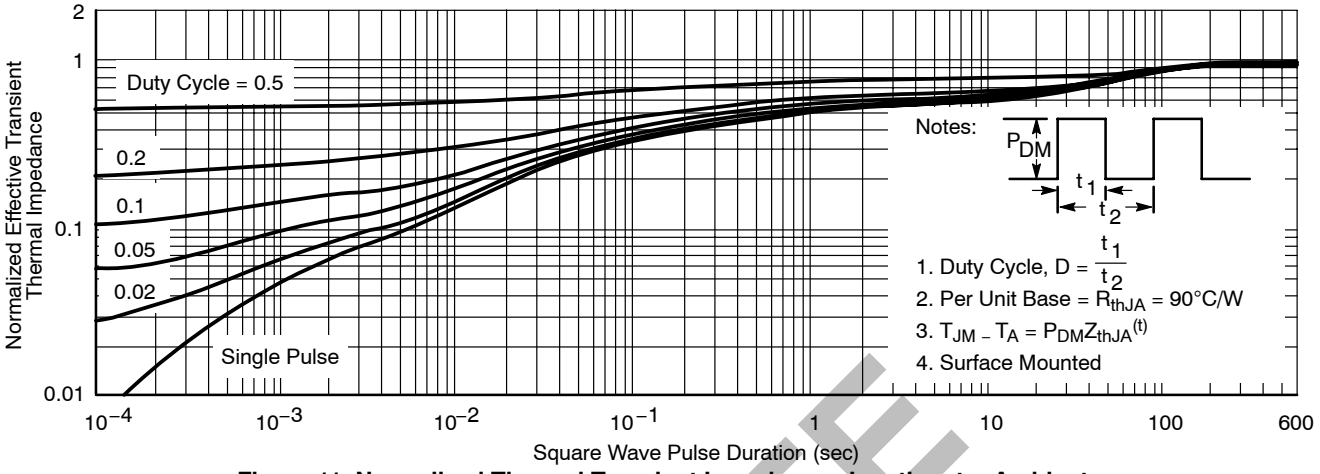


Figure 11. Normalized Thermal Transient Impedance, Junction−to−Ambient

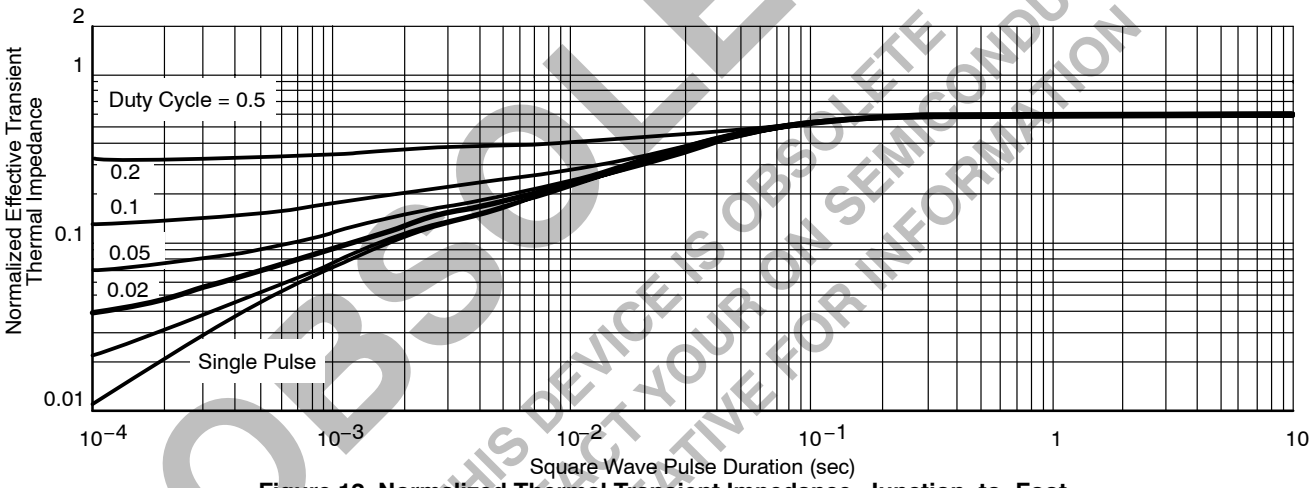


Figure 12. Normalized Thermal Transient Impedance, Junction−to−Foot

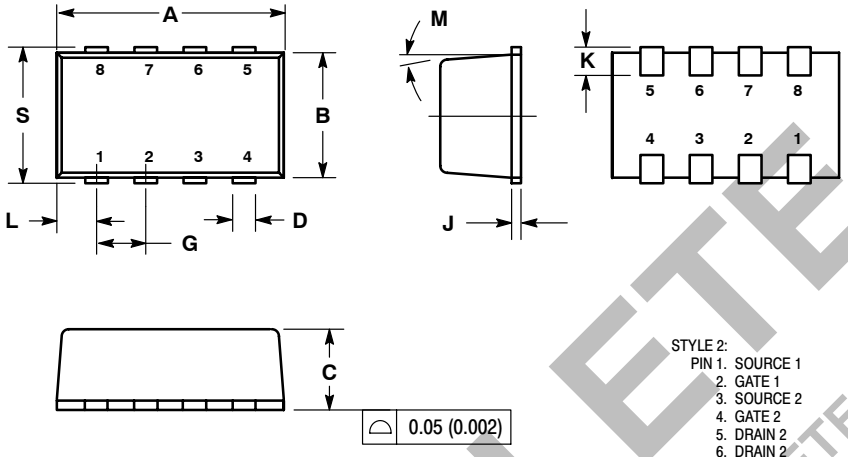
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Notes

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PACKAGE DIMENSIONS

ChipFET
CASE 1206A−03
ISSUE D



STYLE 2:
PIN 1. SOURCE 1
2. GATE 1
3. SOURCE 2
4. GATE 2
5. DRAIN 2
6. DRAIN 2
7. DRAIN 1
8. DRAIN 1

NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. MOLD GATE BURRS SHALL NOT EXCEED 0.13 MM PER SIDE.
4. LEADFRAME TO MOLDED BODY OFFSET IN HORIZONTAL AND VERTICAL SHALL NOT EXCEED 0.08 MM.
5. DIMENSIONS A AND B EXCLUSIVE OF MOLD GATE BURRS.
6. NO MOLD FLASH ALLOWED ON THE TOP AND BOTTOM LEAD SURFACE.
7. 1206A−01 AND 1206A−02 OBSOLETE. NEW STANDARD IS 1206A−03.

	MILLIMETERS		INCHES	
DIM	MIN	MAX	MIN	MAX
A	2.95	3.10	0.116	0.122
B	1.55	1.70	0.061	0.067
C	1.00	1.10	0.039	0.043
D	0.25	0.35	0.010	0.014
G	0.65 BSC		0.025 BSC	
J	0.10	0.20	0.004	0.008
K	0.28	0.42	0.011	0.017
L	0.55 BSC		0.022 BSC	
M	5 ° NOM		5 ° NOM	
S	1.80	2.00	0.072	0.080

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