

NTGS3443T1

Power MOSFET 2 Amps, 20 Volts P-Channel TSOP-6

Features

- Ultra Low $R_{DS(on)}$
- Higher Efficiency Extending Battery Life
- Miniature TSOP6 Surface Mount Package
- Pb-Free Package May be Available. The G-Suffix Denotes a Pb-Free Lead Finish

Applications

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

MAXIMUM RATINGS ($T_J = 25^\circ\text{C}$ unless otherwise noted)

Rating	Symbol	Value	Unit
Drain-to-Source Voltage	V_{DSS}	-20	Volts
Gate-to-Source Voltage - Continuous	V_{GS}	± 12	Volts
Thermal Resistance Junction-to-Ambient (Note 1)	$R_{\theta JA}$	244	$^\circ\text{C/W}$
Total Power Dissipation @ $T_A = 25^\circ\text{C}$	P_d	0.5	Watts
Drain Current - Continuous @ $T_A = 25^\circ\text{C}$	I_D	-2.2	Amps
- Pulsed Drain Current ($T_p < 10 \mu\text{s}$)	I_{DM}	-10	Amps
Thermal Resistance Junction-to-Ambient (Note 2)	$R_{\theta JA}$	128	$^\circ\text{C/W}$
Total Power Dissipation @ $T_A = 25^\circ\text{C}$	P_d	1.0	Watts
Drain Current - Continuous @ $T_A = 25^\circ\text{C}$	I_D	-3.1	Amps
- Pulsed Drain Current ($T_p < 10 \mu\text{s}$)	I_{DM}	-14	Amps
Thermal Resistance Junction-to-Ambient (Note 3)	$R_{\theta JA}$	62.5	$^\circ\text{C/W}$
Total Power Dissipation @ $T_A = 25^\circ\text{C}$	P_d	2.0	Watts
Drain Current - Continuous @ $T_A = 25^\circ\text{C}$	I_D	-4.4	Amps
- Pulsed Drain Current ($T_p < 10 \mu\text{s}$)	I_{DM}	-20	Amps
Operating and Storage Temperature Range	T_J, T_{stg}	-55 to 150	$^\circ\text{C}$
Maximum Lead Temperature for Soldering Purposes for 10 Seconds	T_L	260	$^\circ\text{C}$

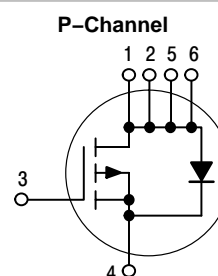
1. Minimum FR-4 or G-10PCB, operating to steady state.
2. Mounted onto a 2 in square FR-4 board (1" sq. 2 oz. cu. 0.06" thick single sided), operating to steady state.
3. Mounted onto a 2 in square FR-4 board (1" sq. 2 oz. cu. 0.06" thick single sided), $t < 5.0$ seconds.



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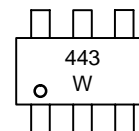
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2 AMPERES
20 VOLTS
 $R_{DS(on)} = 65 \text{ m}\Omega$



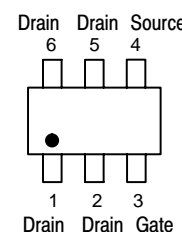
TSOP-6
CASE 318G
Style 1

MARKING DIAGRAM



443 = Device Code
W = Work Week

PIN ASSIGNMENT



ORDERING INFORMATION

Device	Package	Shipping†
NTGS3443T1	TSOP-6	3000 Tape & Reel
NTGS3443T1G	TSOP-6	3000 Tape & Reel

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

NTGS3443T1

ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise noted) (Notes 4 & 5)

Characteristic	Symbol	Min	Typ	Max	Unit	
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage ($V_{GS} = 0\text{ Vdc}$, $I_D = -10\ \mu\text{A}$)	$V_{(BR)DSS}$	-20	-	-	Vdc	
Zero Gate Voltage Drain Current ($V_{GS} = 0\text{ Vdc}$, $V_{DS} = -20\text{ Vdc}$, $T_J = 25^\circ\text{C}$) ($V_{GS} = 0\text{ Vdc}$, $V_{DS} = -20\text{ Vdc}$, $T_J = 70^\circ\text{C}$)	I_{DSS}	-	-	-1.0 -5.0	μA dc	
Gate-Body Leakage Current ($V_{GS} = -12\text{ Vdc}$, $V_{DS} = 0\text{ Vdc}$)	I_{GSS}	-	-	-100	nA	
Gate-Body Leakage Current ($V_{GS} = +12\text{ Vdc}$, $V_{DS} = 0\text{ Vdc}$)	I_{GSS}	-	-	100	nA	
ON CHARACTERISTICS						
Gate Threshold Voltage ($V_{DS} = V_{GS}$, $I_D = -250\ \mu\text{A}$)	$V_{GS(th)}$	-0.60	-0.95	-1.50	Vdc	
Static Drain-Source On-State Resistance ($V_{GS} = -4.5\text{ Vdc}$, $I_D = -4.4\text{ A}$ dc) ($V_{GS} = -2.7\text{ Vdc}$, $I_D = -3.7\text{ A}$ dc) ($V_{GS} = -2.5\text{ Vdc}$, $I_D = -3.5\text{ A}$ dc)	$R_{DS(on)}$	-	0.058 0.082 0.092	0.065 0.090 0.100	Ω	
Forward Transconductance ($V_{DS} = -10\text{ Vdc}$, $I_D = -4.4\text{ A}$ dc)	g_{FS}	-	8.8	-	mhos	
DYNAMIC CHARACTERISTICS						
Input Capacitance	$(V_{DS} = -5.0\text{ Vdc}$, $V_{GS} = 0\text{ Vdc}$, $f = 1.0\text{ MHz}$)	C_{iss}	-	565	-	pF
Output Capacitance		C_{oss}	-	320	-	pF
Reverse Transfer Capacitance		C_{rss}	-	120	-	pF
SWITCHING CHARACTERISTICS						
Turn-On Delay Time	$(V_{DD} = -20\text{ Vdc}$, $I_D = -1.0\text{ A}$ dc, $V_{GS} = -4.5\text{ Vdc}$, $R_g = 6.0\ \Omega$)	$t_{d(on)}$	-	10	25	ns
Rise Time		t_r	-	18	45	ns
Turn-Off Delay Time		$t_{d(off)}$	-	30	50	ns
Fall Time		t_f	-	31	50	ns
Total Gate Charge	$(V_{DS} = -10\text{ Vdc}$, $V_{GS} = -4.5\text{ Vdc}$, $I_D = -4.4\text{ A}$ dc)	Q_{tot}	-	7.5	15	nC
Gate-Source Charge		Q_{gs}	-	1.4	-	nC
Gate-Drain Charge		Q_{gd}	-	2.9	-	nC
BODY-DRAIN DIODE RATINGS						
Diode Forward On-Voltage	$(I_S = -1.7\text{ A}$ dc, $V_{GS} = 0\text{ Vdc}$)	V_{SD}	-	-0.83	-1.2	Vdc
Reverse Recovery Time	$(I_S = -1.7\text{ A}$ dc, $dI_S/dt = 100\text{ A}/\mu\text{s}$)	t_{rr}	-	30	-	ns

4. Indicates Pulse Test: P.W. = 300 μsec max, Duty Cycle = 2%.

5. Handling precautions to protect against electrostatic discharge is mandatory.

TYPICAL ELECTRICAL CHARACTERISTICS

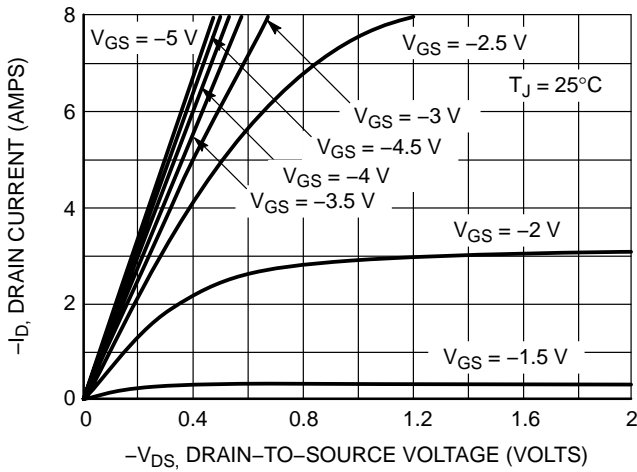


Figure 1. On-Region Characteristics

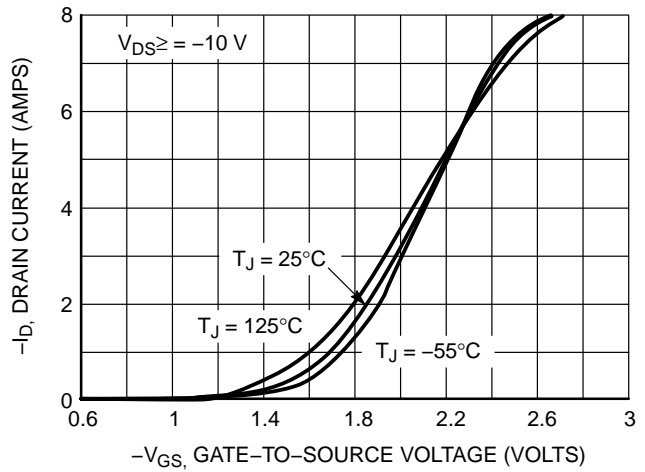


Figure 2. Transfer Characteristics

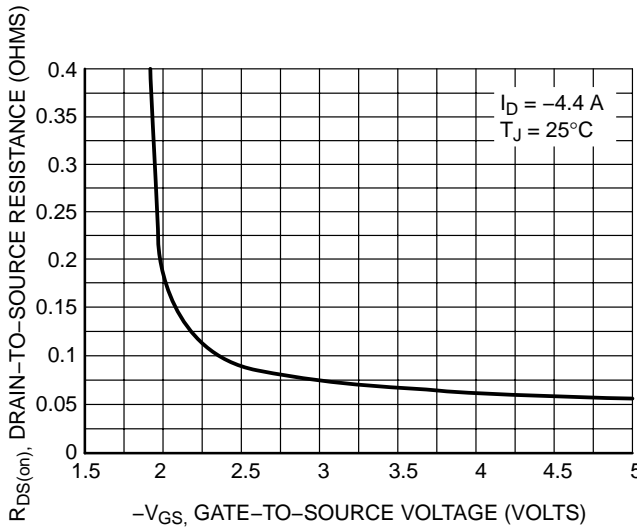


Figure 3. On-Resistance vs. Gate-to-Source Voltage

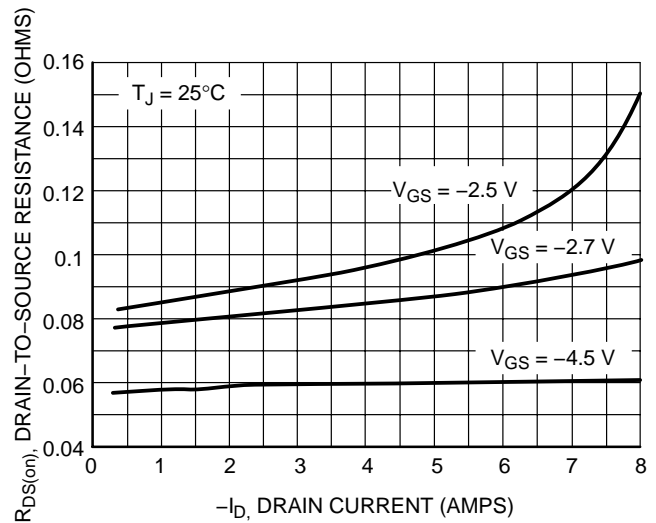


Figure 4. On-Resistance vs. Drain Current and Gate Voltage

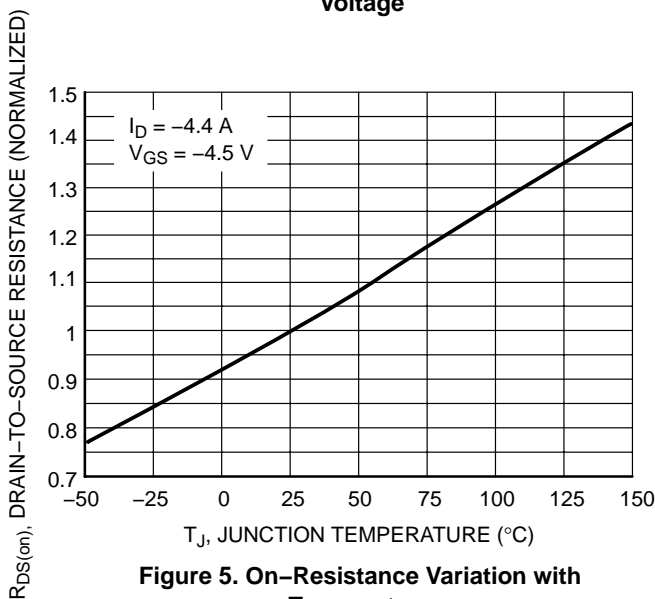


Figure 5. On-Resistance Variation with Temperature

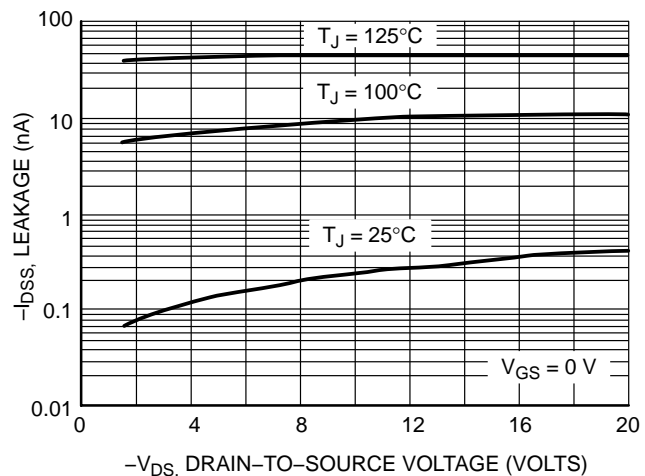


Figure 6. Drain-to-Source Leakage Current vs. Voltage

TYPICAL ELECTRICAL CHARACTERISTICS

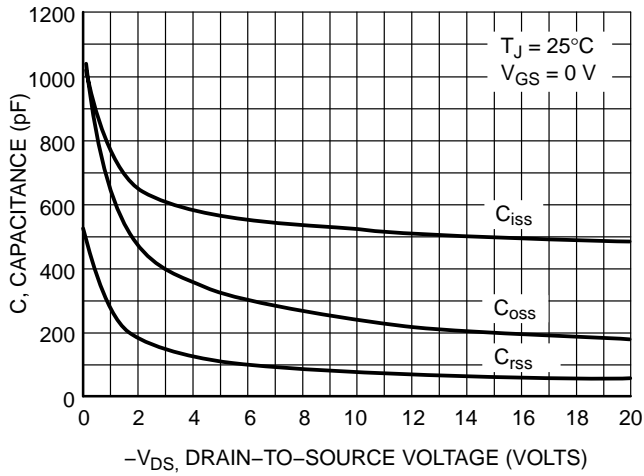


Figure 7. Capacitance Variation

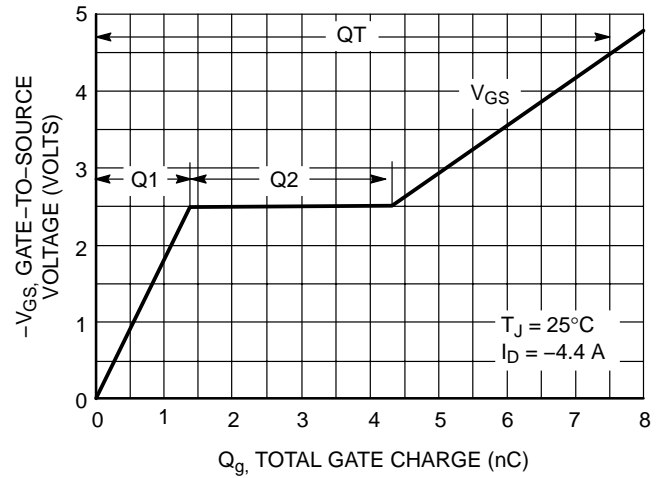


Figure 8. Gate-to-Source and Drain-to-Source Voltage vs. Total Charge

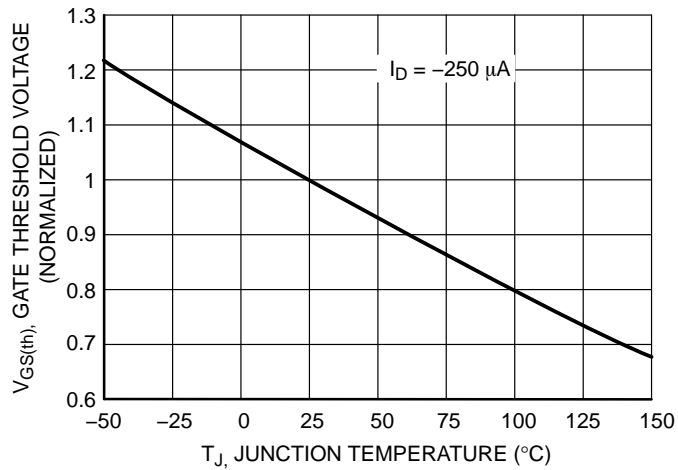


Figure 9. Gate Threshold Voltage Variation with Temperature

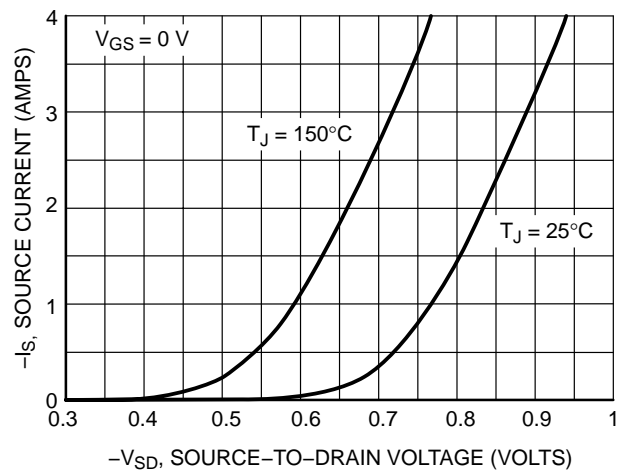


Figure 10. Diode Forward Voltage vs. Current

NTGS3443T1

TYPICAL ELECTRICAL CHARACTERISTICS

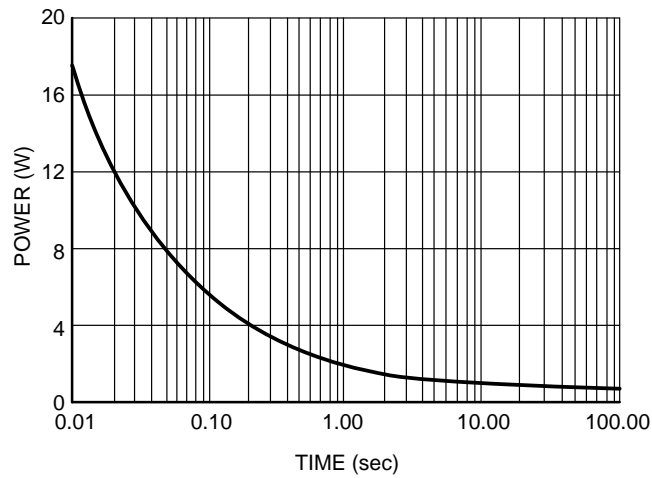


Figure 11. Single Pulse Power

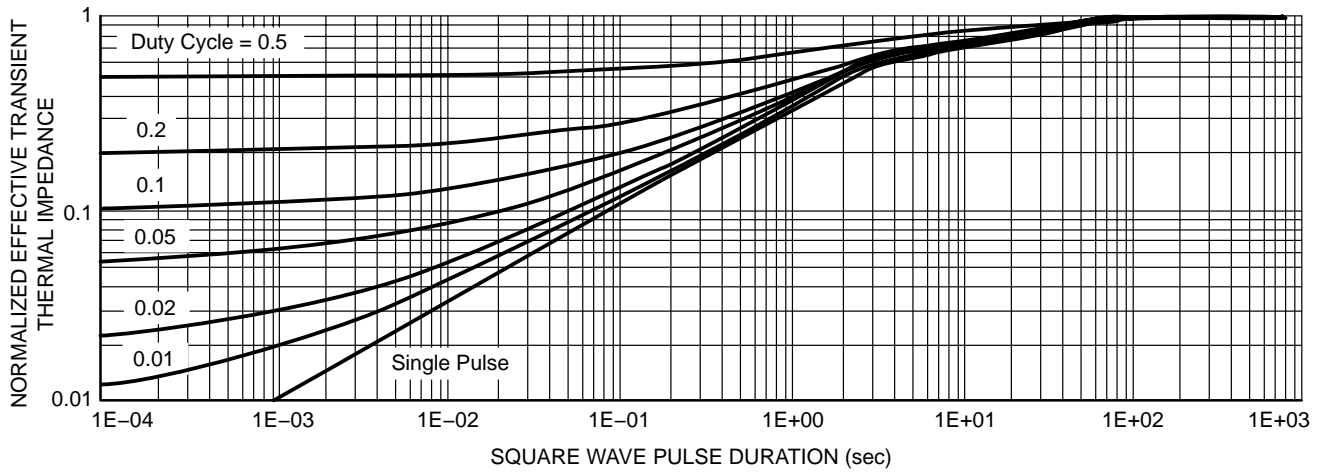
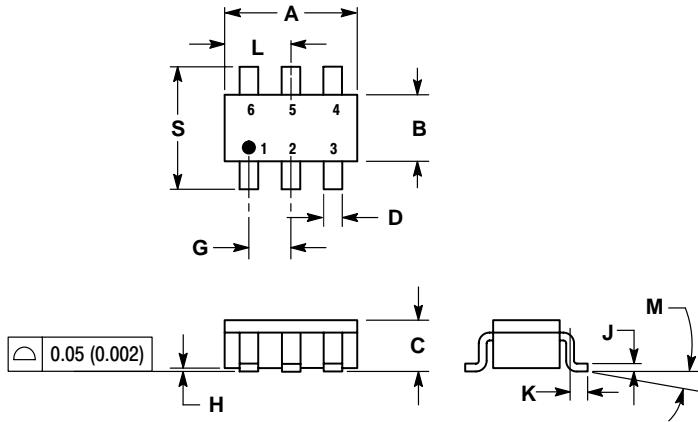


Figure 12. Normalized Thermal Transient Impedance, Junction-to-Ambient

NTGS3443T1

PACKAGE DIMENSIONS

TSOP-6 CASE 318G-02 ISSUE K



NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. DIMENSIONS A AND B DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	2.90	3.10	0.1142	0.1220
B	1.30	1.70	0.0512	0.0669
C	0.90	1.10	0.0354	0.0433
D	0.25	0.50	0.0098	0.0197
G	0.85	1.05	0.0335	0.0413
H	0.013	0.100	0.0005	0.0040
J	0.10	0.26	0.0040	0.0102
K	0.20	0.60	0.0079	0.0236
L	1.25	1.55	0.0493	0.0610
M	0	10	0	10
S	2.50	3.00	0.0985	0.1181

STYLE 1:

- PIN 1: DRAIN
- DRAIN
- GATE
- SOURCE
- DRAIN
- DRAIN

SOLDERING FOOTPRINT*

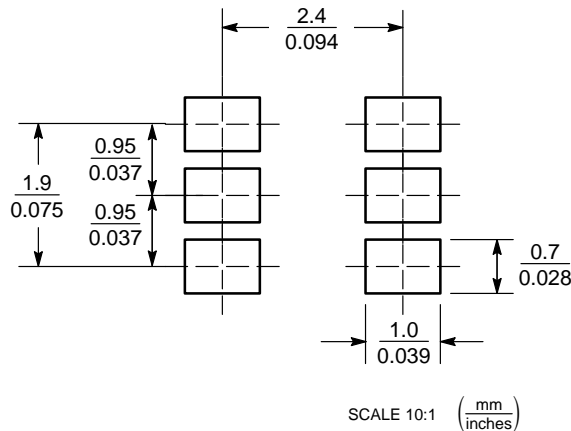


Figure 13. TSOP-6

*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

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