NTGS3441T1

Power MOSFET
1 Amp, 20 Volts

P−Channel TSOP−6

Features

- Ultra Low $R_{DS(on)}$
- Higher Efficiency Extending Battery Life
- Miniature TSOP−6 Surface Mount Package
- Pb−Free Package is Available

Applications

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

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

Rating	Symbol	Value	Unit
Drain−to−Source Voltage	V_{DSS}	−20	V
Gate−to−Source Voltage − Continuous	V_{GS}	±8.0	V

Thermal Resistance
   Junction−to−Ambient (Note 1)
Total Power Dissipation @ T_A = 25°C
Drain Current − Continuous @ T_A = 25°C
   − Pulsed Drain Current (T_p < 10 µS)
	$R_{\theta JA}$
	P_d
	I_D
	I_{DM}
		244
		0.5
		−1.65
		−10
			°C/W
			W
			A
			A

Thermal Resistance
   Junction−to−Ambient (Note 2)
Total Power Dissipation @ T_A = 25°C
Drain Current − Continuous @ T_A = 25°C
   − Pulsed Drain Current (T_p < 10 µS)
	$R_{\theta JA}$
	P_d
	I_D
	I_{DM}
		128
		1.0
		−2.35
		−14
			°C/W
			W
			A
			A

Thermal Resistance
   Junction−to−Ambient (Note 3)
Total Power Dissipation @ T_A = 25°C
Drain Current − Continuous @ T_A = 25°C
   − Pulsed Drain Current (T_p < 10 µS)
	$R_{\theta JA}$
	P_d
	I_D
	I_{DM}
		62.5
		2.0
		−3.3
		−20
			°C/W
			W
			A
			A

Operating and Storage Temperature Range	T_J, T_{stg}	−55 to 150	°C
Maximum Lead Temperature for Soldering Purposes for 10 Seconds	T_L	260	°C

Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

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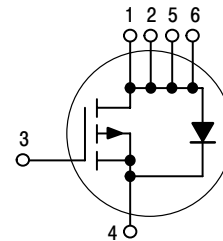3. Mounted onto a 2″ square FR−4 board (1 in sq, 2 oz. Cu. 0.06″ thick single sided), t < 5.0 seconds.

ON Semiconductor®

1 AMPERE
20 VOLTS
$R_{DS(on)}$ = 90 mΩ

P−Channel

MARKING DIAGRAM & PIN ASSIGNMENT

**TSOP−6
CASE 318G
STYLE 1**

	Drain	Drain	Source
	6	5	4

PT M ■

	1	2	3
	Drain	Drain	Gate
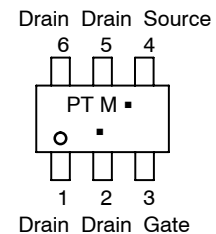
PT   = Specific Device Code
M   = Date Code*
■   = Pb−Free Package

(Note: Microdot may be in either location)

*Date Code orientation may vary depending upon manufacturing location.

ORDERING INFORMATION

Device	Package	Shipping[†]
NTGS3441T1	TSOP−6	3000 / Tape & Reel
NTGS3441T1G	TSOP−6 (Pb−Free)	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.

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted) (Notes 4 & 5)

Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Drain−Source Breakdown Voltage (V_{GS} = 0 Vdc, I_D = −10 µA)	$V_{(BR)DSS}$	−20	−	−	Vdc
Zero Gate Voltage Drain Current (V_{GS} = 0 Vdc, V_{DS} = −20 Vdc, T_J = 25°C) (V_{GS} = 0 Vdc, V_{DS} = −20 Vdc, T_J = 70°C)	I_{DSS}	− −	− −	−1.0 −5.0	µAdc
Gate−Body Leakage Current (V_{GS} = −8.0 Vdc, V_{DS} = 0 Vdc)	I_{GSS}	−	−	−100	nAdc
Gate−Body Leakage Current (V_{GS} = +8.0 Vdc, V_{DS} = 0 Vdc)	I_{GSS}	−	−	100	nAdc
ON CHARACTERISTICS					
Gate Threshold Voltage (V_{DS} = V_{GS}, I_D = −250 µAdc)	$V_{GS(th)}$	−0.45	−1.05	−1.50	Vdc
Static Drain−Source On−State Resistance (V_{GS} = −4.5 Vdc, I_D = −3.3 Adc) (V_{GS} = −2.5 Vdc, I_D = −2.9 Adc)	$R_{DS(on)}$	− −	0.069 0.117	0.090 0.135	Ω
Forward Transconductance (V_{DS} = −10 Vdc, I_D = −3.3 Adc)	g_{FS}	−	6.8	−	Mhos
DYNAMIC CHARACTERISTICS					
Input Capacitance	C_{iss}	−	480	−	pF
Output Capacitance	(V_{DS} = −5.0 Vdc, V_{GS} = 0 Vdc, f = 1.0 MHz) C_{oss}	−	265	−	pF
Reverse Transfer Capacitance	C_{rss}	−	100	−	pF
SWITCHING CHARACTERISTICS					
Turn−On Delay Time	$t_{d(on)}$	−	13	25	ns
Rise Time	(V_{DD} = −20 Vdc, I_D = −1.6 Adc, t_r	−	23.5	45	ns
Turn−Off Delay Time	V_{GS} = −4.5 Vdc, R_g = 6.0 Ω) $t_{d(off)}$	−	27	50	ns
Fall Time	t_f	−	24	45	ns
Total Gate Charge	Q_{tot}	−	6.2	14	nC
Gate−Source Charge	(V_{DS} = −10 Vdc, V_{GS} = −4.5 Vdc, Q_{gs}	−	1.3	−	nC
Gate−Drain Charge	I_D = −3.3 Adc) Q_{gd}	−	2.5	−	nC
BODY−DRAIN DIODE RATINGS					
Diode Forward On−Voltage (I_S = −1.6 Adc, V_{GS} = 0 Vdc)	V_{SD}	−	−0.88	−1.2	Vdc
Diode Forward On−Voltage (I_S = −3.3 Adc, V_{GS} = 0 Vdc)	V_{SD}	−	−0.98	−	Vdc
Reverse Recovery Time (I_S = −1.6 Adc, dI_S/dt = 100 A/µs)	t_{rr}	−	30	60	ns

4. Indicates Pulse Test: P.W. = 300 µsec max, Duty Cycle = 2%.
5. Handling precautions to protect against electrostatic discharge are mandatory.

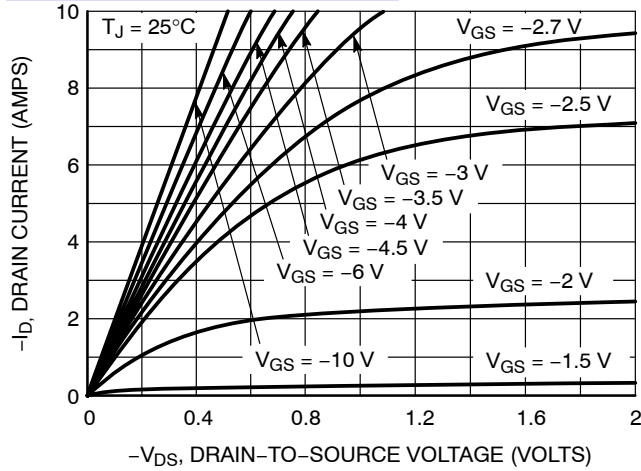# NTGS3441T1

TYPICAL ELECTRICAL CHARACTERISTICS

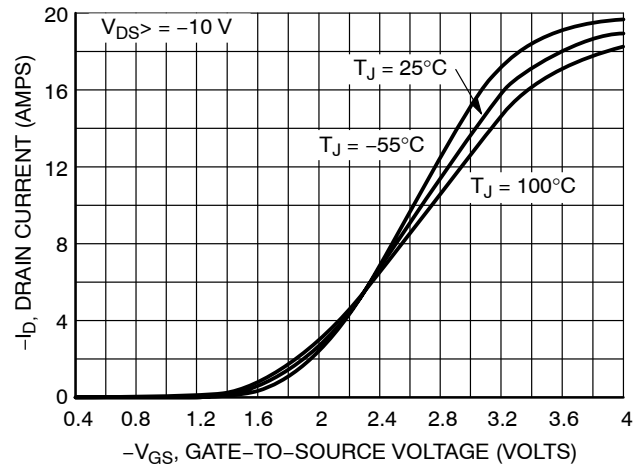Figure 1. On−Region Characteristics

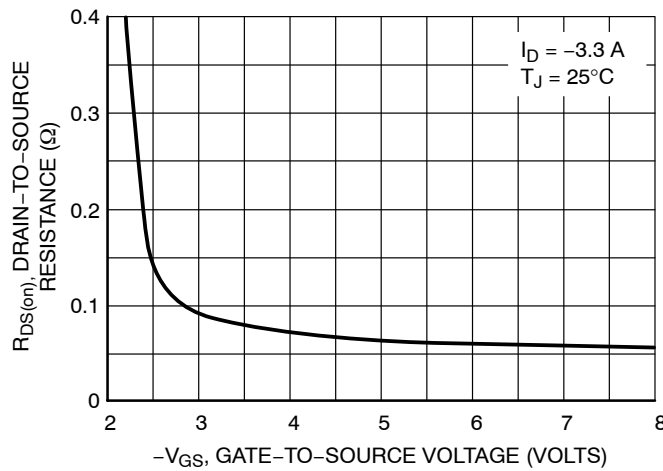Figure 2. Transfer Characteristics

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

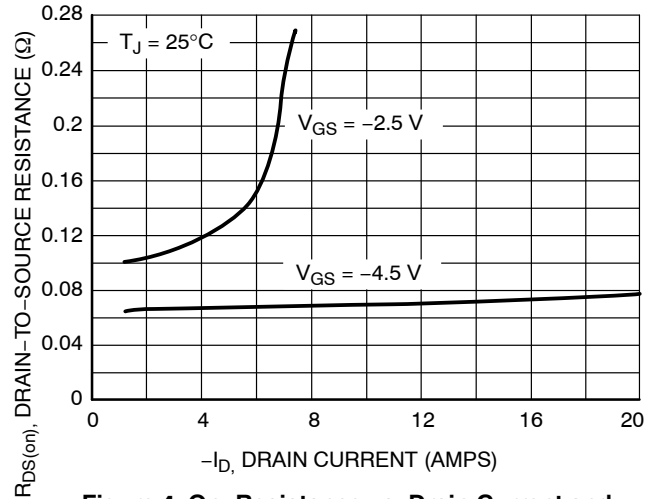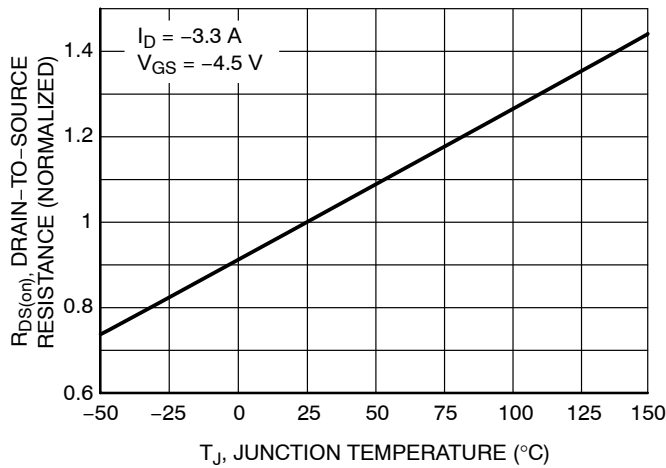Figure 4. On−Resistance vs. Drain Current and Gate Voltage

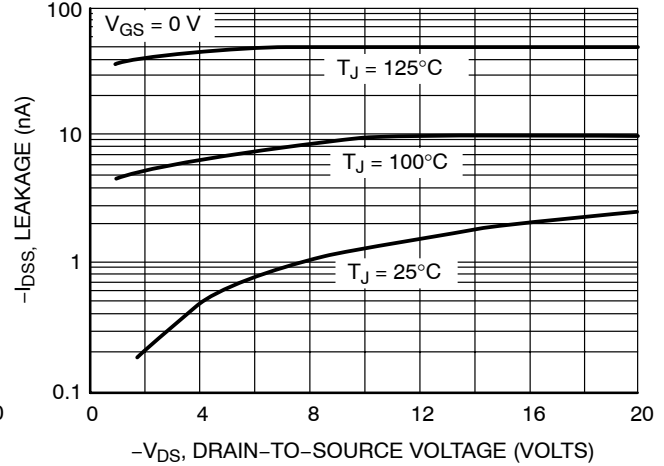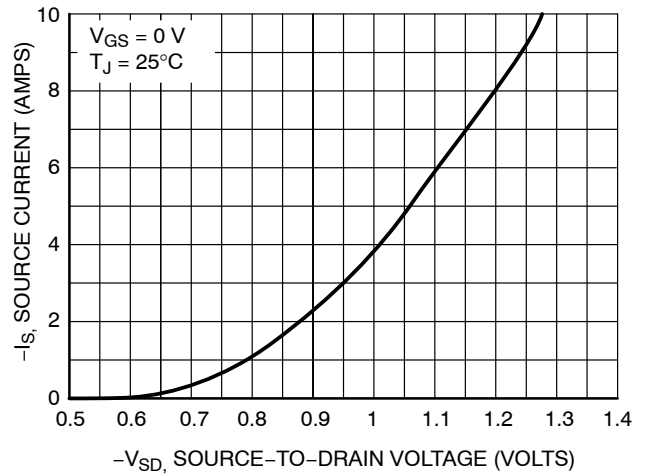
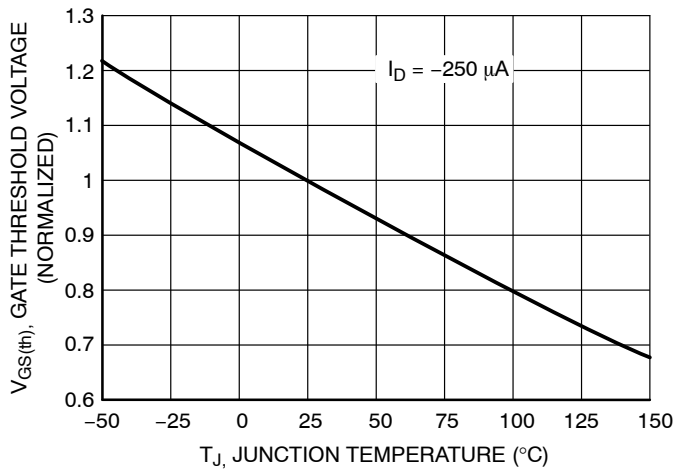Figure 5. On−Resistance Variation with Temperature

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

NTGS3441T1

TYPICAL ELECTRICAL CHARACTERISTICS

"NTGS3441T1-D"

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
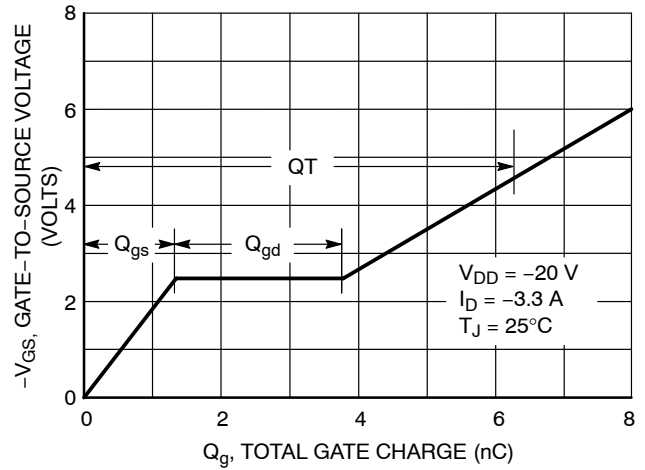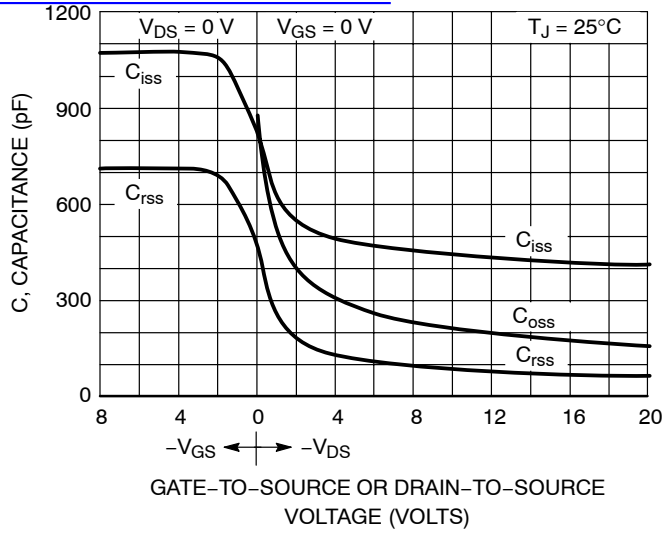
TYPICAL ELECTRICAL CHARACTERISTICS
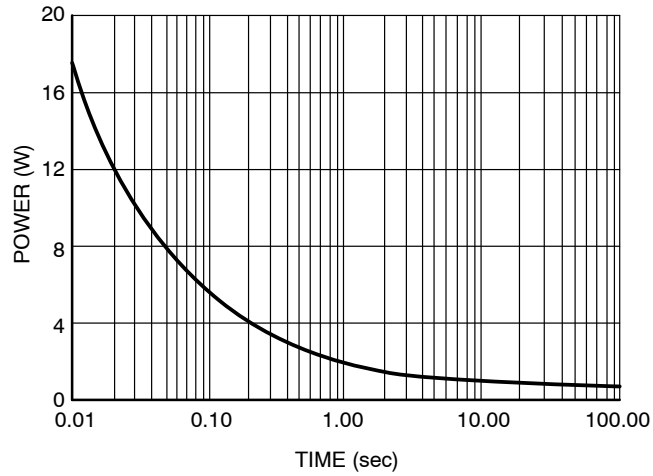
Figure 11. Single Pulse Power
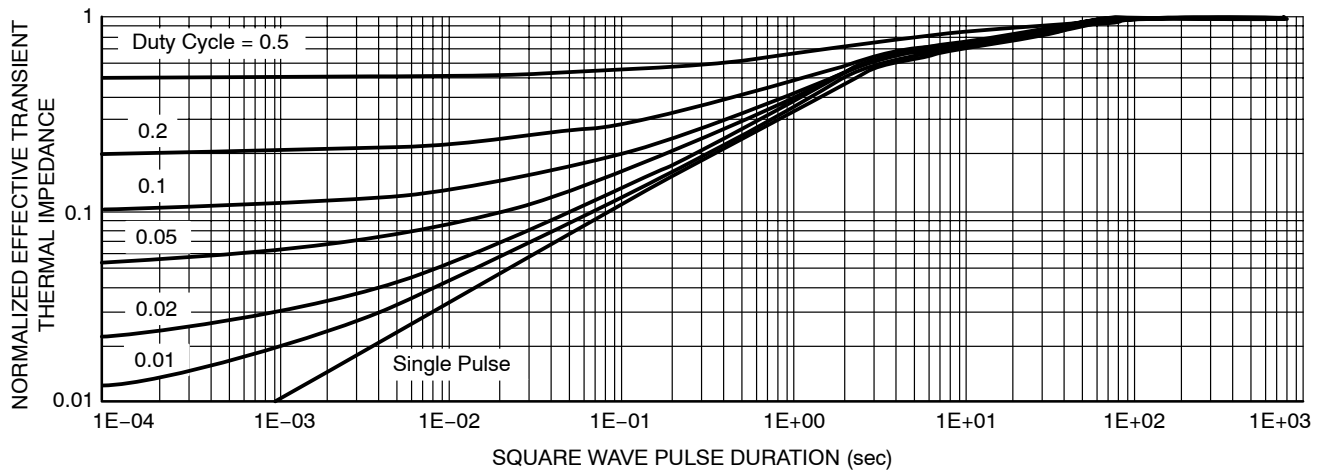
Figure 12. Normalized Thermal Transient Impedance, Junction−to−Ambient

PACKAGE DIMENSIONS

"NTGS3441T1-D"

TSOP−6
CASE 318G−02
ISSUE P
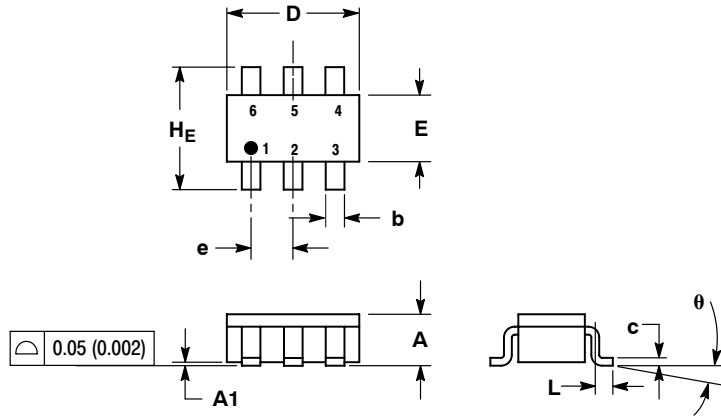
NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. DIMENSIONS A AND B DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.

DIM	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.90	1.00	1.10	0.035	0.039	0.043
A1	0.01	0.06	0.10	0.001	0.002	0.004
b	0.25	0.38	0.50	0.010	0.014	0.020
c	0.10	0.18	0.26	0.004	0.007	0.010
D	2.90	3.00	3.10	0.114	0.118	0.122
E	1.30	1.50	1.70	0.051	0.059	0.067
e	0.85	0.95	1.05	0.034	0.037	0.041
L	0.20	0.40	0.60	0.008	0.016	0.024
H_E	2.50	2.75	3.00	0.099	0.108	0.118
θ	0°	–	10°	0°	–	10°

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

0.05 (0.002)

SOLDERING FOOTPRINT*

2.4 / 0.094

0.95 / 0.037

0.95 / 0.037

1.9 / 0.075

0.7 / 0.028

1.0 / 0.039

SCALE 10:1 (mm / inches)
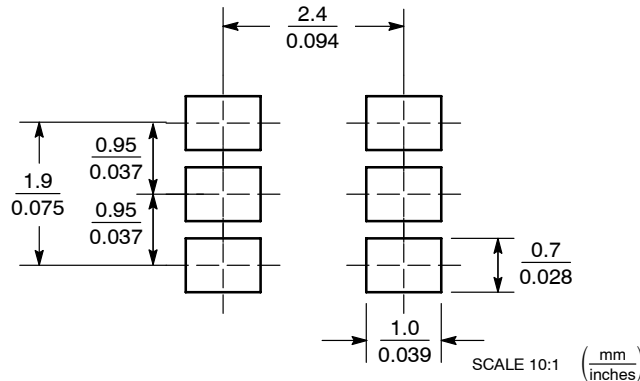
*For additional information on our Pb−Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.