


Low Voltage Surface Mount TMOS™ Power MOSFET Selector Guide

ON Semiconductor

The logo consists of a green circle with the letters "ON" in white, bold, sans-serif font.The background of the page is a close-up, high-angle photograph of a printed circuit board (PCB) populated with numerous surface-mount components. The image is overlaid with a semi-transparent teal color. The components are densely packed, and the perspective is looking down at the board, showing the intricate wiring and solder connections.

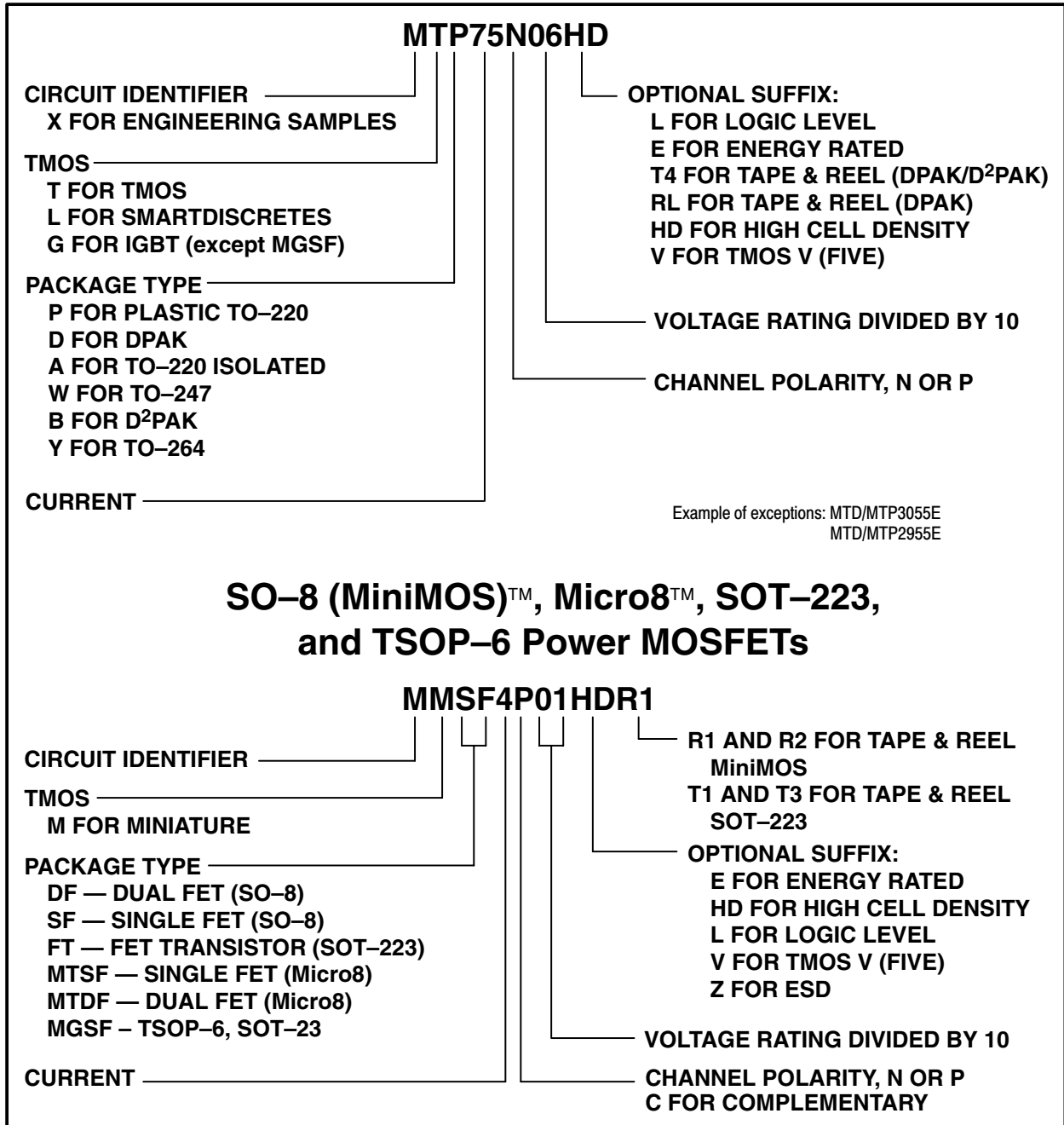
Featuring MiniMOS™ (SO-8), EZFET™, Micro8™, SOT-223,
TSOP-6, SOT-23, SC-70/SOT-323, DPAK and D²PAK



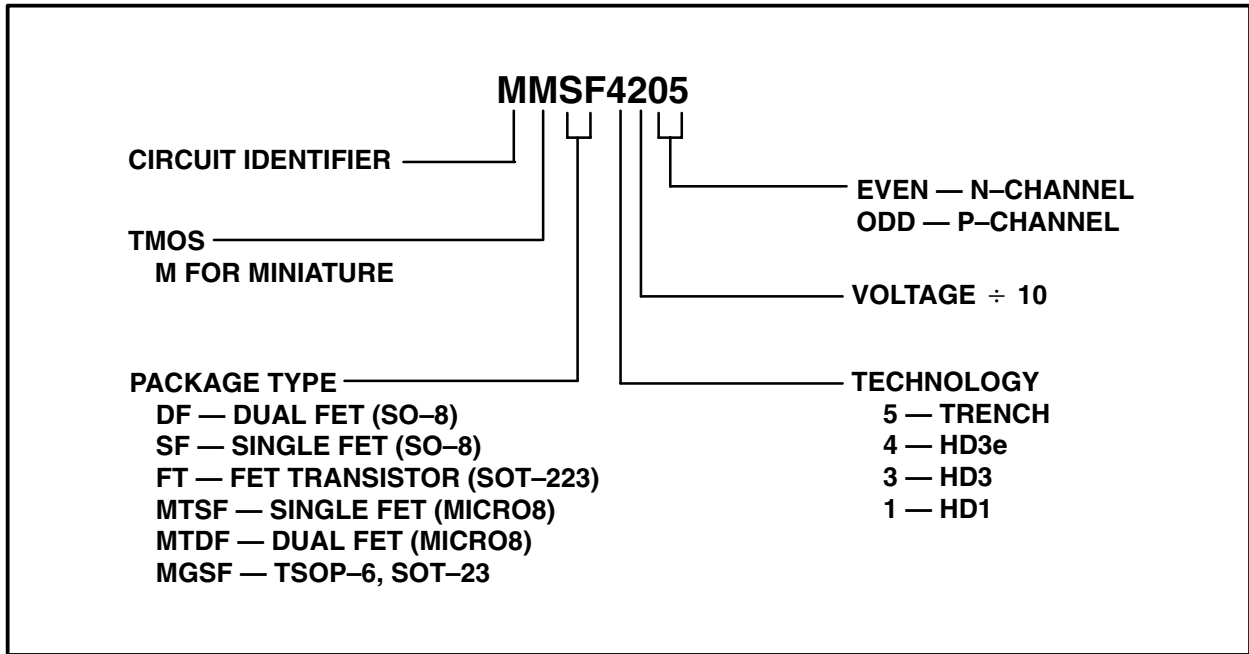
TMOS Power MOSFETs

TMOS Power MOSFETs Numbering System

Wherever possible, ON Semiconductors has used the following numbering systems for TMOS power MOSFET products.



Part Numbering System



CASE 419-02
SC-70



CASE 318-09
SOT-23



CASE 318G-02
TSOP-6



CASE 846A-02
Micro8



CASE 318E-04
SOT-223



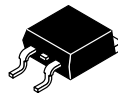
CASE 751-06
SO-8



CASE 369A-13
TO-252, DPAK



CASE 418B-03
TO-264, D²PAK



Packages Not to Scale

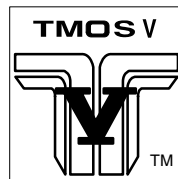


Table 1. SO-8 (MiniMOS™) — Case 751-06

V _{(BR)DSS} (Volts) Min	Max R _{DS(on)} @ V _{GS}				I _D (cont) Amps	Device ⁽³⁾	P _D ^(1,2) (Watts) Max	Configuration ⁽⁵⁾
	10 V (Ω)	4.5 V (Ω)	2.7 V (Ω)	2.5 V (Ω)				
60	—	0.130 ⁽⁴⁾	—	—	3.3	MMDF3N06VL	2.0	Dual N-Channel
	0.100	0.200	—	—	3.3	MMDF3N06HD		
50	0.300	0.500	—	—	2.0	MMDF1N05E	2.0	Dual N-Channel
40	0.080	0.100	—	—	3.4	MMDF3N04HD		
30	0.030	0.039	—	—	7.0	MMSF1308	2.5	Single N-Channel
	0.015	0.019	—	—	10.0	MMSF1310		
	0.0125	0.020	—	—	11.5	MMSF3300		
	0.040	0.050	—	—	6.5	MMSF5N03HD		
	0.028	0.040	—	—	8.2	MMSF7N03HD		
	0.100	0.110	—	—	4.6	MMSF3P03HD	2.0	Single P-Channel
	0.035	0.050	—	—	7.0	MMSF7P03HD		
	0.070	0.075	—	—	4.1	MMDF3N03HD		
	0.035	0.050	—	—	6.0	MMDF6N03HD		
	0.200	0.300	—	—	3.0	MMDF2P03HD		
0.085	0.160	—	—	3.5	MMDF4P03HD	2.0	Dual P-Channel	
0.070/0.200	0.075/0.300	—	—	4.1	MMDF2C03HD			
0.050/0.085	0.080/0.160	—	—	5.5/4.4	MMDF4C03HD	2.5	Complementary	
25	0.035	0.050	—	—	5.0	MMDFS6N303	2.0	MOSFET/Schottky
	0.100	0.160	—	—	3.5	MMDFS3P303		
25	0.100/0.210	0.160/0.375	—	—	3.0/2.0	MMDF1300	1.8	Complementary
	0.250	0.400	—	—	2.5	MMDF2P02E	2.0	Dual P-Channel
	0.100/0.250	0.200/0.400	—	—	3.6	MMDF2C02E		Complementary
	0.100	0.200	—	—	3.6	MMDF2N02E		Dual N-Channel
20	—	0.045	0.055	—	4.0	MMSF4N01HD	2.5	Single N-Channel
	0.025	0.040	—	—	8.2	MMSF5N02HD		
	0.250	0.400	—	—	2.5	MMSF2P02E		
	0.075	0.095	—	—	5.6	MMSF3P02HD		
	—	0.030	—	0.045	8.7	MMSF5P02HD		
	—	0.014	—	0.020	10.0	MMSF4205	2.0	Single P-Channel
	—	0.045	0.055	—	5.2	MMDF4N01HD		
	—	0.035	—	0.049	6.5	MMDF6N02HD		
	0.160	0.180	—	—	3.3	MMDF2P02HD		
	—	0.033	—	0.050	7.8	MMDF4207		
0.090	0.100	—	—	3.8	MMDF3N02HD	2.0	Dual N-Channel	
0.090/0.160	0.100/0.180	—	—	3.8	MMDF2C02HD		Complementary	
0.160	0.180	—	—	2.0	MMDFS2P102		MOSFET/Schottky	
12	—	0.080	0.090	—	5.1	MMSF4P01HD	2.5	Single P-Channel
	—	0.180	0.220	—	3.4	MMDF2P01HD	2.0	Dual P-Channel
	—	0.045/0.180	—	—	5.2	MMDF2C01HD		Complementary

(1) T_C = 25°C
 (2) See Data Sheet for Applicable Mounting Configuration.
 (3) Available in Tape and Reel only. R2 suffix = 2500 per reel.
 (4) V_{GS} = 5 V
 (5) Data for all Complementary Devices listed as Nch/Pch.
 Devices listed in **bold, italic** are ON Semiconductor preferred devices.

Table 2. EZFET™ — SO-8 Power MOSFETs with Zener Gate Protection — Case 751-06

V _{(BR)DSS} (Volts) Min	Max R _{DS(on)} @ V _{GS}				I _D (cont) Amps	Device ⁽³⁾	P _D ^(1,2) (Watts) Max	Configuration
	10 V (Ω)	4.5 V (Ω)	2.7 V (Ω)	2.5 V (Ω)				
50	0.3	—	—	—	2.0	MMDF2N05Z	2.0	Dual N-Channel
30	0.03	0.04	—	—	7.5	MMSF7N03Z	2.5	Single N-Channel
	0.013	0.018	—	—	10	MMSF10N03Z	1.6	
20	—	0.015	0.019	—	10	MMSF10N02Z	2.5	Dual N-Channel
	—	0.04	0.05	—	5.0	MMDF5N02Z	2.0	
	—	0.027	—	0.035	7.0	MMDF7N02Z		

(1) T_C = 25°C
 (2) See Data Sheet for Applicable Mounting Configuration
 (3) Available in Tape and Reel only. R2 suffix = 2500 per reel.

Table 3. Micro8™ — Case 846A-02

V _{(BR)DSS} (Volts) Min	Max R _{DS(on)} @ V _{GS}				I _D (cont) Amps	Device ⁽³⁾	P _D ^(1,2) (Watts) Max	Configuration
	10 V (Ω)	4.5 V (Ω)	2.7 V (Ω)	2.5 V (Ω)				
60	0.22	0.26	—	—	1.5	MTDF2N06HD	1.25	Dual N-Channel
30	0.04	0.06	—	—	5.7	MTSF3N03HD	1.79	Single N-Channel
	0.09	0.15	—	—	4.1	MTSF2P03HD		Single P-Channel
	0.12	0.16	—	—	1.9	MTDF1N03HD	1.25	Dual N-Channel
20	—	0.04	0.05	—	6.1	MTSF3N02HD	1.79	Single N-Channel
	—	0.16	0.19	—	1.8	MTSF1P02HD	1.8	Single P-Channel
	—	0.09	0.12	—	2.4	MTSF2P02HD		
	—	0.12	0.16	—	1.9	MTDF1N02HD	1.25	Dual N-Channel
	—	0.175	0.28	—	2.3	MTDF1P02HD		Dual P-Channel
	—	0.12/0.175	0.16/0.28	—	2.8	MTDF1C02HD		Complementary

(1) T_C = 25°C

(2) See Data Sheet for Applicable Mounting Configuration

(3) Available in Tape and Reel only. R2 suffix = 2500 per reel.

Table 4. SOT-223 — Case 318E-04

V _{(BR)DSS} (Volts) Min	Max R _{DS(on)} @ V _{GS}				I _D (cont) Amps	Device ⁽³⁾	P _D ^(1,2) (Watts) Max
	10 V (Ω)	5.0 V (Ω)	2.7 V (Ω)	2.5 V (Ω)			

SOT-223 — N-Channel

200	14	—	—	—	0.25	MMFT107	0.8
	1.5	—	—	—	0.3	MMFT1N20	
100	0.25	—	—	—	1.0	MMFT1N10E	
90	6.0	—	—	10	0.7	MMFT2406	1.5
60	0.13	—	—	—	1.7	MMFT3055V	2.0
	—	0.14	—	—	1.5	MMFT3055VL	
	1.7	—	—	—	0.3	MMFT960	0.8
20	—	0.15	—	—	1.6	MMFT2N02EL	

SOT-223 — P-Channel

60	0.3	—	—	—	1.2	MMFT2955E	0.8
30	0.1	—	—	—	5.2	MMFT5P03HD	3.73

(1) T_C = 25°C

(2) See Data Sheet for Applicable Mounting Configuration

(3) Available in Tape and Reel only. T1 suffix = 1000 per reel, T3 suffix = 4000 per reel.

Table 5. TSOP-6 — Case 318G-02

V _{(BR)DSS} (Volts) Min	Max R _{DS(on)} @ V _{GS}				I _D (cont) Amps	Device	P _D ^(1,2) (Watts) Max
	10 V (Ω)	4.5 V (Ω)	2.7 V (Ω)	2.5 V (Ω)			

TSOP-6 — N-Channel

30	0.065	0.095	—	—	1.75	MGSF3454XT1	0.95
	0.065	0.095	—	—	4.2	MGSF3454VT1	2.0
20	—	0.07	—	0.095	1.7	MGSF3442XT1	0.4
	—	0.07	—	0.095	4.0	MGSF3442VT1	2.0

TSOP-6 — P-Channel

30	0.1	0.19	—	—	1.45	MGSF3455XT1	0.4
	0.1	0.19	—	—	3.5	MGSF3455VT1	2.0
20	—	0.1	—	0.135	1.5	MGSF3441XT1	0.95
	—	0.9	—	0.135	3.3	MGSF3441VT1	2.0
	—	0.175	0.28	—	1.3	MGSF2P02HD	0.4
12	—	—	—	0.098	3.3	MGSF3433VT1	2.0

(1) T_C = 25°C

(2) See Data Sheet for Applicable Mounting Configuration

Table 6. SOT-23 — Case 318-08

$V_{(BR)DSS}$ (Volts) Min	Max $R_{DS(on)}$ @ V_{GS}			I_D (cont) Amps	Device	$P_D^{(1,2)}$ (Watts) Max
	10 V (Ω)	4.5 V (Ω)	2.5 V (Ω)			
SOT-23 — N-Channel						
60	5.0	—	—	0.50	<i>MMBF170LT1</i>	0.225
	7.5	—	—	0.115	<i>2N7002LT1</i>	
50	—	3.5 @ 5 V	7 @ 2.75	0.20	<i>BSS138LT1</i>	
30	—	—	—	0.1	<i>MMBF1374T1</i>	0.100
	0.1	0.145	—	0.75	<i>MGSF1N03LT1</i>	
20	0.09	0.13	—	0.75	<i>MGSF1N02LT1</i>	0.225
	1.0	1.4	—	0.3	<i>MMBF0201NLT1</i>	
	—	0.085	0.115	0.75	<i>MGSF1N02ELT1</i>	
SOT-23 — P-Channel						
50	—	10 @ 5 V	—	0.1	<i>BSS84LT1</i>	0.225
20	—	0.26	0.5	0.75	<i>MGSF1P02ELT1</i>	0.4
	0.35	0.5	—	—	<i>MGSF1P02LT1</i>	
	1.4	3.5	—	0.3	<i>MMBF0202PLT1</i>	0.225

(1) $T_C = 25^\circ\text{C}$
 (2) See Data Sheet for Applicable Mounting Configuration

Table 7. SC-70 / SOT-323 — Case 419-02

$V_{(BR)DSS}$ (Volts) Min	Max $R_{DS(on)}$ @ V_{GS}			I_D (cont) Amps	Device	$P_D^{(1,2)}$ (Watts) Max	V_{GS} (Volts) Min
	10 V (Ω)	4.5 V (Ω)	2.7 V (Ω)				
SC-70/SOT-323 — N-Channel							
30	—	5.0	—	0.10	<i>MMBF1374T1</i>	0.10	1.0
20	1.0	1.4	—	0.30	<i>MMBF2201NT1</i>	0.15	
SC-70/SOT-323 — P-Channel							
20	2.2	3.5	—	0.30	<i>MMBF2202PT1</i>	0.15	1.0

(1) $T_C = 25^\circ\text{C}$
 (2) See Data Sheet for Applicable Mounting Configuration

Table 8. DPAK — Case 369A-13 (TO-252)

$V_{(BR)DSS}$ (Volts) Min	Max $R_{DS(on)}$ @ V_{GS}			I_D (cont) Amps	Device ⁽³⁾	$P_D^{(1,2)}$ (Watts) Max
	10 V (Ω)	5.0 V (Ω)	2.7 V (Ω)			
DPAK — N-Channel						
800	12	—	—	1.0	<i>MTD1N80E</i>	48
600	2.3	—	—	4.0	<i>NTD4N60</i>	96
500	5.0	—	—	1.0	<i>MTD1N50E</i>	40
	3.6	—	—	2.0	<i>MTD2N50E</i>	
	1.8	—	—	5.0	<i>NTD5N50</i>	
400	3.5	—	—	2.0	<i>MTD2N40E</i>	40
	1.1	—	—	6.0	<i>NTD6N40</i>	96
250	1.40	—	—	3.0	<i>MTD3N25E</i>	40
200	1.20	—	—	4.0	<i>MTD4N20E</i>	
100	0.25	—	—	9.0	<i>MTD9N10E</i>	
60	—	0.18	—	12	<i>MTD3055VL</i>	48
	—	0.085	—	15	<i>MTD15N06VL</i>	60
	0.12	—	—	15	<i>MTD15N06V</i>	55
	0.15	—	—	12	<i>MTD3055V</i>	48
	0.045	—	—	20	<i>MTD20N06HD</i>	40
	—	0.045	—	20	<i>MTD20N06HDL</i>	
30	0.010	—	—	30	<i>MTD3302</i>	96
	—	0.035	—	20	<i>MTD20N03HDL</i>	74
	0.022	—	—	20	<i>MTD1302</i>	

(1) $T_C = 25^\circ\text{C}$
 (2) See Data Sheet for Applicable Mounting Configuration
 (3) Available in Tape and Reel. T4 suffix = 2500 per reel.

Table 8. DPAK — Case 369A–13 (TO–252) (continued)

$V_{(BR)DSS}$ (Volts) Min	Max $R_{DS(on)}$ @ V_{GS}			I_D (cont) Amps	Device ⁽³⁾	$P_D^{(1,2)}$ (Watts) Max
	10 V (Ω)	5.0 V (Ω)	2.7 V (Ω)			
DPAK — P-Channel						
500	15.0	—	—	1.0	<i>MTD1P50E</i>	50
400	8.0	—	—	1.0	<i>MTD1P40E</i>	65
60	0.45	—	—	5.0	<i>MTD5P06V</i>	40
	0.20	—	—	12	<i>MTD2955V</i>	60
30	—	0.175	—	15	<i>MTD20P06HDL</i>	72
	—	0.099	—	19	<i>MTD20P03HDL</i>	75

(1) $T_C = 25^\circ\text{C}$

(2) See Data Sheet for Applicable Mounting Configuration

(3) Available in Tape and Reel. T4 suffix = 2500 per reel.

Table 9. D²PAK — Case 418B–03 (TO–264)

$V_{(BR)DSS}$ (Volts) Min	Max $R_{DS(on)}$ @ V_{GS}			I_D (cont) Amps	Device ⁽³⁾	$P_D^{(1,2)}$ (Watts) Max
	10 V (Ω)	5.0 V (Ω)	2.7 V (Ω)			
D²PAK — N-Channel						
1200	5.0	—	—	3.0	<i>MTB3N120E</i>	125
1000	9.0	—	—	1.0	<i>MTB1N100E</i>	75
	4.0	—	—	3.0	<i>MTB3N100E</i>	125
800	3.0	—	—	4.0	<i>MTB4N80E</i>	125
600	1.2	—	—	6.0	<i>MTB6N60E</i>	125
	2.2	—	—	3.0	<i>MTB3N60E</i>	75
	1.1	—	—	6.0	<i>NTB6N60</i>	142
	0.75	—	—	10	<i>NTB10N60</i>	201
500	0.8	—	—	8.0	<i>MTB8N50E</i>	125
	0.8	—	—	8.0	<i>NTB8N50</i>	142
	0.55	—	—	12	<i>NTB12N50</i>	201
400	0.55	—	—	10	<i>MTB10N40E</i>	125
	0.5	—	—	10	<i>NTB10N40</i>	142
	0.33	—	—	15	<i>NTB15N40</i>	201
250	0.45	—	—	9.0	<i>MTB9N25E</i>	80
200	0.16	—	—	20	<i>MTB20N20E</i>	125
150	0.07	—	—	29	<i>MTB29N15E</i>	125
100	0.060	—	—	33	<i>MTB33N10E</i>	125
	0.04	—	—	40	<i>MTB40N10E</i>	169
60	0.12	—	—	15	<i>MTB15N06V</i>	55
	—	0.032	—	42	<i>MTB50N06VL</i>	125
	0.022	—	—	52	<i>MTB52N06V</i>	165
	—	0.05	—	30	<i>MTB30N06VL</i>	90
	0.04	—	—	32	<i>MTB36N06V</i>	90
	0.028	—	—	42	<i>MTB50N06V</i>	125
	—	0.025	—	52	<i>MTB52N06VL</i>	188
	0.016	—	—	55	<i>MTB55N06Z</i>	136
	0.014	—	—	60	<i>MTB60N06HD</i>	125
	0.01	—	—	75	<i>MTB75N06HD</i>	125
50	0.0095	—	—	75	<i>MTB75N05HD</i>	125
	—	0.014	—	60	<i>MTB60N05HDL</i>	150
30	0.0065	—	—	75	<i>MTB1306</i>	125
25	—	0.009	—	75	<i>MTB75N03HDL</i>	125

Table 9. D²PAK — Case 418B-03 (TO-264) (continued)

V _{(BR)DSS} (Volts) Min	Max R _{DS(on)} @ V _{GS}			I _D (cont) Amps	Device ⁽³⁾	P _D ^(1,2) (Watts) Max
	10 V (Ω)	5.0 V (Ω)	2.7 V (Ω)			
D²PAK — P-Channel						
60	0.12	—	—	23	<i>MTB23P06V</i>	90
400	0.08	—	—	30	<i>MTB30P06V</i>	125
30	—	0.025	—	50	<i>MTB50P03HDL</i>	

(1) T_C = 25°C
 (2) See Data Sheet for Applicable Mounting Configuration
 (3) Available in Tape and Reel. T4 suffix = 800 per reel.

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ON SEMICONDUCTOR STANDARD DOCUMENT TYPE DEFINITIONS**DATA SHEET CLASSIFICATIONS**

A Data Sheet is the fundamental publication for each individual product/device, or series of products/devices, containing detailed parametric information and any other key information needed in using, designing-in or purchasing of the product(s)/device(s) it describes. Below are the three classifications of Data Sheet: Product Preview; Advance Information; and Fully Released Technical Data

PRODUCT PREVIEW

A Product Preview is a summary document for a product/device under consideration or in the early stages of development. The Product Preview exists only until an “Advance Information” document is published that replaces it. The Product Preview is often used as the first section or chapter in a corresponding reference manual. The Product Preview displays the following disclaimer at the bottom of the first page: “This document contains information on a product under development. ON Semiconductor reserves the right to change or discontinue this product without notice.”

ADVANCE INFORMATION

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FULLY RELEASED TECHNICAL DATA

The Fully Released Technical Data document is for a product/device that is in full production (i.e., fully released). It replaces the Advance Information document and represents a part that is fully qualified. The Fully Released Technical Data document is virtually the same document as the Product Preview and the Advance Information document with the exception that it provides information that is unavailable for a product in the early phases of development, such as complete parametric characterization data. The Fully Released Technical Data document is also a more comprehensive document than either of its earlier incarnations. This document displays no disclaimer, and while it may be informally referred to as a “data sheet,” it is not labeled as such.

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A Data Book is a publication that contains primarily a collection of Data Sheets, general family and/or parametric information, Application Notes and any other information needed as reference or support material for the Data Sheets. It may also contain cross reference or selector guide information, detailed quality and reliability information, packaging and case outline information, etc.

APPLICATION NOTE

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JAPAN: ON Semiconductor, Japan Customer Focus Center
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Phone: 81-3-5740-2745
Email: r14525@onsemi.com

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