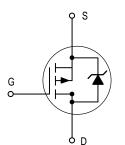
# Product Preview

# Medium Power Surface Mount Products **TMOS Dual P-Channel Field Effect Transistors**



WaveFET™ devices are an advanced series of power MOSFETs which utilize Motorola's latest MOSFET technology process to achieve the lowest possible on–resistance per silicon area. They are capable of withstanding high energy in the avalanche and commutation modes and the drain–to–source diode has a very low reverse recovery time. WaveFET™ devices are designed for use in low voltage, high speed switching applications where power efficiency is important. Typical applications are dc–dc converters, and power management in portable and battery powered products such as computers, printers, cellular and cordless phones. They can also be used for low voltage motor controls in mass storage products such as disk drives and tape drives. The avalanche energy is specified to eliminate the guesswork in designs where inductive loads are switched and offer additional safety margin against unexpected voltage transients.

- Ultra Low R<sub>DS(on)</sub> Provides Higher Efficiency and Extends Battery Life in Portable Applications
- Characterized Over a Wide Range of Power Ratings
- Logic Level Gate Drive Can Be Driven by Logic ICs
- Diode Is Characterized for Use In Bridge Circuits
- Diode Exhibits High Speed, with Soft Recovery
- IDSS Specified at Elevated Temperature
- Miniature SO–8 Surface Mount Package Saves Board Space

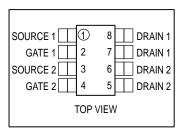


# **MMDF3207**

Motorola Preferred Device

DUAL TMOS POWER MOSFET 7.8 AMPERES 20 VOLTS RDS(on) = 33 m $\Omega$ 





# **DEVICE MARKING**

## ORDERING INFORMATION

D3207	Device	Reel Size	Tape Width	Quantity
D3207	MMDF3207R2	13″	12 mm embossed tape	2500 units

This document contains information on a product under development. Motorola reserves the right to change or discontinue this product without notice. HDTMOS is a trademark of Motorola, Inc. TMOS is a registered trademark of Motorola, Inc.

Preferred devices are Motorola recommended choices for future use and best overall value.



# **MMDF3207**

# **MAXIMUM RATINGS** ( $T_J = 25$ °C unless otherwise specified)

Characteristics		Symbol	Maximum	Unit
Drain–to–Source Voltage Drain–to–Gate Voltage ( $R_{GS} = 1.0 \text{ M}\Omega$ ) Gate–to–Source Voltage — Continuous		V <sub>DSS</sub> V <sub>DGR</sub> V <sub>GS</sub>	20 12 ±12	V
1 Inch Square @ 10 seconds on FR–4 or G–10 PCB	Thermal Resistance — Junction to Ambient Total Power Dissipation @ T <sub>A</sub> = 25°C Linear Derating Factor Drain Current — Continuous @ T <sub>A</sub> = 25°C — Continuous @ T <sub>A</sub> = 70°C — Pulsed Drain Current (1)	RTHJA PD ID ID	62.5 2.0 16 7.8 5.7 40	°C/W Watts mW/°C A A A
1 Inch Square @ Steady State on FR-4 or G-10 PCB	Thermal Resistance — Junction to Ambient Total Power Dissipation @ T <sub>A</sub> = 25°C Linear Derating Factor Drain Current — Continuous @ T <sub>A</sub> = 25°C — Continuous @ T <sub>A</sub> = 70°C — Pulsed Drain Current (1)	R <sub>THJA</sub> PD I <sub>D</sub> I <sub>D</sub>	98 1.28 10.2 6.2 4.6 35	°C/W Watts mW/°C A A
Minimum Pad @ Steady State on FR-4 or G-10 PCB	Thermal Resistance — Junction to Ambient Total Power Dissipation @ T <sub>A</sub> = 25°C Linear Derating Factor Drain Current — Continuous @ T <sub>A</sub> = 25°C — Continuous @ T <sub>A</sub> = 70°C — Pulsed Drain Current (1)	R <sub>THJA</sub> PD I <sub>D</sub> I <sub>D</sub>	166 0.75 6.0 4.8 3.5 30	°C/W Watts mW/°C A A
Operating and Storage Temperature Range		T <sub>J</sub> , T <sub>stg</sub>	-55 to 150	°C

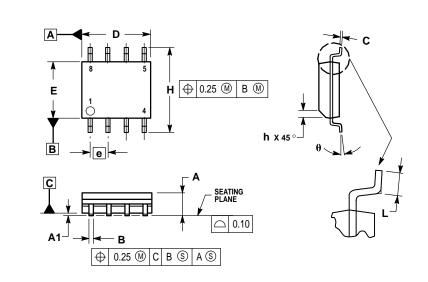
<sup>(1)</sup> Repetitive rating; pulse width limited by maximum junction temperature.

# **ELECTRICAL CHARACTERISTICS** (T<sub>C</sub> = 25°C unless otherwise noted)

Characteristic		Symbol	Min	Тур	Max	Unit
OFF CHARACTERISTICS						
Drain-to-Source Breakdown Voltage(1) (VGS = 0 Vdc, ID = 0.25 mAdc) Temperature Coefficient (Positive)		V <sub>(BR)DSS</sub>	20 —	— TBD	_	Vdc mV/°C
Zero Gate Voltage Drain Current (VDS = 20 Vdc, VGS = 0 Vdc) (VDS = 20 Vdc, VGS = 0 Vdc, TJ = 55°C)		I <sub>DSS</sub>	<u> </u>	_ _	1.0 5.0	μAdc
Gate–Body Leakage Current (V <sub>GS</sub> = ±12 Vdc, V <sub>DS</sub> = 0 Vdc)		IGSS	_	_	100	nAdc
ON CHARACTERISTICS <sup>(1)</sup>				•		•
Gate Threshold Voltage <sup>(1)</sup> (V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 0.25 mAdc) Threshold Temperature Coefficient	t (Negative)	VGS(th)	0.6	— TBD	_ _	Vdc mV/°C
Static Drain-to-Source On-Resistan (V <sub>GS</sub> = 4.5 Vdc, I <sub>D</sub> = 7.8 Adc) (V <sub>GS</sub> = 2.5 Vdc, I <sub>D</sub> = 6.2 Adc)	nce(1)	R <sub>DS(on)</sub>		TBD TBD	33 50	mΩ
Forward Transconductance (V <sub>DS</sub> = 1	10 Vdc, I <sub>D</sub> = 7.8 Adc) <sup>(1)</sup>	9FS	_	TBD	_	Mhos
DYNAMIC CHARACTERISTICS				•		•
Input Capacitance		C <sub>iss</sub>	_	TBD	TBD	pF
Output Capacitance	(V <sub>DS</sub> = 15 Vdc, V <sub>GS</sub> = 0 V, f = 1.0 MHz)	C <sub>oss</sub>	_	TBD	TBD	
Transfer Capacitance		C <sub>rss</sub>	_	TBD	TBD	
SWITCHING CHARACTERISTICS(2)						
Turn-On Delay Time		<sup>t</sup> d(on)	_	TBD	TBD	ns
Rise Time	$(V_{DS} = 10 \text{ Vdc}, I_{D} = 1.0 \text{ Adc},$	t <sub>r</sub>	_	TBD	TBD	
Turn-Off Delay Time	V <sub>GS</sub> = 10 Vdc, R <sub>G</sub> = 6.0 Ω) <sup>(1)</sup>	t <sub>d</sub> (off)	_	TBD	TBD	
Fall Time	1	t <sub>f</sub>	_	TBD	TBD	
Turn-On Delay Time		<sup>t</sup> d(on)	_	TBD	TBD	
Rise Time	(V <sub>DD</sub> = 10 Vdc, I <sub>D</sub> = 1.0 Adc,	t <sub>r</sub>	_	TBD	TBD	1
Turn-Off Delay Time	$V_{GS} = 4.5 \text{ Vdc},$ $R_G = 6.0 \Omega)^{(1)}$	t <sub>d</sub> (off)	_	TBD	TBD	
Fall Time		t <sub>f</sub>	_	TBD	TBD	-
Gate Charge		QT	_	TBD	TBD	nC
	$(V_{DS} = 10 \text{ Vdc}, I_{D} = 7.8 \text{ Adc}, V_{GS} = 4.5 \text{ Vdc})(1)$	Q <sub>1</sub>	_	TBD	_	
		Q <sub>2</sub>	_	TBD	_	
		$Q_3$	_	TBD	_	1
SOURCE-DRAIN DIODE CHARACTE	ERISTICS					1
Forward On-Voltage	$(I_S = 1.7 \text{ Adc}, V_{GS} = 0 \text{ Vdc})(1)$ $(I_S = 1.7 \text{ Adc}, V_{GS} = 0 \text{ Vdc}, T_J = 125^{\circ}\text{C})$	V <sub>SD</sub>		TBD TBD	1.2 —	Vdc
Reverse Recovery Time	verse Recovery Time		_	TBD	_	ns
	$(I_S = 1.7 \text{ Adc}, V_{GS} = 0 \text{ Vdc}, \\ dI_S/dt = 100 \text{ A/}\mu\text{s})(1)$	ta	_	TBD	_	1
		t <sub>b</sub>	_	TBD	_	1
				1		

Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2%.
 Switching characteristics are independent of operating junction temperatures.
 Repetitive rating; pulse width limited by max. junction temperature.

#### PACKAGE DIMENSIONS



- DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994
- DIMENSIONS ARE IN MILLIMETER.
  DIMENSION D AND E DO NOT INCLUDE MOLD PROTRUSION.
  MAXIMUM MOLD PROTRUSION 0.15 PER SIDE.
- DIMENSION B DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR

PROTRUSION SHALL BE 0.127 TOTAL IN EXCESS OF THE B DIMENSION AT MAXIMUM MATERIAL

	MILLIMETERS			
DIM	MIN	MAX		
Α	1.35	1.75		
A1	0.10	0.25		
В	0.35	0.49		
С	0.19	0.25		
D	4.80	5.00		
E	3.80	4.00		
е	1.27	1.27 BSC		
Н	5.80	6.20		
h	0.25	0.50		
L	0.40	1.25		
A	0.0	7 °		

STYLE 13:

PIN 1. N.C.

- SOURCE
- SOURCE
- GATE DRAIN
- 5.
- DRAIN DRAIN
- DRAIN

**CASE 751-06 ISSUE T** 

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