Product Preview

WaveFET™

Power Surface Mount Products

HDTMOS Single N-Channel Field Effect Transistor



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.

- Characterized Over a Wide Range of Power Ratings
- Ultralow RDS(on) Provides Higher Efficiency and Extends Battery Life in Portable Applications
- 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**
- Avalanche Energy Specified
- Industry Standard DPAK Surface Mount Package

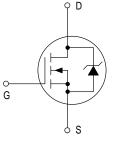


MTD3302

SINGLE TMOS POWER MOSFET 30 VOLTS $R_{DS(on)} = 10 \text{ m}\Omega$



CASE 369A-13, Style 2 DPAK





MAXIMUM RATINGS (T_{.1} = 25°C unless otherwise specified)

Parameter		Value	Unit
Drain-to-Source Voltage	VDSS	30	Vdc
Drain-to-Gate Voltage	V _{DGR}	30	Vdc
Gate-to-Source Voltage	VGS	±20	Vdc
Operating and Storage Temperature Range	T _J , T _{stg}	-55 to 150	°C
Single Pulse Drain–to–Source Avalanche Energy — Starting T _J = 25°C	EAS		mJ
$(V_{DD} = 25 \text{ Vdc}, V_{GS} = 10 \text{ Vdc}, L = 126 \text{ mH}, I_{L(pk)} = 3.0 \text{ A}, V_{DS} = 30 \text{ Vdc})$		500	

DEVICE MARKING

ORDERING INFORMATION

D3302	Device	Reel Size	Tape Width	Quantity	
D3302	MTD3302T4	13″	12 mm embossed tape	2500	

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MTD3302

POWER RATINGS (T_J = 25°C unless otherwise specified)

Parameter			Value	Unit
Drain Current — Continuous @ T _A = 25°C — Continuous @ T _A = 100°C — Single Pulse (tp ≤ 10 µs)	Mounted on heat sink T _{case} = 25°C	I _D	30 30 70	Adc Adc Adc
Total Power Dissipation @ T _A = 25°C Linear Derating Factor	V _{GS} = 10 Vdc	PD	96 769	Watts mW/°C
Thermal Resistance — Junction-to-Case	Steady State	$R_{\theta JC}$	1.3	°C/W
Continuous Source Current (Diode Conduction)	ĺ	IS	2.0	Adc

Parameter			Value	Unit
Drain Current — Continuous @ T _A = 25°C — Continuous @ T _A = 100°C — Single Pulse (tp ≤ 10 μs)	Mounted on 1 inch square FR-4 or G10 board	I _D	10.8 6.6 70	Adc Adc Adc
Total Power Dissipation @ T _A = 25°C Linear Derating Factor	V _{GS} = 10 Vdc	PD	1.8 14	Watts mW/°C
Thermal Resistance — Junction-to-Ambient	Steady State	$R_{\theta JA}$	71.4	°C/W
Continuous Source Current (Diode Conduction)	,	Is	2.0	Adc

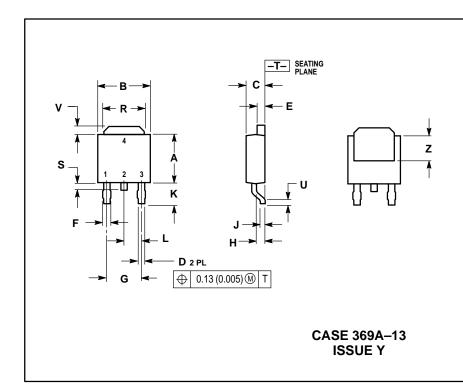
Parameter			Value	Unit
Drain Current — Continuous @ T _A = 25°C — Continuous @ T _A = 100°C — Single Pulse (tp ≤ 10 μs)	Mounted on minimum recommended FR-4 or G10 board	I _D I _{DM}	8.3 5.2 60	Adc Adc Adc
Total Power Dissipation @ T _A = 25°C Linear Derating Factor	V _{GS} = 10 Vdc	PD	1.0 8.3	Watts mW/°C
Thermal Resistance — Junction–to–Ambient	Steady State	$R_{\theta JA}$	120	°C/W
Continuous Source Current (Diode Conduction)	<u> </u>	IS	2.0	Adc

ELECTRICAL CHARACTERISTICS (T_{.1} = 25°C unless otherwise specified)

Char	Symbol	Min	Тур	Max	Unit	
OFF CHARACTERISTICS						
Drain–to–Source Breakdown Voltage (V _{GS} = 0 Vdc, I _D = 250 μAdc) Temperature Coefficient (Positive)			30 —	33 23	_ _	Vdc mV/°C
Zero Gate Voltage Drain Current (VDS = 30 Vdc, VGS = 0 Vdc) (VDS = 30 Vdc, VGS = 0 Vdc, TJ =	= 125°C)	I _{DSS}	_	0.02 0.5	1.0 10	μAdc
Gate-Body Leakage Current (VGS =	± 20 Vdc, V _{DS} = 0 Vdc)	IGSS	_	_	±100	nAdc
ON CHARACTERISTICS ⁽¹⁾						
Gate Threshold Voltage (V _{DS} = V _{GS} , I _D = 250 μAdc) Threshold Temperature Coefficient	t (Negative)	VGS(th)	1.0 —	1.9 4.7		Vdc mV/°C
Static Drain–to–Source On–Resistance (VGS = 10 Vdc, ID = 10 Adc) (VGS = 4.5 Vdc, ID = 5.0 Adc)			_	8.9 13	10 16	mΩ
Forward Transconductance (V _{DS} = 1	15 Vdc, I _D = 10 Adc)	9FS	5	13	_	Mhos
DYNAMIC CHARACTERISTICS						
Input Capacitance		C _{iss}	_	1810	_	pF
Output Capacitance	$(V_{DS} = 24 \text{ Vdc}, V_{GS} = 0 \text{ Vdc}, f = 1.0 \text{ MHz})$	Coss	_	165	_	
Transfer Capacitance	1,	C _{rss}	_	595	_	
SWITCHING CHARACTERISTICS(2)						
Turn-On Delay Time		^t d(on)	_	9	_	ns
Rise Time	$(V_{DD} = 25 \text{ Vdc}, I_D = 1.0 \text{ Adc},$	t _r	_	10	_	
Turn-Off Delay Time	V_{GS} = 10 Vdc, R _G = 6.0 Ω)	^t d(off)	_	60	_	
Fall Time	1	t _f	_	43	_	
Turn-On Delay Time		^t d(on)	_	18	_	ns
Rise Time	$(V_{DD} = 25 \text{ Vdc}, I_D = 1.0 \text{ Adc},$	t _r	_	32	_	
Turn-Off Delay Time	$V_{GS} = 4.5 \text{ Vdc},$ $R_{G} = 6.0 \Omega)$	t _d (off)	_	42	_	
Fall Time	1	t _f	_	44	_	
Gate Charge		QT	_	46	60	nC
	(V _{DS} = 15 Vdc, I _D = 2.0 Adc,	Q ₁	_	5.3		
	V _{GS} = 10 Vdc)	Q ₂	_	10.7	_	
		Q ₃	_	10.3	_	
SOURCE-DRAIN DIODE CHARACTE	ERISTICS					
Forward On–Voltage (1)	(I _S = 2.3 Adc, V _{GS} = 0 Vdc) (I _S = 2.3 Adc, V _{GS} = 0 Vdc, T _J = 125°C)	V _{SD}		0.75 0.58	1.1 —	Vdc
Reverse Recovery Time		t _{rr}	_	36	_	ns
	(I _S = 2.3 Adc, V _{GS} = 0 Vdc,	ta	_	21	_	
	dl _S /dt = 100 A/μs)	t _b	_	15	_	
Reverse Recovery Stored Charge		Q _{RR}	_	0.041	_	μC

Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2%.
 Switching characteristics are independent of operating junction temperatures.

PACKAGE DIMENSIONS



- NOTES:
 1. DIMENSIONING AND TOLERANCING PER ANSI
- Y14.5M, 1982.
 2. CONTROLLING DIMENSION: INCH.

	INCHES		MILLIN	IETERS
DIM	MIN	MAX	MIN	MAX
Α	0.235	0.250	5.97	6.35
В	0.250	0.265	6.35	6.73
С	0.086	0.094	2.19	2.38
D	0.027	0.035	0.69	0.88
Е	0.033	0.040	0.84	1.01
F	0.037	0.047	0.94	1.19
G	0.180	BSC	4.58 BSC	
Н	0.034	0.040	0.87	1.01
J	0.018	0.023	0.46	0.58
K	0.102	0.114	2.60	2.89
L	0.090 BSC		2.29 BSC	
R	0.175	0.215	4.45	5.46
S	0.020	0.050	0.51	1.27
U	0.020		0.51	
٧	0.030	0.050	0.77	1.27
7	0.138		3.51	

STYLE 2: PIN 1. GATE 2 DRAIN

3. SOURCE 4. DRAIN

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