TOSHIBA Field Effect Transistor Silicon N Channel MOS Type (Ultra High speed U-MOSIII)

TPC8018-H

High Speed and High Efficiency DC-DC Converters Notebook PC Applications Portable Equipment Applications

- Small footprint due to small and thin package
- High speed switching
- Small gate charge: Qg = 38 nC (typ.)
- Low drain-source ON resistance: $RDS(ON) = 3.5 m\Omega$ (typ.)
- High forward transfer admittance: $|\,Y_{\rm fs}\,|$ =50 S (typ.)
- Low leakage current: $I_{\rm DSS}$ = 10 μA (max) (V_{\rm DS} = 30 V)
- Enhancement mode: V_{th} = 1.1 to 2.3 V (V_{DS} = 10 V, I_D = 1 mA)

Maximum Ratings (Ta = 25°C)

Characte	ristics	Symbol	Rating	Unit	
Drain-source voltage		V _{DSS}	30	V	
Drain-gate voltage (R	t _{GS} = 20 kΩ)	V _{DGR}	30	V	
Gate-source voltage		V _{GSS}	±20	V	
Drain current	DC (Note 1)	۱ _D	18	٨	
Diameditent	Pulsed (Note 1)	I _{DP}	72	A	
Drain power dissipati	on (t = 10 s) (Note 2a)	PD	1.9	W	
Drain power dissipati	on (t = 10 s) (Note 2b)	PD	1.0	W	
Single pulse avalancl	ne energy (Note 3)	E _{AS}	210	mJ	
Avalanche current		I _{AR}	18	А	
Repetitive avalanche (energy Note 2a) (Note 4)	E _{AR}	0.19	mJ	
Channel temperature		T _{ch}	150	°C	
Storage temperature	range	T _{stg}	-55 to 150	°C	

Note: For (Note 1), (Note 2), (Note 3), (Note 4), please refer to the next page.

This transistor is an electrostatic sensitive device. Please handle with caution.



Weight: 0.080 g (typ.)

Circuit Configuration



Unit: mm

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Thermal Characteristics

Characteristics	Symbol	Max	Unit	
Thermal resistance, channel to ambient $(t = 10 \text{ s})$ (Note 2a)	R _{th (ch-a)}	65.8	°C/W	
Thermal resistance, channel to ambient $(t = 10 \text{ s})$ (Note 2b)	R _{th (ch-a)}	125	°C/W	

Marking (Note 5)



Note 1: Please use devices on condition that the channel temperature is below 150°C.

Note 2: (a) Device mounted on a glass-epoxy board (a)



(b) Device mounted on a glass-epoxy board (b)



Note 3: $V_{DD} =$ 24 V, $T_{ch} =$ 25°C (initial), L = 0.5 mH, R_G = 25 Ω , I_{AR} = 18 A

Note 4: Repetitive rating: pulse width limited by max channel temperature

Note 5: • on lower left of the marking indicates Pin 1.

* Weekly code: (Three digits)



Electrical Characteristics (Ta = 25°C)

Cha	racteristics	Symbol	Test Condition	Min	Тур.	Max	Unit
Gate leakage curr	rent	I _{GSS}	$V_{GS}=\pm 16~V,~V_{DS}=0~V$			±10	μA
Drain cut-OFF cu	rrent	I _{DSS}	$V_{DS} = 30 \text{ V}, \text{ V}_{GS} = 0 \text{ V}$	_	_	10	μA
Drain-source breakdown voltage		V (BR) DSS	$I_D = 10 \text{ mA}, V_{GS} = 0 \text{ V}$	30	_	_	V
Drain-source brea	Kuown vollage	V (BR) DSX	$I_D = 10 \text{ mA}, V_{GS} = -20 \text{ V}$	15	_	_	v
Gate threshold vo	ltage	V _{th}	$V_{DS} = 10 \text{ V}, \text{ I}_{D} = 1 \text{ mA}$	1.1		2.3	V
	ragiotanaa		$V_{GS} = 4.5 \text{ V}, \text{ I}_{D} = 9 \text{ A}$	_	4.8	6.2	
Drain-source ON	vard transfer admittance		V _{GS} = 10 V, I _D = 9 A	_	3.5	4.6	- mu
Forward transfer a	admittance	Y _{fs}	$V_{DS} = 10 \text{ V}, \text{ I}_{D} = 9 \text{ A}$	25	50		S
Input capacitance		C _{iss}			2265		
Reverse transfer capacitance		C _{rss}	V _{DS} = 10 V, V _{GS} = 0 V, f = 1 MHz		255		pF
Output capacitance		C _{oss}			1045		
Drain-source breakd Gate threshold volta Drain-source ON res Forward transfer ad Input capacitance Reverse transfer ca Output capacitance Switching time Total gate charge (gate-source plus ga Gate-source charge Gate-drain ("miller")	Rise time	tr	$V_{GS} \stackrel{10}{}_{0}V \prod_{V \in S} \stackrel{I_{D} = 9}{}_{0} A$	_	5	_	- ns
	Turn-ON time	t _{on}			14	_	
	Fall time	t _f		_	11		
	Turn-OFF time	t _{off}	V _{DD} ≃ 15 V Duty ≦ 1%, t _w = 10 μs		52	_	
Total gate charge	otal gate charge		$V_{DD}\simeq 24$ V, $V_{GS}=10$ V, $I_{D}=18$ A		38		
(gate-source plus	gate-drain)	Qg	$V_{DD}\simeq 24~V,~V_{GS}=5~V,~I_{D}=18~A$		21		
Gate-source charge 1		Q _{gs1}	$V_{DD} \simeq 24$ V, V_{GS} = 10 V, I_D = 18 A		7.3		nC
Gate-drain ("miller") charge		Q _{gd}			9		
Gate switch charge		Q _{SW}			12		

Source-Drain Ratings and Characteristics (Ta = 25°C)

Characteristics		Symbol	Test Condition	Min	Тур.	Max	Unit	
Drain reverse current	Pulse	(Note 1)	I _{DRP}	—	_	_	72	А
Forward voltage (diode)			V _{DSF}	$I_{DR} = 18 \text{ A}, V_{GS} = 0 \text{ V}$	_	_	-1.2	V

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CAPACITANCE - VDS 10000 Ciss (PF) 1000 C CAPACITANCE Coss Crss 100 COMMON SOURCE $V_{GS} = 0 V$ f = 1 MHz $Tc = 25^{\circ}C$ 10 L 0.1 10 100 DRAIN-SOURCE VOLTAGE V_{DS} (V)











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