

TOSHIBA Field Effect Transistor Silicon N Channel MOS Type(π -MOSV)

TPCA8009-H

TENTATIVE

High Speed and High Efficiency DC-DC Converters

Unit: mm

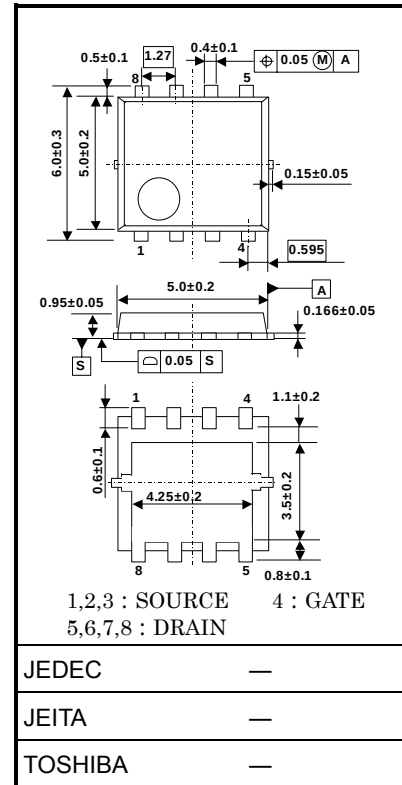
- Small footprint due to small and thin package
- High speed switching
- Small gate charge: $Q_g = 10\text{nC}$ (typ.)
- Low drain-source ON resistance: $R_{DS(ON)} = 240\text{m}\Omega$ (typ.)
- High forward transfer admittance: $|Y_{fs}| = S$ (typ.)
- Low leakage current: $I_{DSS} = 100\text{ }\mu\text{A}$ (max) ($V_{DS} = 100\text{ V}$)
- Enhancement mode: $V_{th} = 2\text{ to }4\text{ V}$ ($V_{DS} = 10\text{ V}$, $I_D = 1\text{ mA}$)

Maximum Ratings ($T_a = 25^\circ\text{C}$)

Characteristics		Symbol	Rating	Unit
Drain-source voltage		V_{DSS}	150	V
Drain-gate voltage ($R_{GS} = 20\text{ k}\Omega$)		V_{DGR}	150	V
Gate-source voltage		V_{GSS}	± 20	V
Drain current	DC (Note 1)	I_D	7	A
	Pulsed (Note 1)	I_{DP}	14	
Drain power dissipation ($T_c = 25^\circ\text{C}$)		P_D	45	W
Drain power dissipation ($t = 10\text{ s}$) (Note 2a)		P_D	2.8	W
Drain power dissipation ($t = 10\text{ s}$) (Note 2b)		P_D	1.6	W
Single pulse avalanche energy (Note 3)		E_{AS}	34	mJ
Avalanche current		I_{AR}	7	A
Repetitive avalanche energy ($T_c = 25^\circ\text{C}$) (Note 4)		E_{AR}	1.5	mJ
Channel temperature		T_{ch}	150	$^\circ\text{C}$
Storage temperature range		T_{stg}	$-55 \sim 150$	$^\circ\text{C}$

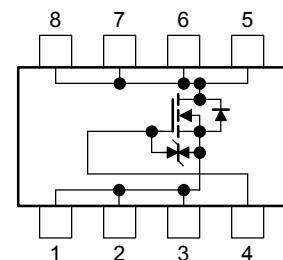
Note: For (Note 1), (Note 2), (Note 3), (Note 4), please refer to the next page.

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



Weight: 0.08 g (typ.)

Circuit Configuration

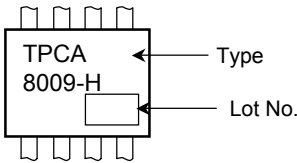


Thermal Characteristics

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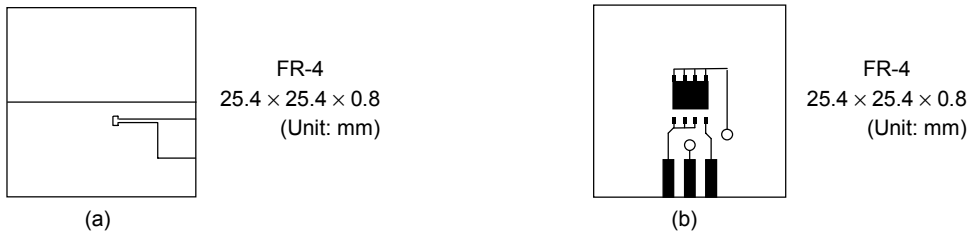
Characteristics	Symbol	Max	Unit
Thermal resistance, channel to case (Tc=25)	R _{th (ch-c)}	2.78	°C/W
Thermal resistance, channel to ambient (t = 10 s) (Note 2a)	R _{th (ch-a)}	44.6	°C/W
Thermal resistance, channel to ambient (t = 10 s) (Note 2b)	R _{th (ch-a)}	78.1	°C/W

Marking (Note 5)



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

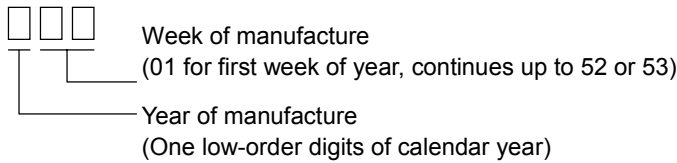
Note 2: (a) Device mounted on a glass-epoxy board (a) (b) Device mounted on a glass-epoxy board (b)



Note 3: V_{DD} = 50 V , T_{ch} = 25°C (initial) , L = 1 mH , R_G = 25 Ω , I_{AR} = 7 A

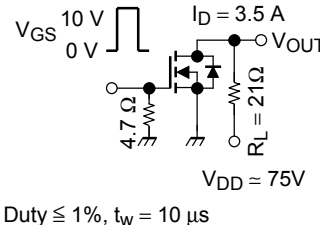
Note 4: Repetitive rating: pulse width limited by max channel temperature

Note 5: * Weekly code: (Three digits)



Electrical Characteristics (Ta = 25°C)

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Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current		I _{GSS}	V _{GS} = ±16 V, V _{DS} = 0 V	—	—	± 10	μA
Drain cut-OFF current		I _{DSS}	V _{DS} = 150 V, V _{GS} = 0 V	—	—	100	μA
Drain-source breakdown voltage	V _{(BR) DSS}	I _D = 10 mA, V _{GS} = 0 V	150	—	—	V	
	V _{(BR) DSX}	I _D = 10 mA, V _{GS} = -5 V	150	—	—		
	V _{(BR) DSX}	I _D = 10 mA, V _{GS} = -20 V	100	—	—		
Gate threshold voltage		V _{th}	V _{DS} = 10 V, I _D = 1mA	2.0	—	4.0	V
Drain-source ON resistance		R _{DS (ON)}	V _{GS} = 10 V, I _D = 3.5A	—	0.23	(0.35)	Ω
Forward transfer admittance		Y _{fs}	V _{DS} = 10 V, I _D = 3.5A	TBD	TBD	—	S
Input capacitance		C _{iss}	V _{DS} = 10 V, V _{GS} = 0 V, f = 1 MHz	—	600	—	pF
Reverse transfer capacitance		C _{rss}		—	20	—	
Output capacitance		C _{oss}		—	220	—	
Switching time	Rise time	t _r	 V_{GS} 10 V 0 V I_D = 3.5 A V_{OUT} 4.7 Ω R_L = 21Ω V_{DD} = 75V Duty ≤ 1%, t_w = 10 μs	—	(7)	—	ns
	Turn-ON time	t _{on}		—	(17)	—	
	Fall time	t _f		—	(13)	—	
	Turn-OFF time	t _{off}		—	(70)	—	
Total gate charge (gate-source plus gate-drain)		Q _g	V _{DD} = 120 V, V _{GS} = 10 V, I _D = 7A	—	(10)	—	nC
Gate-source charge 1		Q _{gs1}		—	(7.6)	—	
Gate-drain (“miller”) charge		Q _{gd}		—	(2.4)	—	
Gate switch charge		Q _{SW}		—	(3.7)	—	

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

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Drain reverse current	Pulse (Note 1)	I_{DRP}	—	—	—	14	A
Forward voltage (diode)		V_{DSF}	$I_{DR} = 7 \text{ A}, V_{GS} = 0 \text{ V}$	—	—	-2.0	V

RESTRICTIONS ON PRODUCT USE

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