

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

## TPCA8008-H

TENTATIVE

High Speed and High Efficiency DC-DC Converters

Unit: mm

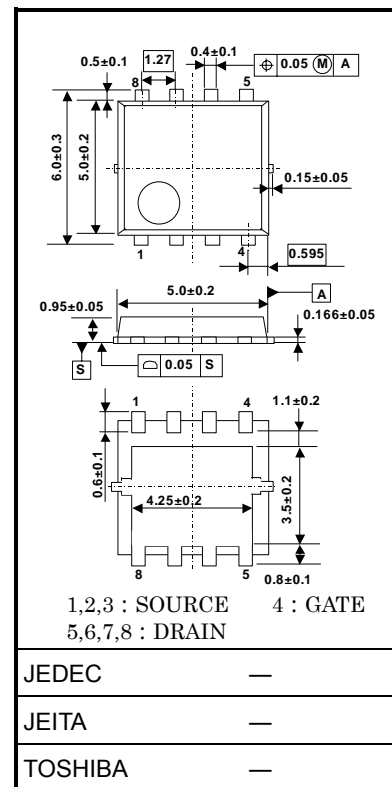
- Small footprint due to small and thin package
- High speed switching
- Small gate charge:  $Q_g = 10\text{nC}$  (typ.)
- Low drain-source ON resistance:  $R_{DS(ON)} = 470\text{m}\Omega$  (typ.)
- High forward transfer admittance:  $|Y_{fs}| = \text{S}$  (typ.)
- Low leakage current:  $I_{DSS} = 100\text{ }\mu\text{A}$  (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		$V_{DSS}$	250	V
Drain-gate voltage ( $R_{GS} = 20\text{ k}\Omega$ )		$V_{DGR}$	250	V
Gate-source voltage		$V_{GSS}$	$\pm 20$	V
Drain current	DC (Note 1)	$I_D$	4	A
	Pulsed (Note 1)	$I_{DP}$	8	
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)		$E_{AS}$	11	mJ
Avalanche current		$I_{AR}$	4	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		$T_{stg}$	$-55 \sim 150$	$^\circ\text{C}$

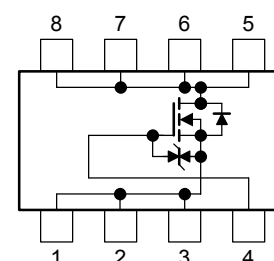
Note: For (Note 1), (Note 2), (Note 3), (Note 4), please refer to the next page.

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



Weight: 0.08 g (typ.)

### Circuit Configuration

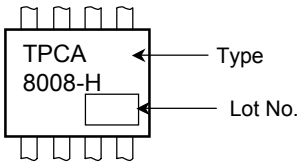


Thermal Characteristics

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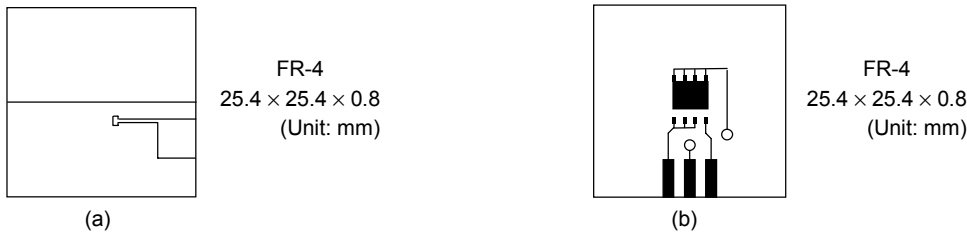
Characteristics	Symbol	Max	Unit
Thermal resistance, channel to case (Tc=25 )	R <sub>th (ch-c)</sub>	2.78	°C/W
Thermal resistance, channel to ambient (t = 10 s) (Note 2a)	R <sub>th (ch-a)</sub>	44.6	°C/W
Thermal resistance, channel to ambient (t = 10 s) (Note 2b)	R <sub>th (ch-a)</sub>	78.1	°C/W

Marking (Note 5)



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

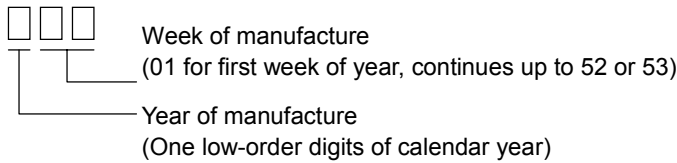
Note 2: (a) Device mounted on a glass-epoxy board (a) (b) Device mounted on a glass-epoxy board (b)



Note 3: V<sub>DD</sub> = 50 V , T<sub>ch</sub> = 25°C (initial) , L = 1 mH , R<sub>G</sub> = 25 Ω , I<sub>AR</sub> = 4 A

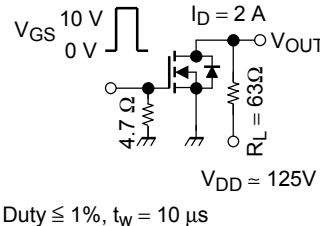
Note 4: Repetitive rating: pulse width limited by max channel temperature

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 <sub>GSS</sub>	V <sub>GS</sub> = ±16 V, V <sub>DS</sub> = 0 V	—	—	± 10	μA
Drain cut-OFF current		I <sub>DSS</sub>	V <sub>DS</sub> = 250 V, V <sub>GS</sub> = 0 V	—	—	100	μA
Drain-source breakdown voltage	V <sub>(BR)</sub> DSS	I <sub>D</sub> = 10 mA, V <sub>GS</sub> = 0 V	250	—	—	V	
	V <sub>(BR)</sub> DSX	I <sub>D</sub> = 10 mA, V <sub>GS</sub> = -5 V	250	—	—		
	V <sub>(BR)</sub> DSX	I <sub>D</sub> = 10 mA, V <sub>GS</sub> = -20 V	200	—	—		
Gate threshold voltage		V <sub>th</sub>	V <sub>DS</sub> = 10 V, I <sub>D</sub> = 1mA	2.0	—	4.0	V
Drain-source ON resistance		R <sub>DS (ON)</sub>	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 2A	—	0.47	0.58	Ω
Forward transfer admittance		Y <sub>fs</sub>	V <sub>DS</sub> = 10 V, I <sub>D</sub> = 2A	1.5	3.0	—	S
Input capacitance		C <sub>iss</sub>	V <sub>DS</sub> = 10 V, V <sub>GS</sub> = 0 V, f = 1 MHz	—	600	—	pF
Reverse transfer capacitance		C <sub>rss</sub>		—	20	—	
Output capacitance		C <sub>oss</sub>		—	220	—	
Switching time	Rise time	t <sub>r</sub>	 <p>V<sub>GS</sub> 10 V 0 V I<sub>D</sub> = 2 A V<sub>OUT</sub> 4.7 Ω 63 Ω L V<sub>DD</sub> = 125V Duty ≤ 1%, t<sub>W</sub> = 10 μs</p>	—	8	—	ns
	Turn-ON time	t <sub>on</sub>		—	17	—	
	Fall time	t <sub>f</sub>		—	13	—	
	Turn-OFF time	t <sub>off</sub>		—	70	—	
Total gate charge (gate-source plus gate-drain)		Q <sub>g</sub>	V <sub>DD</sub> = 200V, V <sub>GS</sub> = 10 V, I <sub>D</sub> = 4A	—	10	—	nC
Gate-source charge 1		Q <sub>gs1</sub>		—	7.6	—	
Gate-drain (“miller”) charge		Q <sub>gd</sub>		—	2.4	—	
Gate switch charge		Q <sub>SW</sub>		—	3.7	—	

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

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Drain reverse current	Pulse (Note 1)	$I_{DRP}$	—	—	—	8	A
Forward voltage (diode)		$V_{DSF}$	$I_{DR} = 4 \text{ A}, V_{GS} = 0 \text{ V}$	—	—	-2.0	V

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