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

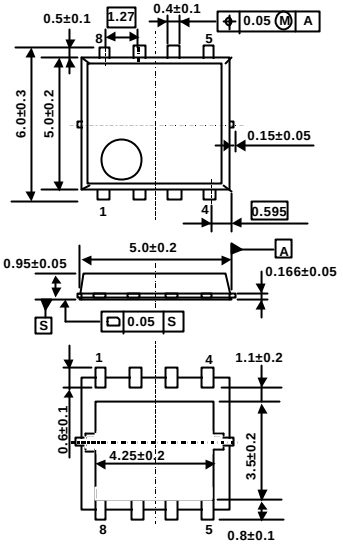
TPCA8010-H

TENTATIVE

High Speed and High Efficiency DC-DC Converters

- Small footprint due to small and thin package
- High speed switching
- Small gate charge: Q_g = 10nC (typ.)
- Low drain-source ON resistance: $R_{DS\ (ON)}$ = 380mΩ (typ.)
- High forward transfer admittance: $|Y_{fs}|$ = S (typ.)
- Low leakage current: I_{DSS} = 100 μA (max) (V_{DS} = 100 V)
- Enhancement mode: V_{th} = 2 to 4V (V_{DS} = 10 V, I_D = 1 mA)

Unit: mm



1,2,3：SOURCE 4：GATE
5,6,7,8：DRAIN

JEDEC	?
JEITA	?
TOSHIBA	?

Weight: 0.08 g (typ.)

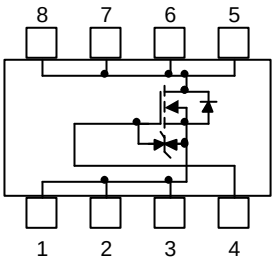
Maximum Ratings (Ta = 25°C)

Characteristics		Symbol	Rating	Unit
Drain-source voltage		V_{DSS}	200	V
Drain-gate voltage (R_{GS} = 20 kΩ)		V_{DGR}	200	V
Gate-source voltage		V_{GSS}	±20	V
Drain current	DC (Note 1)	I_D	5.5	A
	Pulsed (Note 1)	I_{DP}	11	
Drain power dissipation (Tc=25°C)		P_D	15	W
Drain power dissipation (t = 10 s) (Note 2a)		P_D	2.8	W
Drain power dissipation (t = 10 s) (Note 2b)		P_D	1.6	W
Single pulse avalanche energy (Note 3)		E_{AS}	19	mJ
Avalanche current		I_{AR}	5.5	A
Repetitive avalanche energy (Tc=25°C) (Note 4)		E_{AR}	1.5	mJ
Channel temperature		T_{ch}	150	°C
Storage temperature range		T_{stg}	−55~150	°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.

Circuit Configuration



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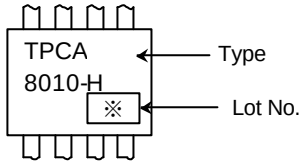
Thermal Characteristics

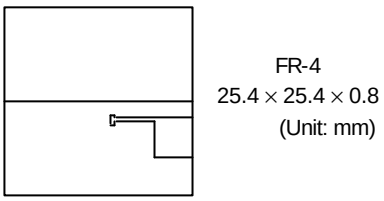
Characteristics	Symbol	Max	Unit
Thermal resistance, channel to case (Tc=25°C)	$R_{th\ (ch\text{-}c)}$	2.78	°C/W
Thermal resistance, channel to ambient (t = 10 s) (Note 2a)	$R_{th\ (ch\text{-}a)}$	44.6	°C/W
Thermal resistance, channel to ambient (t = 10 s) (Note 2b)	$R_{th\ (ch\text{-}a)}$	78.1	°C/W

Marking (Note 5)

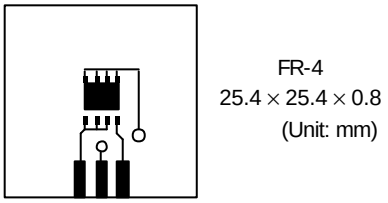


Note 1: Please use devices on condition that the channel temperature is below 150°C.

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



(a)

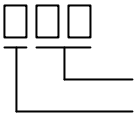


(b)

Note 3: V_{DD} = 50 V, T_{ch} = 25°C (initial), L = 1 mH, R_G = 25 Ω, I_{AR} = 5.5 A

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

Note 5: * Weekly code: (Three digits)



Week of manufacture
(01 for first week of year, continues up to 52 or 53)

Year of manufacture
(One low-order digits of calendar year)

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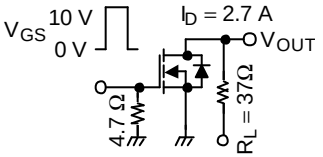
Electrical Characteristics (Ta = 25°C)

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} = 200 V, V_{GS} = 0 V	—	—	100	μA
Drain-source breakdown voltage		$V_{(BR)\ DSS}$	I_D = 10 mA, V_{GS} = 0 V	200	—	—	V
		$V_{(BR)\ DSX}$	I_D = 10 mA, V_{GS} = -5 V	200	—	—	
		$V_{(BR)\ DSX}$	I_D = 10 mA, V_{GS} = -20 V	150	—	—	
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 = 2.7A	—	0.38	‘(0.45)	mΩ
Forward transfer admittance		$\|Y_{fs}\|$	V_{DS} = 10 V, I_D = 2.7A	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	 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} ≃ 160 V, V_{GS} = 10 V, I_D = 5.5A	—	(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}	—	—	—	11	A
Forward voltage (diode)		V_{DSF}	I_{DR} = 5.5A, V_{GS} = 0 V	—	—	−2.0	V

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