TOSHIBA

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

TPCA8005-H   TENTATIVE

High Speed and High Efficiency DC-DC Converters

Notebook PC Applications

Portable Equipment Applications

Unit: mm

- Small footprint due to small and thin package
- High speed switching
- Small gate charge: Q_g = 24 nC (typ.)
- Low drain-source ON resistance: $R_{DS (ON)}$ = 6.8 mΩ (typ.)
- High forward transfer admittance: $|Y_{fs}|$ = 46S (typ.)
- Low leakage current: I_{DSS} = 10 μA (max) (V_{DS} = 30 V)
- Enhancement mode: V_{th} = 1.1 to 2.3 V (V_{DS} = 10 V, I_D = 1 mA)

1,2,3 : SOURCE   4 : GATE
5,6,7,8 : DRAIN

JEDEC	—
JEITA	—
TOSHIBA	2-6J1B

Weight: 0.080 g (typ.)

Maximum Ratings (Ta = 25°C)

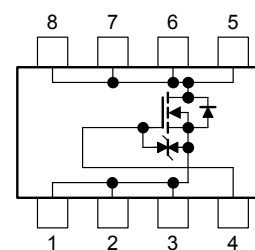| Characteristics		Symbol	Rating	Unit
Drain-source voltage		V_{DSS}	30	V
Drain-gate voltage (R_{GS} = 20 kΩ)		V_{DGR}	30	V
Gate-source voltage		V_{GSS}	±20	V
Drain current	DC (Note 1)	I_D	30	A
	Pulsed (Note 1)	I_{DP}	90	
Drain power dissipation (Tc=25°C)		P_D	45	W
Drain power dissipation (t = 10 s) (Note 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}	117	mJ
Avalanche current		I_{AR}	30	A
Repetitive avalanche energy (Tc=25°C) (Note 4)		E_{AR}	4.5	mJ
Channel temperature		T_{ch}	150	°C
Storage temperature range		T_{stg}	−55 to 150	°C

Circuit Configuration

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.

2003-11-13
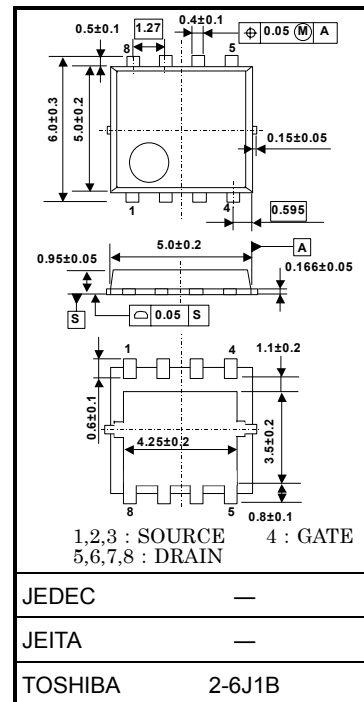
Thermal Characteristics

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)

TPCA
8005-H
※

— Type

— Lot No.
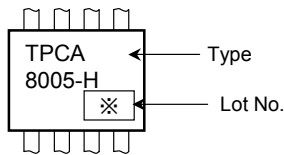
Note 1: Please use devices on condition that the channel temperature is below 150°C.

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

FR-4
25.4 × 25.4 × 0.8
(Unit: mm)

(a)

FR-4
25.4 × 25.4 × 0.8
(Unit: mm)

(b)
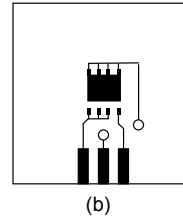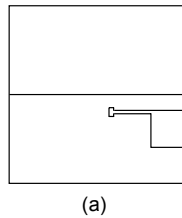
Note 3: V_{DD} = 24 V, T_{ch} = 25°C (initial),   L = 0.1 mH, R_G = 25 Ω, I_{AR} = 30 A

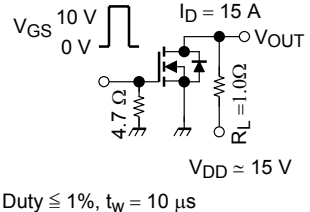Note 4: Repetitive rating: pulse width limited by max channel temperature

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)
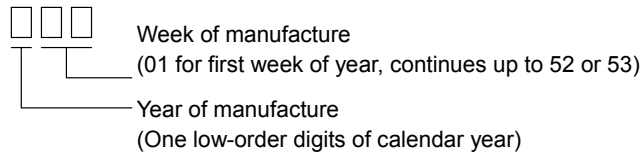
Electrical Characteristics (Ta = 25°C)

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current		I_{GSS}	$V_{GS} = \pm16$ V, $V_{DS} = 0$ V	—	—	±10	μA
Drain cut-OFF current		I_{DSS}	$V_{DS} = 30$ V, $V_{GS} = 0$ V	—	—	10	μA
Drain-source breakdown voltage		$V_{(BR)DSS}$	$I_D = 10$ mA, $V_{GS} = 0$ V	30	—	—	V
		$V_{(BR)DSX}$	$I_D = 10$ mA, $V_{GS} = -20$ V	15	—	—	
Gate threshold voltage		V_{th}	$V_{DS} = 10$ V, $I_D = 1$ mA	1.1	—	2.3	V
Drain-source ON resistance		$R_{DS(ON)}$	$V_{GS} = 4.5$ V, $I_D = 15$ A	—	9.5	13	mΩ
			$V_{GS} = 10$ V, $I_D = 15$ A	—	6.8	9	
Forward transfer admittance		$|Y_{fs}|$	$V_{DS} = 10$ V, $I_D = 15$ A	23	46	—	S
Input capacitance		C_{iss}	$V_{DS} = 10$ V, $V_{GS} = 0$ V, f = 1 MHz	—	1395	—	pF
Reverse transfer capacitance		C_{rss}		—	140	—	
Output capacitance		C_{oss}		—	525	—	
Switching time	Rise time	t_r	V_{GS} 10 V, 0 V; $I_D = 15$ A; V_{OUT}; 4.7 Ω; $R_L = 1.0$ Ω; $V_{DD} \simeq 15$ V; Duty ≦ 1%, $t_w = 10$ μs	—	3	—	ns
	Turn-ON time	t_{on}		—	9	—	
	Fall time	t_f		—	8	—	
	Turn-OFF time	t_{off}		—	27	—	
Total gate charge (gate-source plus gate-drain)		Q_g	$V_{DD} \simeq 24$ V, $V_{GS} = 10$ V, $I_D = 30$ A	—	24	—	nC
			$V_{DD} \simeq 24$ V, $V_{GS} = 5$ V, $I_D = 30$ A	—	13	—	
Gate-source charge 1		Q_{gs1}	$V_{DD} \simeq 24$ V, $V_{GS} = 10$ V, $I_D = 30$ A	—	4.7	—	
Gate-drain ("miller") charge		Q_{gd}		—	5.6	—	
Gate switch charge		Q_{SW}		—	7.7	—	

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

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Drain reverse current	Pulse (Note 1)	I_{DRP}	—	—	—	90	A
Forward voltage (diode)		V_{DSF}	$I_{DR} = 30$ A, $V_{GS} = 0$ V	—	—	−1.2	V

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