

Q1: TOSHIBA FIELD EFFECT TRANSISTOR SILICON N CHANNEL MOS TYPE (U-MOSIII)

Q2: INCLUDES SCHOTTKY BARRIER DIODE FIELD EFFECT TRANSISTOR SILICON N CHANNEL MOS TYPE (U-MOSIII)

TPC8A01

TENTATIVE

DC-DC CONVERTER
NOTE BOOK PC

PORTABLE MACHINES AND TOOLS

- Includes Schottky Barrier Diode Type. (Q2)
- Compact and thin package, and a small mounting area. (Q1, Q2)
- High Speed Switching. (Q1)
- Small Gate Charge. (Q1): $Q_g = \text{ nC (Typ.)}$
- Low Drain - Source ON Resistance. (Q2): $R_{DS(ON)} = \text{ m}\Omega \text{ (Typ.)}$
- High Forward Transfer Admittance. (Q2): $|Y_{fs}| = \text{ S (Typ.)}$
- Low Leakage Current. (Q1, Q2): $I_{DSS} = 10 \mu\text{ A (Max.)}$ ($V_{DS} = 30\text{ V}$)
- Enhancement - Mode. (Q1, Q2): $V_{th} = 1.3 \sim 2.5\text{ V}$ ($V_{DS} = 10\text{ V}$, $I_D = 1\text{ mA}$)

MAXIMUM RATINGS ($T_a = 25^\circ\text{C}$)

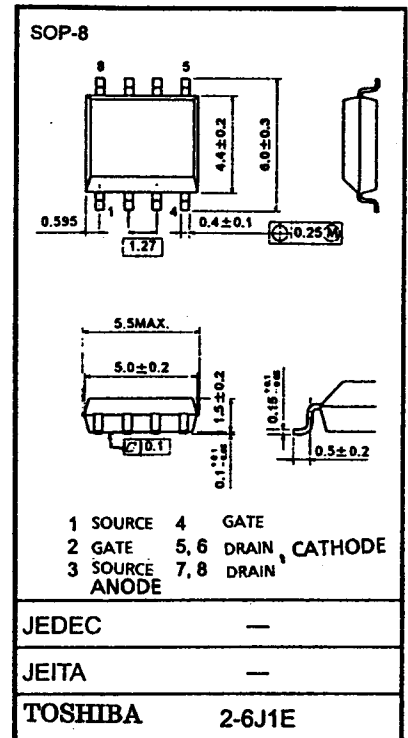
CHARACTERISTIC	SYMBOL	RATING		UNIT	
		Q1	Q2		
Drain - Source Voltage	V_{DSS}	30	30	V	
Drain - Gate Voltage ($R_{GS} = 20\text{ k}\Omega$)	V_{DGR}	30	30	V	
Gate - Source Voltage	V_{GSS}	± 20	± 20	V	
Drain Current	DC (Notel)	I_D	6	8.6	A
	Pulse	I_{DP}	24	34.4	A
Drain Power Dissipation ($t = 10\text{ s}$) (Note2a)	Single-device Operation (Note3a)	$P_{D(1)}$	1.5		W
	Single-device value at dual Operation (Note3b)	$P_{D(2)}$	1.1		
Drain Power Dissipation ($t = 10\text{ s}$) (Note2b)	Single-device Operation (Note3a)	$P_{D(1)}$	0.75		
	Single-device value at dual Operation (Note3b)	$P_{D(2)}$	0.45		
Single Pulse Avalanche Energy (Note4)	E_{AS}			mJ	
Avalanche Current (Notel)	I_{AR}	6.0	8.6	A	
Repetitive Avalanche Energy Single-device value at dual Operation (Note2a, 3b, 5)	E_{AR}	0.11		mJ	
Channel Temperature	T_{ch}	150		$^\circ\text{C}$	
Storage Temperature Range	T_{stg}	-55~150		$^\circ\text{C}$	

Note: (Note1), (Note2), (Note3), (Note4), (Note5) Please see next page.

THIS TRANSISTOR IS AN ELECTROSTATIC SENSITIVE DEVICE.

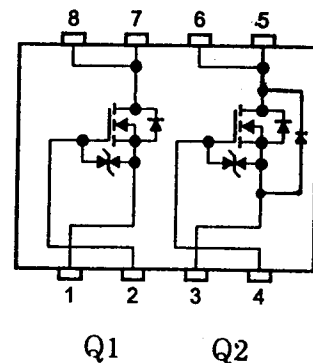
PLEASE HANDLE WITH CAUTION.

UNIT: mm



Weight: 0.08g (Typ)

CIRCUIT CONFIGURATION

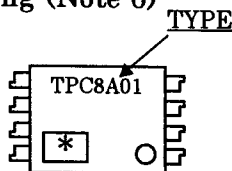


TENTATIVE

THERMAL CHARACTERISTICS

CHARACTERISTICS		SYMBOL	MAX.	UNIT
Thermal resistance, channel to ambient (t=10s) (Note 2a)	Single-device operation (Note3a)	$R_{th(ch-a)(1)}$	83.3	°C/W
	Single-device value at dual operation (Note3b)	$R_{th(ch-a)(2)}$	114	
Thermal resistance, channel to ambient (t=10s) (Note 2b)	Single-device operation (Note3a)	$R_{th(ch-a)(1)}$	167	
	Single-device value at dual operation (Note3b)	$R_{th(ch-a)(2)}$	278	

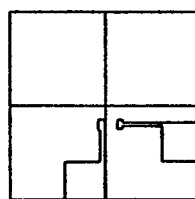
Marking (Note 6)



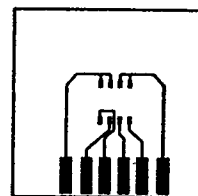
Note1: Please use devices on condition that the channel temperature is below 150°C.

Note2:

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



FR-4
25.4X25.4X0.8
(Unit in mm)



FR-4
25.4X25.4X0.8
(Unit in mm)

(a)

(b)

Note3:

- (a) The power dissipation and thermal resistance values shown are for a single device (During single-device operation, power is only applied to one device)
- (b) The power dissipation and thermal resistance values shown are for a single device (During dual operation, power is evenly applied to both device)

Note4: Q1: $V_{DD}=24V, T_{ch}=25^{\circ}C$ (initial), $L=$ mH, $I_{AR}=$ A, $R_G=25\Omega$

Q2: $V_{DD}=24V, T_{ch}=25^{\circ}C$ (initial), $L=$ mH, $I_{AR}=$ A, $R_G=25\Omega$

Note5: Repetitive rating ; Pulse Width Limited by maximum channel temperature.

Note6: O on lower right of the marking indicates Pin 1

* shows lot number. (Year of manufacture: last decimal digit of the year of manufacture, Month of manufacture: January to December are denoted by letter A to L respectively)

Q 1

TENTATIVE

Electrical Characteristics (T_a=25°C)

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current		I _{GSS}	V _{GS} =±16V, V _{DS} =0V	-	-	±10	μA
Drain cut-OFF current		I _{DSS}	V _{DS} =30V, V _{GS} =0V	-	-	10	μA
Drain-source breakdown voltage		V _{(BR)DSS}	I _D =10mA, V _{GS} =0V	30	-	-	V
		V _{(BR)DSX}	I _D =10mA, V _{GS} =-20V	15	-	-	
Gate threshold voltage		V _{th}	V _{DS} =10V, I _D =1mA	1.3	-	2.5	V
Drain-source ON resistance		R _{DS(ON)}	V _{GS} =4.5V, I _D =4A	-	26	33	mΩ
			V _{GS} =10V, I _D =6A	-	18	23	
Forward transfer admittance		Y _{fs}	V _{DS} =10V, I _D =3.0A	3.8	7.6	-	S
Input capacitance		C _{iss}	V _{DS} =10V, V _{GS} =0V, f=1MHz	-	830	-	pF
Reverse transfer capacitance		C _{rss}		-	130	-	
Output capacitance		C _{oss}		-	400	-	
Switching time	Rise time	t _r	<p>Duty ≤ 1%, tw=10us VDD ≈ 15V</p>	-	18	-	ns
	Turn-ON time	t _{on}		-	25	-	
	Fall time	t _f		-	3.3	-	
	Turn-OFF time	t _{off}		-	20	-	
Total gate charge (gate-source plus gate-drain)		Q _g	V _{DD} ≈ 24V, V _{GS} =10V, I _D =6.0A	-	14	-	nC
Gate-source charge 1		Q _{gs1}		-	-	-	
Gate-Drain("miller")charge		Q _{gd}		-	3.4	-	

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

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Drain reverse current	Pulse	I _{DRP}	-	-	-	24	A
Diode forward voltage		V _{DSF}	I _{DR} =6.0A, V _{GS} =0V	-	-	-1.2	V

Q 2

TENTATIVE

Electrical Characteristics (T_a=25°C)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit	
Gate leakage current	I _{GSS}	V _{GS} =±16V, V _{DS} =0V	-	-	±10	μA	
Drain cut-OFF current	I _{DSS}	V _{DS} =30V, V _{GS} =0V	-	-	500	μA	
Drain-source breakdown voltage	V _{(BR)DSS}	I _D =10mA, V _{GS} =0V	30	-	-	V	
	V _{(BR)DSX}	I _D =10mA, V _{GS} =-20V	15	-	-		
Gate threshold voltage	V _{th}	V _{DS} =10V, I _D =1mA	1.3	-	2.5	V	
Drain-source ON resistance	R _{DS(ON)}	V _{GS} =4.5V, I _D =8.6A	-	20	26	mΩ	
		V _{GS} =10V, I _D =8.6A	-	16	21		
Forward transfer admittance	Y _{fs}	V _{DS} =10V, I _D =4.3A	5.7	11.4	-	S	
Input capacitance	C _{iss}	V _{DS} =10V, V _{GS} =0V, f=1MHz	-	2120	-	pF	
Reverse transfer capacitance	C _{rss}		-	230	-		
Output capacitance	C _{oss}		-	430	-		
Switching time	Rise time	t _r		-	7.1	-	ns
	Turn-ON time	t _{on}		-	18	-	
	Fall time	t _f		-	5.6	-	
	Turn-OFF time	t _{off}		-	33	-	
Total gate charge (gate-source plus gate-drain)	Q _g	V _{DD} ≈ 24V, V _{GS} =10V, I _D =8.6A	-	35	-	nC	
Gate-source charge 1	Q _{gs1}		-	-	-		
Gate-Drain("miller")charge	Q _{gd}		-	6.6	-		

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

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Drain reverse current	I _{DRP}	-	-	-	-	A
Diode forward voltage	V _{DSF}	I _{DR} =1.0A, V _{GS} =0V	-	-0.48	-0.5	V

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