

MOSFETs Silicon N-Channel MOS (U-MOSVII)

TPCP8206

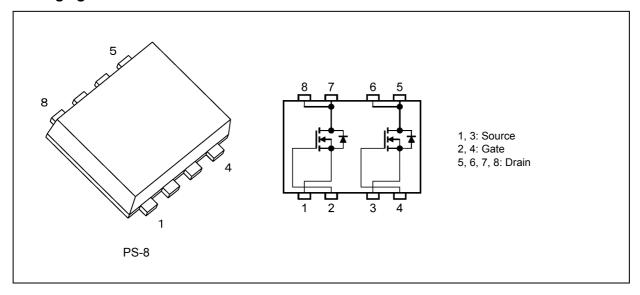
1. Applications

· Mobile Equipments

2. Features

- (1) Small footprint due to a small and thin package
- (2) Low drain-source on-resistance: $R_{DS(ON)} = 19 \text{ m}\Omega$ (typ.) ($V_{GS} = 4.5 \text{ V}$)
- (3) Low leakage current: $I_{DSS} = 10 \mu A \text{ (max) (V}_{DS} = 20 \text{ V)}$
- (4) Enhancement mode: V_{th} = 0.5 to 1.2 V (V_{DS} = 10 V, I_D = 0.2 mA)

3. Packaging and Internal Circuit



4. Absolute Maximum Ratings (Note) (Ta = 25°C unless otherwise specified)

Characteristics			Symbol	Rating	Unit
Drain-source voltage			V_{DSS}	20	V
Gate-source voltage			V_{GSS}	±12	
Drain current (DC)		(Note 1)	I _D	6.0	Α
Drain current (pulsed)		(Note 1)	I _{DP}	20	
Power dissipation (single operation)	(t = 5 s)	(Note 2), (Note 4)	P _{D(1)}	1.48	W
Power dissipation (per device for dual operation)	(t = 5 s)	(Note 2), (Note 5)	P _{D(2)}	1.23	
Power dissipation (single operation)	(t = 5 s)	(Note 3), (Note 4)	P _{D(1)}	0.58	
Power dissipation (per device for dual operation)	(t = 5 s)	(Note 3), (Note 5)	P _{D(2)}	0.36	
Single-pulse avalanche energy		(Note 6)	E _{AS}	23.4	mJ
Avalanche current			I _{AR}	6.0	Α
Channel temperature			T _{ch}	150	°C
Storage temperature			T _{stg}	-55 to 150	

Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings.

Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc).



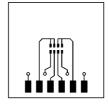
5. Thermal Characteristics

Characteristics	Symbol	Max	Unit		
Channel-to-ambient thermal resistance (single operation)	(t = 5 s)	(Note 2), (Note 4)	R _{th(ch-a)(1)}	84.4	°C/W
Channel-to-ambient thermal resistance (per device for dual operation)	(t = 5 s)	(Note 2), (Note 5)	R _{th(ch-a)(2)}	101.6	
Channel-to-ambient thermal resistance (single operation)	(t = 5 s)	(Note 3), (Note 4)	R _{th(ch-a)(1)}	215.5	
Channel-to-ambient thermal resistance (per device for dual operation)	(t = 5 s)	(Note 3), (Note 5)	R _{th(ch-a)(2)}	347.2	

- Note 1: Ensure that the channel temperature does not exceed 150°C.
- Note 2: Device mounted on a glass-epoxy board (a), Figure 5.1
- Note 3: Device mounted on a glass-epoxy board (b), Figure 5.2
- Note 4: Power dissipation and thermal resistance values per device with the other device being off (During single operation, power is supplied to only one of the two devices.)
- Note 5: Power dissipation and thermal resistance values per device for dual operation (During dual operation, power is evenly supplied to both devices.)
- Note 6: V_{DD} = 16 V, T_{ch} = 25°C (initial), L = 0.5 mH, R_G = 1 Ω , I_{AR} = 6.0 A



FR-4 $25.4 \times 25.4 \times 0.8$ (Unit: mm)



 $\begin{aligned} & \text{FR-4} \\ 25.4 \times 25.4 \times 0.8 \\ & \text{(Unit: mm)} \end{aligned}$

Fig. 5.1 Device Mounted on a Glass-Epoxy Board (a)

Fig. 5.2 Device Mounted on a Glass-Epoxy Board (b)

Note: This transistor is sensitive to electrostatic discharge and should be handled with care.



6. Electrical Characteristics

6.1. Static Characteristics (T_a = 25°C unless otherwise specified)

Characteristics	Symbol	Test Condition	Min	Тур.	Max	Unit
Gate leakage current	I _{GSS}	$V_{GS} = \pm 12 \text{ V}, V_{DS} = 0 \text{ V}$	_	_	±0.1	μА
Drain cut-off current	I _{DSS}	V _{DS} = 20 V, V _{GS} = 0 V	_	_	10	
Drain-source breakdown voltage	V _{(BR)DSS}	I _D = 10 mA, V _{GS} = 0 V	20			V
	V _{(BR)DSX}	I _D = 10 mA, V _{GS} = -12 V	8			
Gate threshold voltage	V_{th}	V _{DS} = 10 V, I _D = 0.2 mA	0.5	_	1.2	
Drain-source on-resistance	R _{DS(ON)}	V _{GS} = 2.5 V, I _D = 3.0 A		27	35	mΩ
		$V_{GS} = 4.5 \text{ V}, I_D = 3.0 \text{ A}$	_	19	24	

6.2. Dynamic Characteristics (T_a = 25°C unless otherwise specified)

Characteristics	Symbol	Test Condition	Min	Тур.	Max	Unit
Input capacitance	C _{iss}	V _{DS} = 10 V, V _{GS} = 0 V, f = 1 MHz	_	630	_	pF
Reverse transfer capacitance	C _{rss}			47		
Output capacitance	C _{oss}			144		
Switching time (rise time)	t _r	See Figure 6.2.1.	_	4.6	_	ns
Switching time (turn-on time)	t _{on}		_	11.8	_	
Switching time (fall time)	t _f		_	5.9	_	
Switching time (turn-off time)	t _{off}		_	23.3	_	

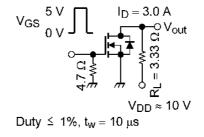


Fig. 6.2.1 Switching Time Test Circuit

6.3. Gate Charge Characteristics (T_a = 25°C unless otherwise specified)

Characteristics	Symbol	Test Condition	Min	Тур.	Max	Unit
Total gate charge (gate-source plus gate-drain)	Qg	$V_{DD} \approx 16 \text{ V}, V_{GS} = 5 \text{ V}, I_D = 6.0 \text{ A}$	_	5.8		nC
Gate-source charge 1	Q _{gs1}		_	1.3		
Gate-drain charge	Q _{gd}		_	1.1	_	

6.4. Source-Drain Characteristics (T_a = 25°C unless otherwise specified)

Characteristics		Symbol	Test Condition	Min	Тур.	Max	Unit
Reverse drain current (pulsed)	(Note 7)	I _{DRP}	_	_	_	20	Α
Diode forward voltage		V_{DSF}	I _{DR} = 6.0 A, V _{GS} = 0 V	_	_	-1.2	٧

Note 7: Ensure that the channel temperature does not exceed 150°C.



7. Marking

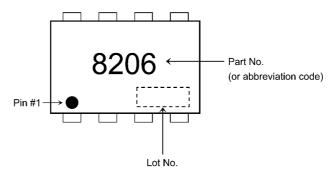


Fig. 7.1 Marking

8. Characteristics Curves (Note)

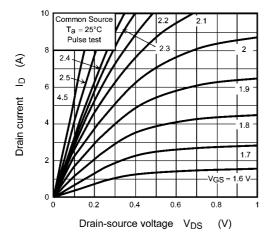


Fig. 8.1 $I_D - V_{DS}$

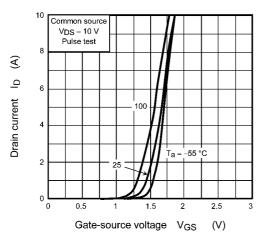


Fig. 8.3 I_D - V_{GS}

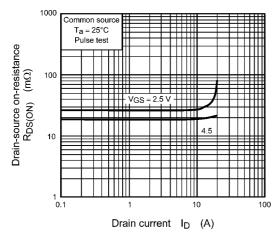


Fig. 8.5 R_{DS(ON)} - I_D

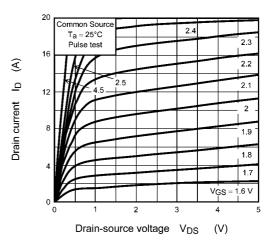


Fig. 8.2 I_D - V_{DS}

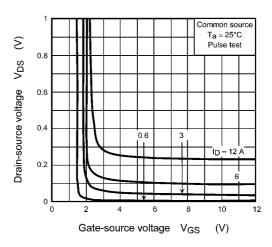


Fig. 8.4 V_{DS} - V_{GS}

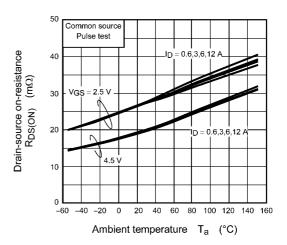


Fig. 8.6 R_{DS(ON)} - T_a

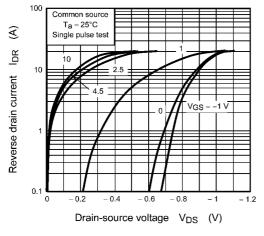


Fig. 8.7 IDR - VDS

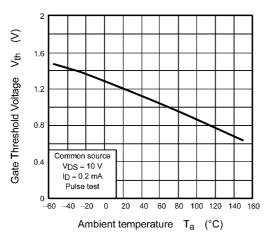


Fig. 8.9 V_{th} - T_a

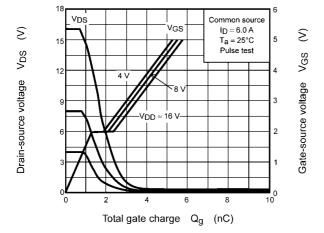


Fig. 8.11 Dynamic Input/Output Characteristics

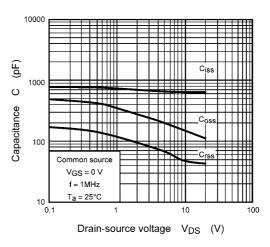


Fig. 8.8 Capacitance - V_{DS}

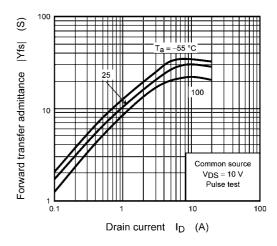


Fig. 8.10 |Y_{fs|} - I_D

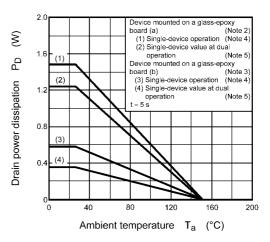


Fig. 8.12 P_D - T_a (Guaranteed Maximum)

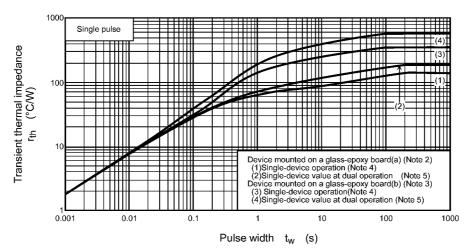


Fig. 8.13 r_{th} - t_w (Guaranteed Maximum)

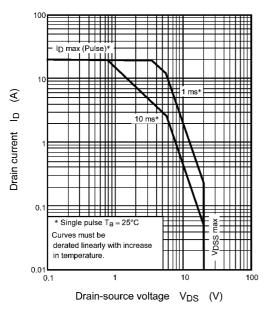


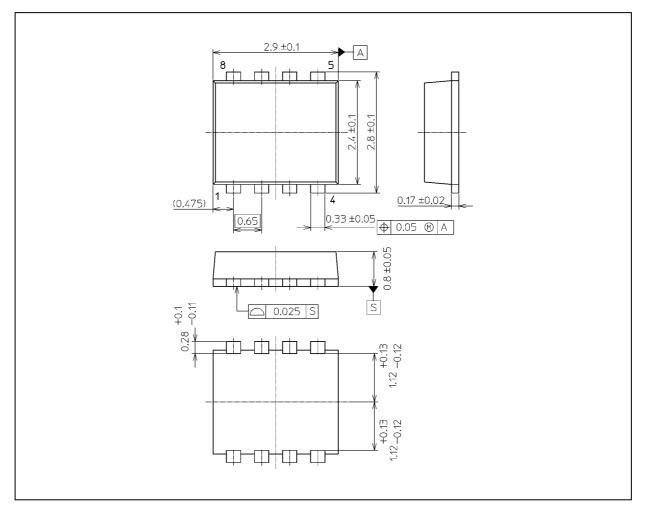
Fig. 8.14 Safe Operating Area (Guaranteed Maximum)

Note: The above characteristics curves are presented for reference only and not guaranteed by production test, unless otherwise noted.



Package Dimensions

Unit: mm



Weight: 0.017 g (typ.)

	Package Name(s)
TOSHIBA: 2-3V1S	
Nickname: PS-8	



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