

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

TPCP8201

Portable Equipment Applications
 Motor Drive Applications
 DC-DC Converter Applications

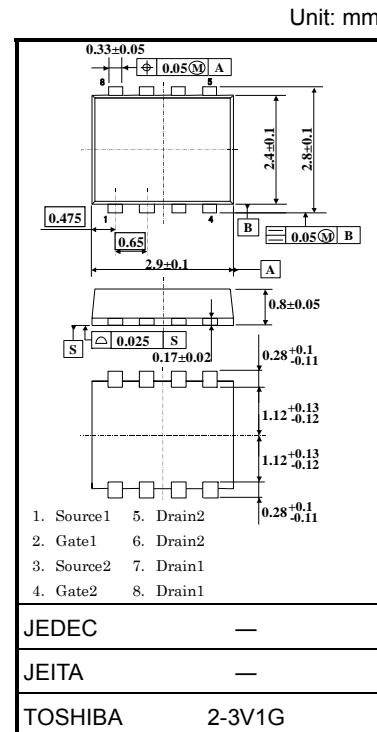
- Lead(Pb)-Free
- Low drain-source ON resistance
 : $R_{DS\ (ON)} = 38\ m\Omega$ (typ.)
- High forward transfer admittance
 : $|Y_{fs}| = 7.0\ S$ (typ.)
- Low leakage current
 : $ID_{SS} = 10\ \mu A$ ($V_{DS} = 30\ V$)
- Enhancement mode
 : $V_{th} = 1.3$ to $2.5\ V$ ($V_{DS} = 10\ V$, $ID = 1mA$)

Maximum Ratings ($T_a = 25^\circ C$)

Characteristics		Symbol	Rating	Unit
Drain-source voltage		V_{DSS}	30	V
Drain-gate voltage ($R_{GS} = 20\ k\Omega$)		V_{DGR}	30	V
Gate-source voltage		V_{GSS}	± 20	V
Drain current	DC (Note 1)	I_D	4.2	A
	Pulse (Note 1)	I_{DP}	16.8	
Drain power dissipation ($t = 5\ s$) (Note 2a)	Single-device operation (Note 3a)	$P_D\ (1)$	1.48	W
	Single-device value at dual operation (Note 3b)	$P_D\ (2)$	1.23	
Drain power dissipation ($t = 5\ s$) (Note 2b)	Single-device operation (Note 3a)	$P_D\ (1)$	0.58	W
	Single-device value at dual operation (Note 3b)	$P_D\ (2)$	0.36	
Single pulse avalanche energy (Note 4)		E_{AS}	2.86	mJ
Avalanche current		I_{AR}	2.1	A
Repetitive avalanche energy Single-device value at dual operation (Note 2a, 3b, 5)		E_{AR}	0.12	mJ
Channel temperature		T_{ch}	150	°C
Storage temperature range		T_{stg}	-55~150	°C

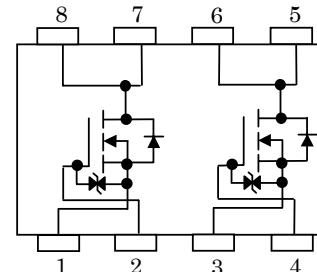
Note: For Notes 1 to 6, refer to the next page.

This transistor is an electrostatic-sensitive device. Handle with caution.

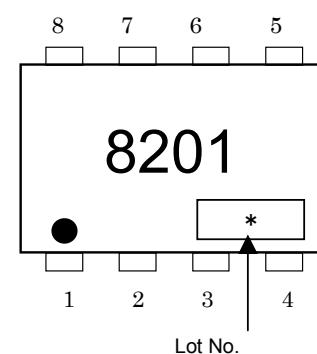


Weight: 0.017 g (typ.)

Circuit Configuration



Marking (Note 6)

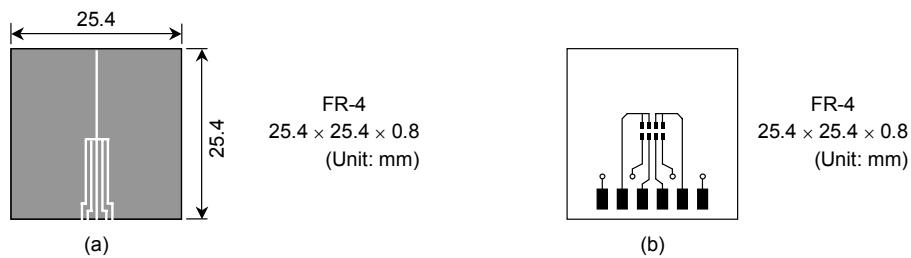


Thermal Characteristics

Characteristics		Symbol	Max	Unit
Thermal resistance, channel to ambient ($t = 5$ s) (Note 2a)	Single-device operation (Note 3a)	R_{th} (ch-a) (1)	84.5	°C/W
	Single-device value at dual operation (Note 3b)	R_{th} (ch-a) (2)	101.6	
Thermal resistance, channel to ambient ($t = 5$ s) (Note 2b)	Single-device operation (Note 3a)	R_{th} (ch-a) (1)	215.5	°C/W
	Single-device value at dual operation (Note 3b)	R_{th} (ch-a) (2)	347.2	

Note 1: The channel temperature should not exceed 150°C during use.

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



Note 3: 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.)

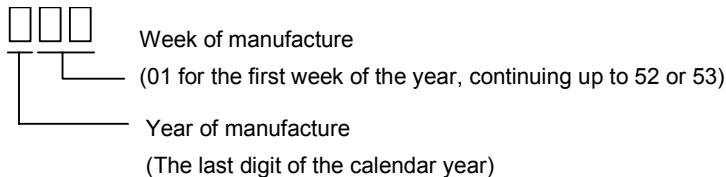
b) The power dissipation and thermal resistance values shown are for a single device.
(During dual operation, power is evenly applied to both devices.)

Note 4: $V_{DD} = 24$ V, $T_{ch} = 25^\circ\text{C}$ (initial), $L = 0.5$ mH, $R_G = 25 \Omega$, $I_{AR} = 2.1$ A

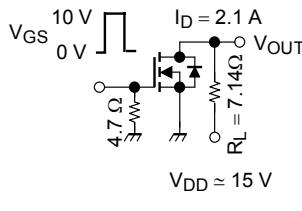
Note 5: Repetitive rating: pulse width limited by maximum channel temperature.

Note 6: ● on the lower left of the marking indicates Pin 1.

※ Weekly code (3 digits):

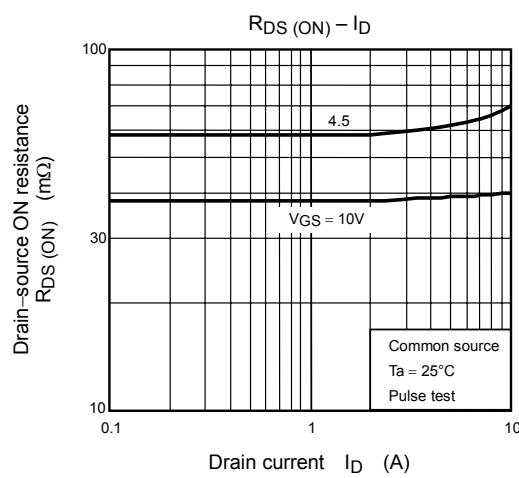
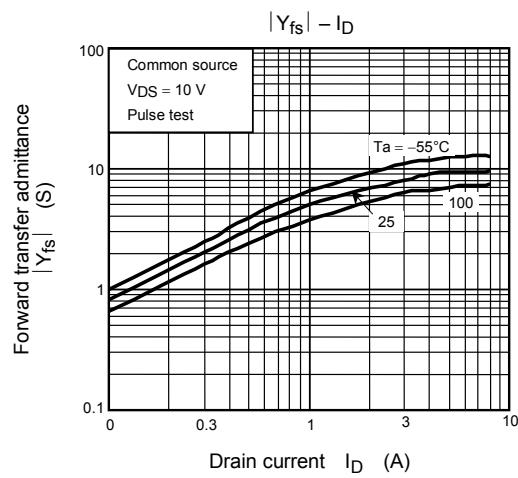
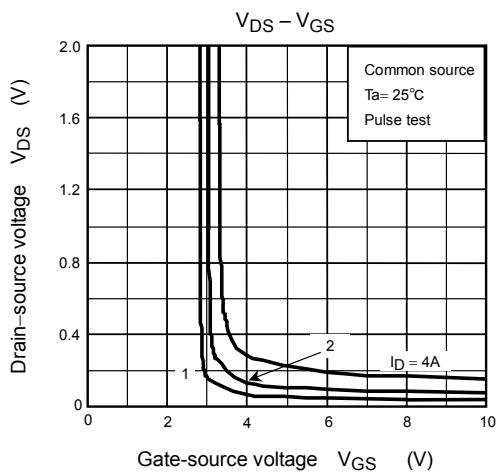
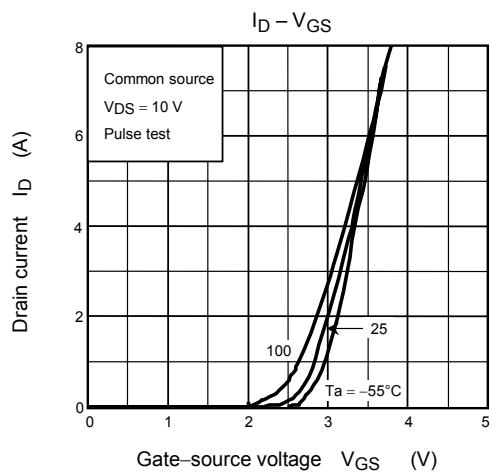
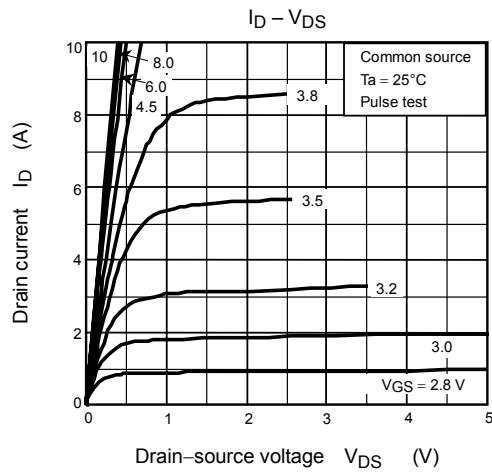
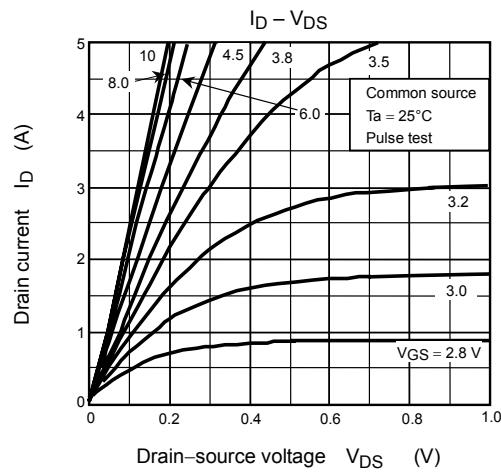


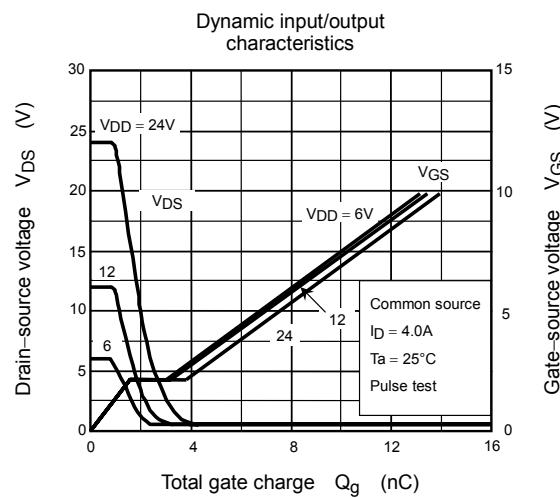
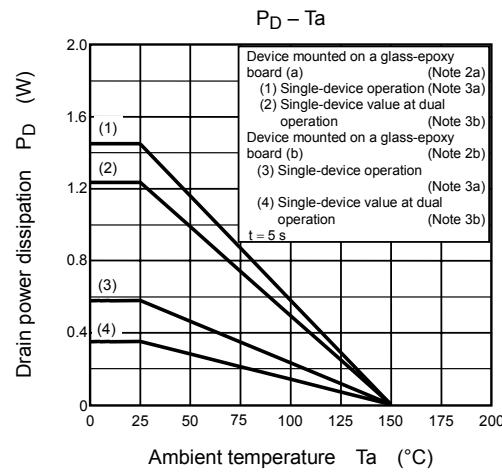
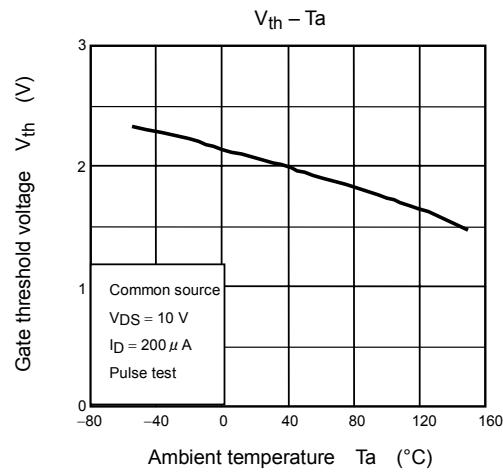
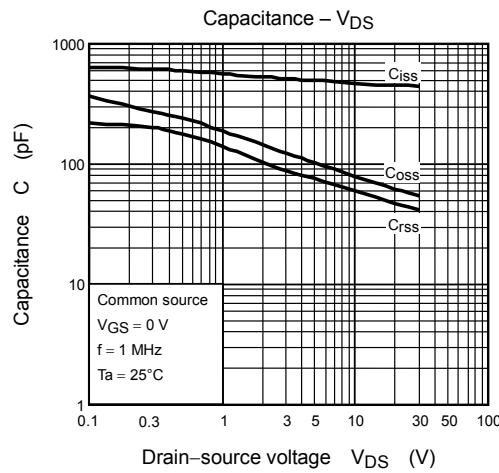
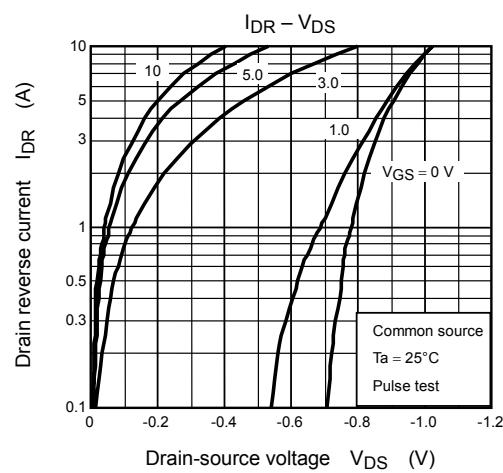
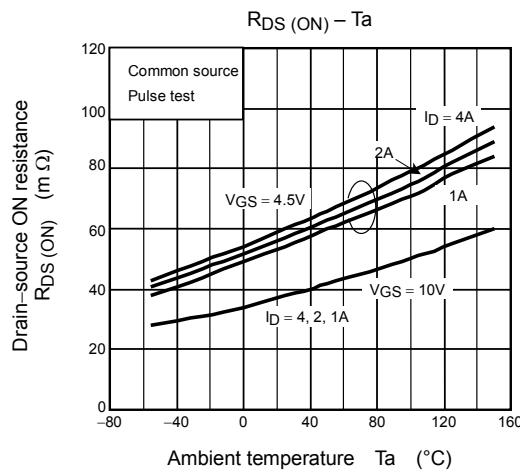
Electrical Characteristics (Ta = 25°C)

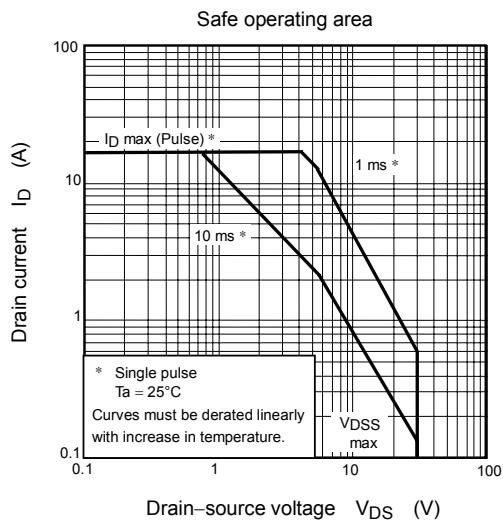
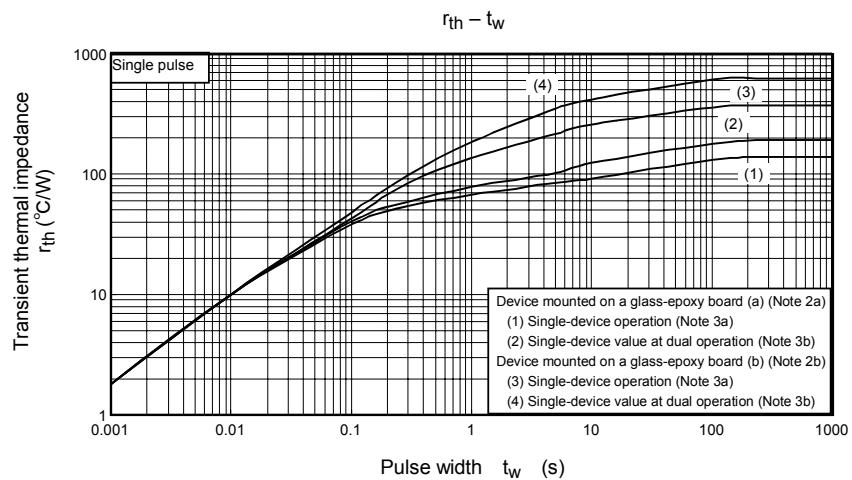
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current	I _{GSS}	V _{GS} = ±16 V, V _{DS} = 0 V	—	—	±10	µA
Drain cut-off current	I _{DSS}	V _{DS} = 30 V, V _{GS} = 0 V	—	—	10	µA
Drain-source breakdown voltage	V _{(BR) DSS}	I _D = 10 mA, V _{GS} = 0 V	30	—	—	V
	V _{(BR) DSX}	I _D = 10 mA, V _{GS} = -20 V	15	—	—	
Gate threshold voltage	V _{th}	V _{DS} = 10 V, I _D = 1 mA	1.3	—	2.5	V
Drain-source ON resistance	R _{DSS} (ON)	V _{GS} = 4.5 V, I _D = 2.1 A	—	58	77	mΩ
		V _{GS} = 10 V, I _D = 2.1 A	—	38	50	
Forward transfer admittance	Y _{fs}	V _{DS} = 10 V, I _D = 2.1 A	3.5	7.0	—	S
Input capacitance	C _{iss}	V _{DS} = 10 V, V _{GS} = 0 V, f = 1 MHz	—	470	—	pF
Reverse transfer capacitance	C _{rss}		—	60	—	
Output capacitance	C _{oss}		—	80	—	
Switching time	Rise time	t _r	 V _{GS} 10 V 0 V ID = 2.1 A V _{OUT} 4.7 pF RL = 7.14Ω V _{DD} ≈ 15 V Duty ≤ 1%, t _W = 10 µs	—	5.2	ns
	Turn-on time	t _{on}		—	8.3	
	Fall time	t _f		—	4.0	
	Turn-off time	t _{off}		—	22	
Total gate charge (gate-source plus gate-drain)	Q _g	V _{DD} ≈ 24 V, V _{GS} = 10 V, I _D = 6 A	—	10	—	nC
Gate-source charge 1	Q _{gs1}		—	1.7	—	
Gate-drain ("miller") charge	Q _{gd}		—	2.4	—	

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

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Drain reverse current	I _{DRP}	—	—	—	16.8	A
Forward voltage (diode)	V _{DSF}	I _{DR} = 4.2 A, V _{GS} = 0 V	—	—	-1.2	V







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