

TPC8204

Lithium Ion Battery Applications

Portable Equipment Applications

Notebook PCs

- Small footprint due to small and thin package
- Low drain–source ON resistance : $R_{DS(ON)} = 16 \text{ m}\Omega$ (typ.)
- High forward transfer admittance : $|Y_{fs}| = 18 \text{ S}$ (typ.)
- Low leakage current : $ID_{SS} = 10 \text{ }\mu\text{A}$ (max) ($V_{DS} = 20 \text{ V}$)
- Enhancement–mode : $V_{th} = 0.5\text{--}1.2 \text{ V}$ ($V_{DS} = 10 \text{ V}$, $ID = 200 \text{ }\mu\text{A}$)

Maximum Ratings (Ta = 25°C)

Characteristics		Symbol	Rating	Unit
Drain-source voltage		V _{DSS}	20	V
Drain-gate voltage (R _{GS} = 20kΩ)		V _{DGR}	20	V
Gate-source voltage		V _{GSS}	±12	V
Drain current	D C (Note 1)	I _D	6	A
	Pulse	I _{DP}	24	
Drain power dissipation (t = 10s) (Note 2a)	Single-device operation (Note 3a)	P _D (1)	1.5	W
	Single-device value at dual operation (Note 3b)	P _D (2)	1.1	
Drain power dissipation (t = 10s) (Note 2b)	Single-device operation (Note 3a)	P _D (1)	0.75	W
	Single-device value at dual operation (Note 3b)	P _D (2)	0.45	
Single pulse avalanche energy (Note 4)		E _{AS}	46.8	mJ
Avalanche current (Note 1)		I _{AR}	6	A
Repetitive avalanche energy Single-device value at operation (Note 2a, Note 3b, Note 5)		E _{AR}	0.1	mJ
Channel temperature		T _{ch}	150	°C
Storage temperature range		T _{stg}	-55~150	°C

Unit: mm

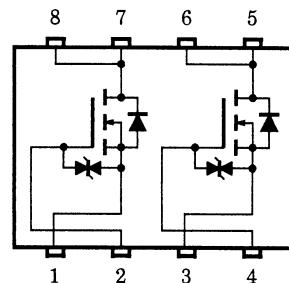
Technical drawing showing the top view dimensions and lead outlines for a MOSFET. The drawing includes:

- Top View Dimensions:**
 - Width: 8 mm
 - Height: 5 mm
 - Lead spacing: 0.4 ± 0.1 mm
 - Lead thickness: 0.25 ± 0.05 mm
 - Lead height: 4.4 ± 0.2 mm
 - Lead width: 6.0 ± 0.3 mm
 - Lead spacing from body: 0.595 ± 0.05 mm (labeled as 1.27 mm)
- Lead Outlines:**
 - JEDEC outline: Shows a 12-pin DIP package with pins 1, 2, 3 on the left and 4, 5, 6, 7, 8 on the right.
 - JEITA outline: Shows a 12-pin DIP package with pins 1, 2, 3 on the left and 4, 5, 6, 7, 8 on the right.
 - TOSHIBA outline: Shows a 12-pin DIP package with pins 1, 2, 3 on the left and 4, 5, 6, 7, 8 on the right.
- Pin Definitions:**

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

Weight: 0.080 g (typ.)

Circuit Configuration



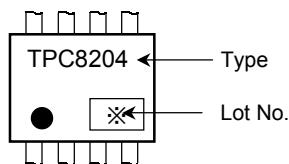
Note: For (Note 1), (Note 2a), (Note 2b), (Note 3a), (Note 3b), (Note 4) and (Note 5) please refer to the next page.

This transistor is an electrostatic sensitive device. Please handle with caution.

Thermal Characteristics

Characteristics	Symbol	Max	Unit
Thermal resistance, channel to ambient ($t = 10s$) (Note 2a)	Single-device operation (Note 3a)	R_{th} (ch-a) (1)	83.3
	Single-device value at dual operation (Note 3b)	R_{th} (ch-a) (2)	114
Thermal resistance, channel to ambient ($t = 10s$) (Note 2b)	Single-device operation (Note 3a)	R_{th} (ch-a) (1)	167
	Single-device value at dual operation (Note 3b)	R_{th} (ch-a) (2)	278

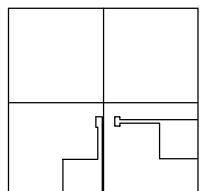
Marking (Note 6)



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

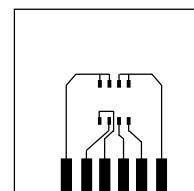
Note 2:

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



(a)

FR-4
25.4 × 25.4 × 0.8
(Unit: mm)



(b)

FR-4
25.4 × 25.4 × 0.8
(Unit: mm)

Note 3:

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

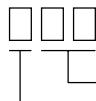
b) The power dissipation and thermal resistance values are shown for a single device
(During dual operation, power is evenly applied to both devices.).

Note 4: $V_{DD} = 16$ V, $T_{ch} = 25^\circ\text{C}$ (initial), $L = 1.0$ mH, $R_G = 25$ Ω, $I_{AR} = 6$ A

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

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

※ Weekly code:(Three digits)



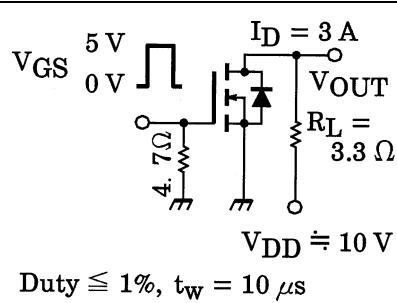
Week of manufacture

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

Year of manufacture

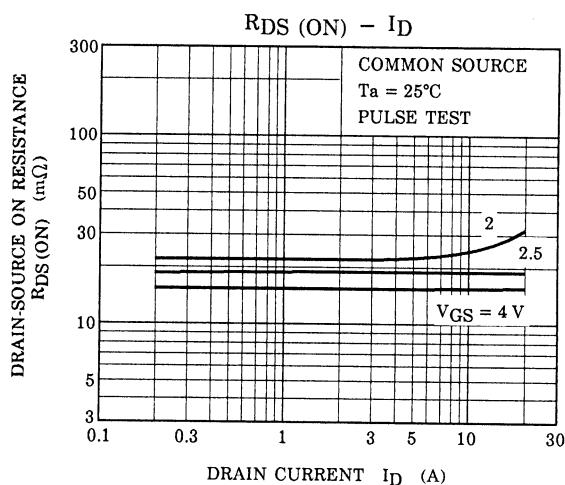
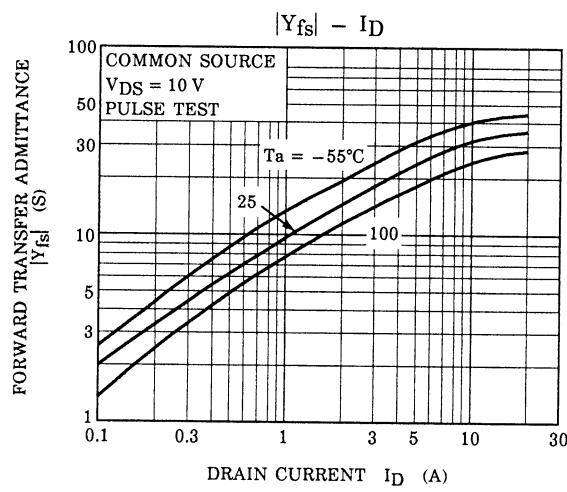
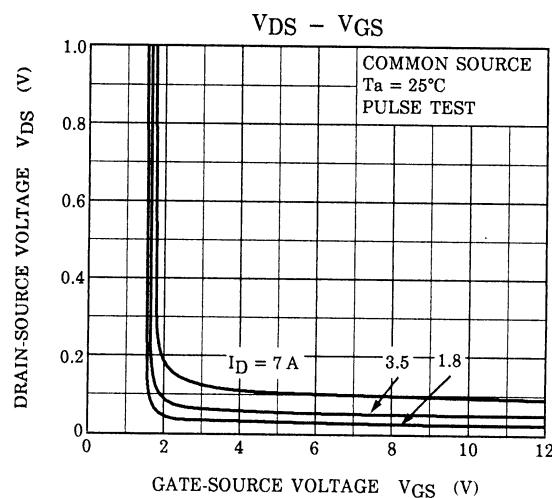
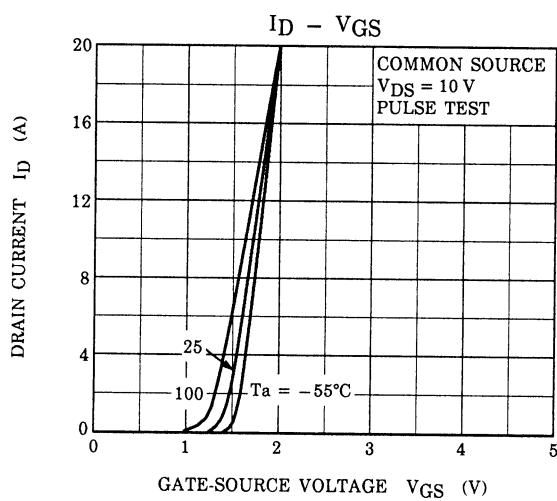
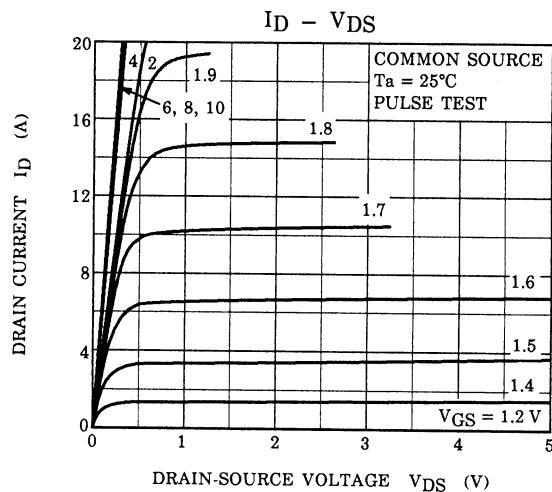
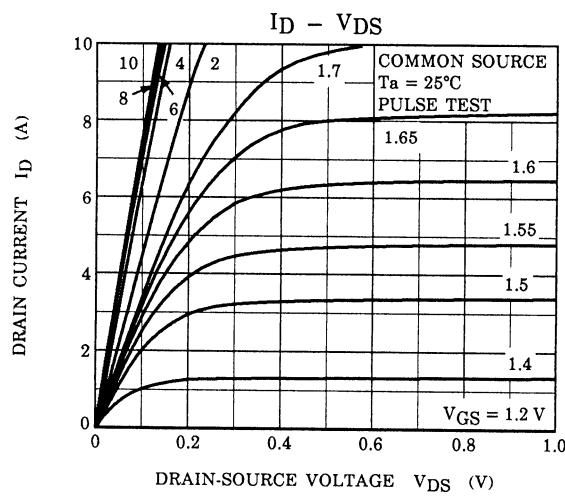
(One low-order digits of calendar year)

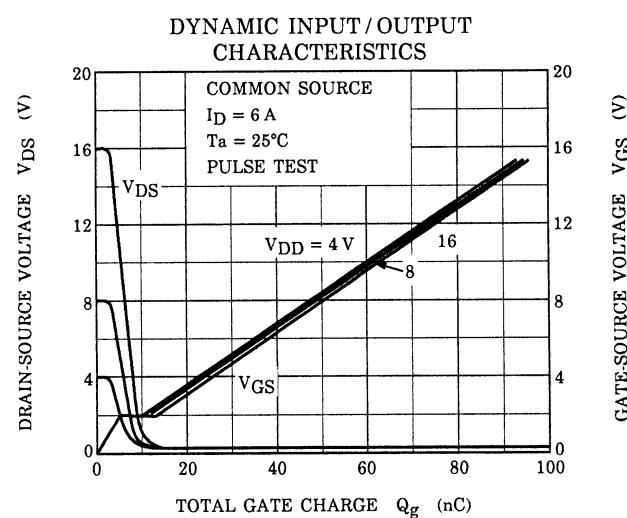
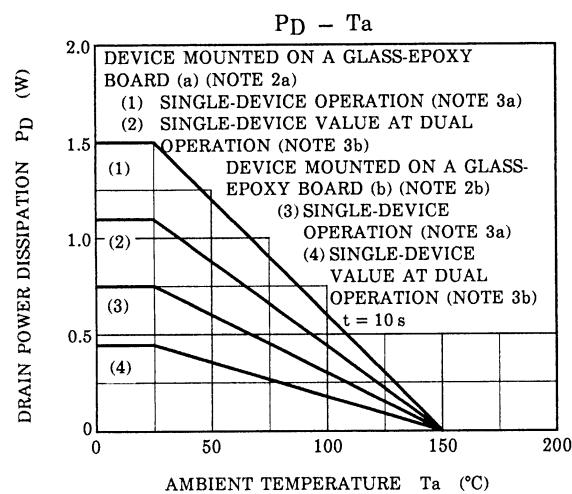
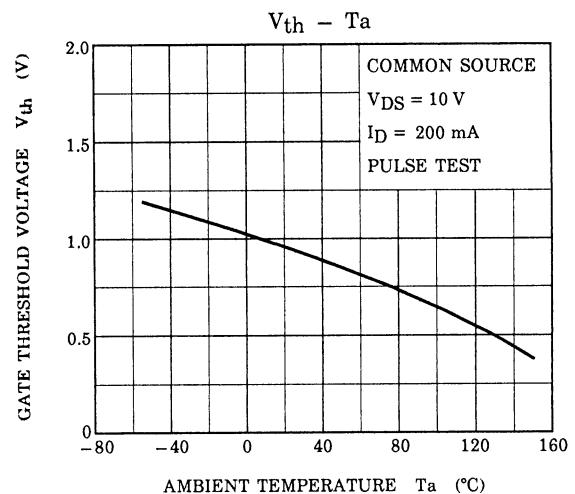
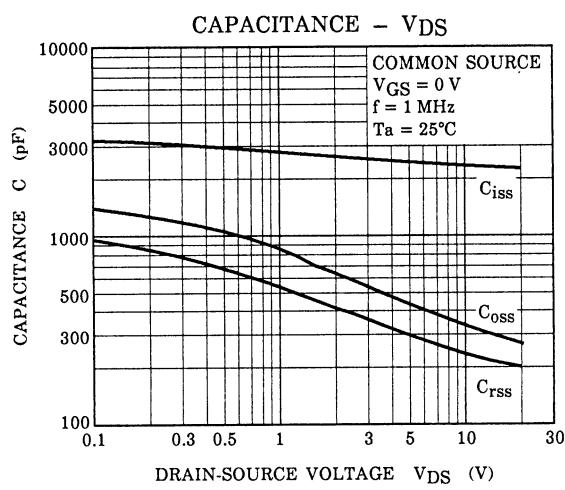
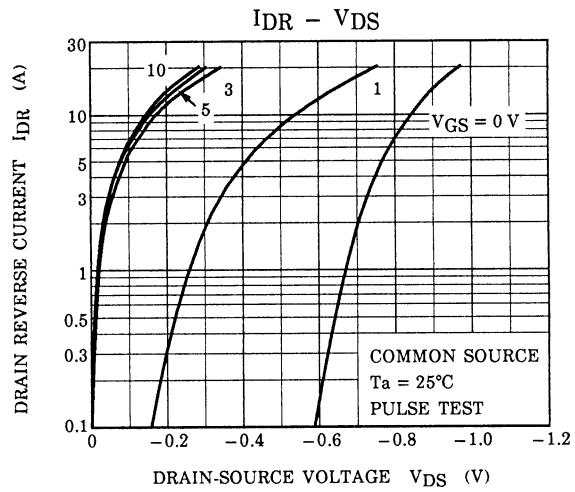
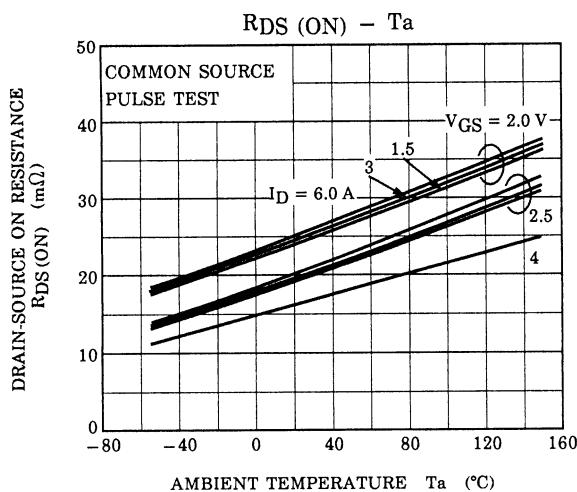
Electrical Characteristics (Ta = 25°C)

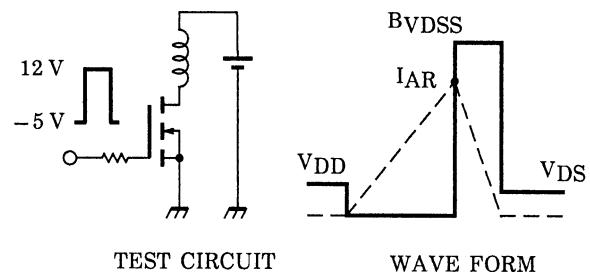
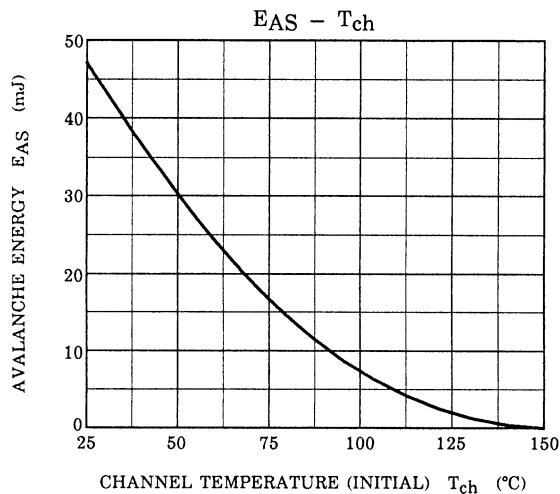
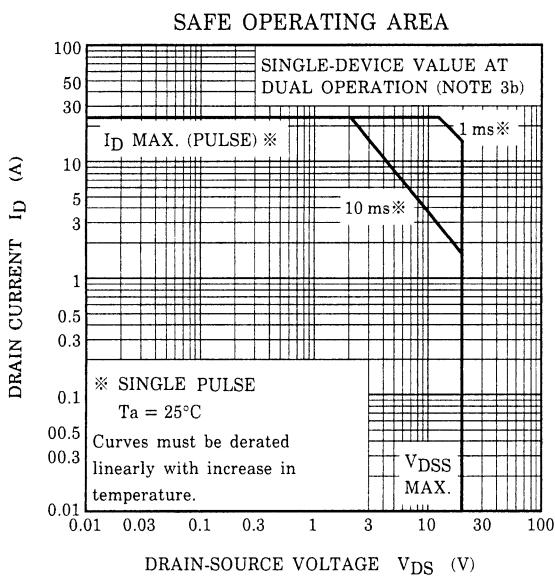
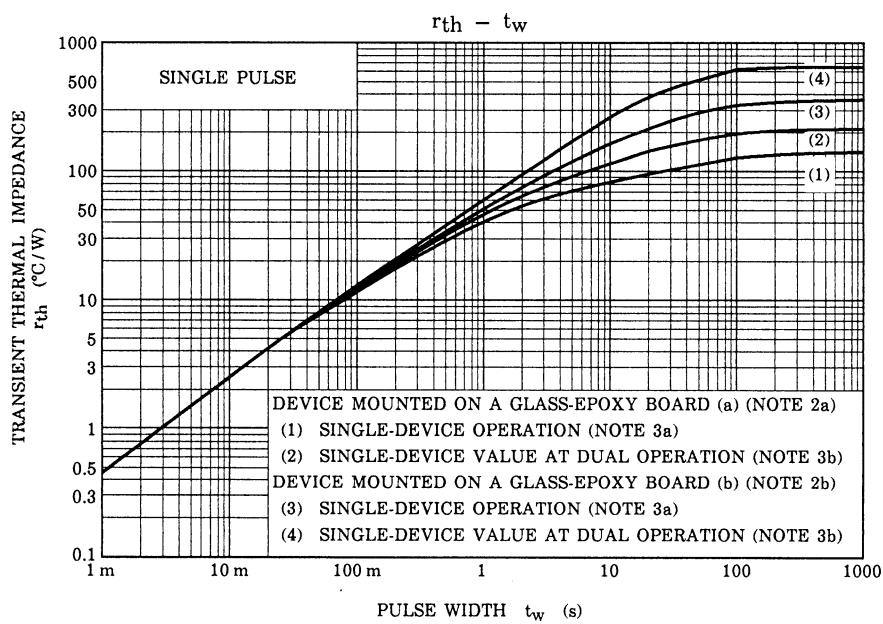
Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current	I _{GSS}	V _{GS} = ±10 V, V _{DS} = 0 V	—	—	±10	µA
Drain cut-off current	I _{DSS}	V _{DS} = 20 V, V _{GS} = 0 V	—	—	10	µA
Drain-source breakdown voltage	V (BR) DSS	I _D = 10 mA, V _{GS} = 0 V	20	—	—	V
	V (BR) DSX	I _D = 10 mA, V _{GS} = -12 V	15	—	—	
Gate threshold voltage	V _{th}	V _{DS} = 10 V, I _D = 200 µA	0.5	—	1.2	V
Drain-source ON resistance	R _{DS} (ON)	V _{GS} = 2 V, I _D = 3 A	—	22	45	mΩ
	R _{DS} (ON)	V _{GS} = 2.5 V, I _D = 3 A	—	19	30	
	R _{DS} (ON)	V _{GS} = 4 V, I _D = 3 A	—	16	20	
Forward transfer admittance	Y _{fs}	V _{DS} = 10 V, I _D = 3 A	8.5	17	—	S
Input capacitance	C _{iss}	V _{DS} = 10 V, V _{GS} = 0 V, f = 1 MHz	—	2740	—	pF
Reverse transfer capacitance	C _{rss}		—	520	—	
Output capacitance	C _{oss}		—	600	—	
Switching time	Rise time	t _r		—	3	ns
	Turn-on time	t _{on}		—	12	
	Fall time	t _f		—	21	
	Turn-off time	t _{off}		—	102	
Total gate charge (gate-source plus gate-drain)	Q _g	V _{DD} ≈ 16 V, V _{GS} = 5 V, I _D = 6 A	—	31	—	nC
Gate-source charge	Q _{gs}		—	24	—	
Gate-drain ("miller") charge	Q _{gd}		—	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}	—	—	—	24	A
Forward voltage (diode)		V _{DSF}	I _{DR} = 6 A, V _{GS} = 0 V	—	—	-1.2	V







$T_{ch} = 25^\circ\text{C}$ (Initial)
 Peak $I_{AR} = 6 \text{ A}$, $R_G = 25 \Omega$ $E_{AS} = \frac{1}{2} \cdot L \cdot I^2 \cdot \left(\frac{B_{VDSS}}{B_{VDSS} - V_{DD}} \right)$
 $V_{DD} = 16 \text{ V}$, $L = 1.0 \text{ mH}$

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