

TPCT4202

Lithium Ion Battery Applications

- Lead(Pb)-Free
- Small footprint due to small and thin package
- Low drain-source ON resistance: $R_{DS(ON)} = 30.5m\Omega$ (typ.)
- High forward transfer admittance: $|Y_{fs}| = 15S$ (typ.)
- Low leakage current: $I_{SSS} = 10 \mu A$ (max) ($V_{DS} = 30 V$)
- Enhancement-mode: $V_{th} = 0.5 \sim 1.2 V$ ($V_{SS} = 10 V, I_S = 200 \mu A$)
- Common drain

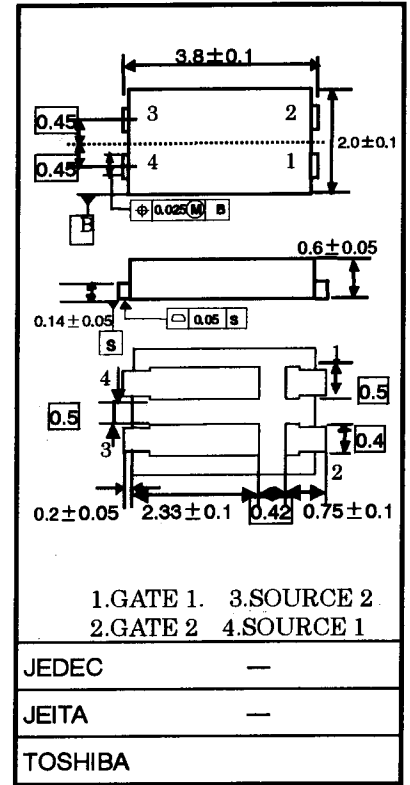
Maximum Ratings (Ta = 25°C)

Characteristics		Symbol	Rating	Unit
Source-source voltage		V_{SS}	30	V
Gate-source voltage		V_{GS}	± 12	V
Drain current	DC (Note 1)	I_S	6	A
	Pulse (Note 1)	I_{SP}	24	
Drain power dissipation (t = 10 s) (Note 2a)	Single-device value at dual operation (Note 3)	P_D	1.7	W
	Single-device value at dual operation (Note 3)	P_D	0.51	
Single pulse avalanche energy (Note 4)		E_{AS}	46.8	mJ
Avalanche current		I_{AR}	6	A
Repetitive avalanche energy Single-device value at dual operation (Note 2a, 3, 5)		E_{AR}	0.17	mJ
Channel temperature		T_{ch}	150	°C
Storage temperature range		T_{stg}	-55~150	°C

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

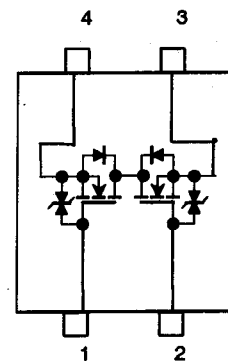
This transistor is an electrostatic sensitive device. Please handle with caution.

Unit: mm



Weight: 0.010 g (typ.)

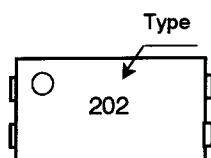
Circuit Configuration



Thermal Characteristics

Characteristics		Symbol	Max	Unit
Thermal resistance, channel to ambient (t = 10 s) (Note 2a)	Single-device value at dual operation (Note 3)	$R_{th(ch-a)}$	76	°C/W
Thermal resistance, channel to ambient (t = 10 s) (Note 2b)	Single-device value at dual operation (Note 3)	$R_{th(ch-a)}$	244	°C/W

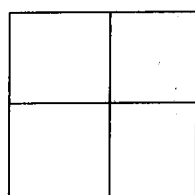
Marking (Note 5)



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

Note 2:

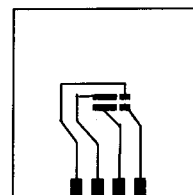
(a) Device mounted on a glass-epoxy board



FR-4
25.4 × 25.4 × 0.8
(unit: mm)

(a)

(b) Device mounted on a glass-epoxy board



FR-4
25.4 × 25.4 × 0.8
(unit: mm)

(b)

Note 3: 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: $V_{DD} = 24\text{ V}$, $T_{ch} = 25^\circ\text{C}$ (initial), $L = 1.0\text{ mH}$, $R_G = 25\ \Omega$, $I_{AR} = 6\text{ A}$

Note 5: Repetitive rating: pulse width limited by max channel temperature

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

Electrical Characteristics (Ta = 25°C)

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current		I_{GSS}	$V_{GS} = \pm 10\text{ V}, V_{SS} = 0\text{ V}$	—	—	± 10	μA
Source cut-OFF current		I_{SSS}	$V_{SS} = 30\text{ V}, V_{GS} = 0\text{ V}$	—	—	10	μA
Source -source breakdown voltage		$V_{(BR) SSS}$	$I_S = 10\text{ mA}, V_{GS} = 0\text{ V}$	30	—	—	V
		$V_{(BR) SSX}$	$I_S = 10\text{ mA}, V_{GS} = -12\text{ V}$	15	—	—	
Gate threshold voltage		V_{th}	$V_{SS} = 10\text{ V}, I_S = 200\ \mu\text{A}$	0.5	—	1.2	V
Source -source ON resistance		$R_{SS} (ON)$	$V_{GS} = 2.5\text{ V}, I_S = 3\text{ A}$	30	40	52	m Ω
			$V_{GS} = 4.0\text{ V}, I_S = 3\text{ A}$	26	32	39	
			$V_{GS} = 4.5\text{ V}, I_S = 3\text{ A}$	24	30.5	38	
Forward transfer admittance		$ Y_{fs} $	$V_{SS} = 10\text{ V}, I_S = 3\text{ A}$	7.5	15	—	S
Input capacitance		C_{iss}	$V_{SS} = 10\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$	—	1540	—	pF
Reverse transfer capacitance		C_{rSS}		—	180	—	
Output capacitance		C_{oss}		—	250	—	
Switching time	Rise time	t_r	<p>$V_{GS} = 5\text{ V}$ 0 V $I_S = 3\text{ A}$ $V_{SS} = 15\text{ V}$ $R_L = 5\ \Omega$ Duty $\leq 1\%$, $t_w = 10\ \mu\text{s}$</p>	—	34	—	ns
	Turn-ON time	t_{on}		—	41	—	
	Fall time	t_f		—	60	—	
	Turn-OFF time	t_{off}		—	161	—	
Total gate charge (gate-source plus gate-drain)		Q_g	$V_{SS} = 24\text{ V}, V_{GS} = 5\text{ V}, I_D = 6\text{ A}$	—	21	—	nC
Gate-source charge 1		Q_{gs1}		—	3	—	
Gate- source ("miller") charge		Q_{gs}		—	6	—	

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

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Source reverse current	Pulse (Note 1)	I_{SRP}	—	—	—	24	A
Forward voltage (diode)		V_{SSF}	$I_{SR} = 6\text{ A}, V_{GS} = 0\text{ V}$	—	—	-1.2	V

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