

TPC8115

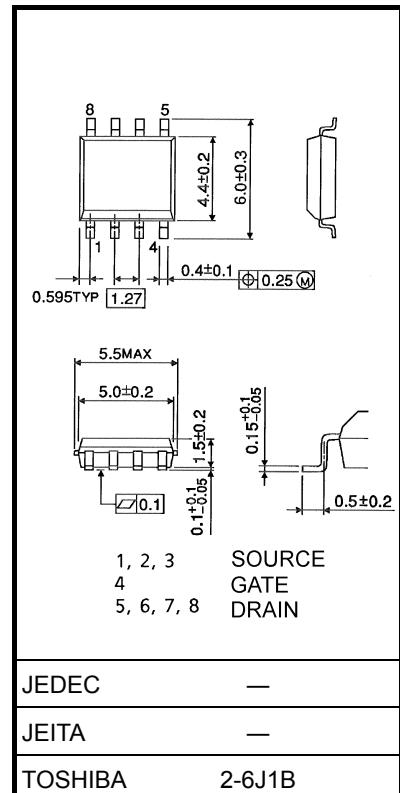
Lithium Ion Battery Applications

Notebook PC Applications

Portable Equipment Applications

Unit: mm

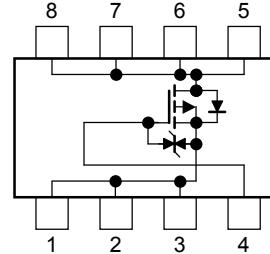
- Small footprint due to small and thin package
- Low drain-source ON resistance: $R_{DS(ON)} = 6.5 \text{ m}\Omega$ (typ.)
- High forward transfer admittance: $|Y_{fs}| = 40 \text{ S}$ (typ.)
- Low leakage current: $IDSS = -10 \text{ }\mu\text{A}$ (max) ($V_{DS} = -20 \text{ V}$)
- Enhancement mode: $V_{th} = -0.5 \text{ to } -1.2 \text{ V}$ ($V_{DS} = -10 \text{ V}$, $I_D = -1 \text{ mA}$)



Absolute Maximum Ratings (Ta = 25°C)

Characteristics	Symbol	Rating	Unit
Drain-source voltage	V _{DSS}	-20	V
Drain-gate voltage ($R_{GS} = 20\text{ k}\Omega$)	V _{DGR}	-20	V
Gate-source voltage	V _{GSS}	± 8	V
Drain current	DC (Note 1)	I _D	-10
	Pulse (Note 1)	I _{DP}	-40
Drain power dissipation ($t = 10\text{ s}$) (Note 2a)	P _D	1.9	W
Drain power dissipation ($t = 10\text{ s}$) (Note 2b)	P _D	1.0	W
Single pulse avalanche energy (Note 3)	E _{AS}	26	mJ
Avalanche current	I _{AR}	-10	A
Repetitive avalanche energy (Note 2a) (Note 4)	E _{AR}	0.19	mJ
Channel temperature	T _{ch}	150	°C
Storage temperature range	T _{stg}	-55 to 150	°C

Circuit Configuration



Note: (Note 1), (Note 2), (Note 3) and (Note 4): See the next page.

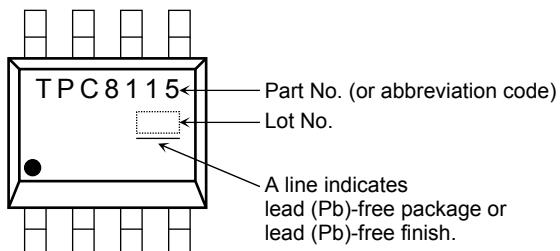
Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within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

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

Thermal Characteristics

Characteristics	Symbol	Max	Unit
Thermal resistance, channel to ambient ($t = 10$ s) (Note 2a)	R_{th} (ch-a)	65.8	°C/W
Thermal resistance, channel to ambient ($t = 10$ s) (Note 2b)	R_{th} (ch-a)	125	°C/W

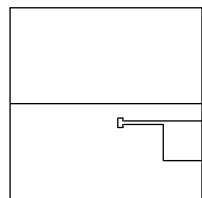
Marking (Note 5)



Note 1: Ensure that the channel temperature does not exceed 150°C.

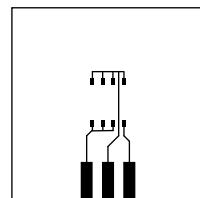
Note 2:

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



FR-4
25.4 × 25.4 × 0.8
(Unit: mm)

(a)



FR-4
25.4 × 25.4 × 0.8
(Unit: mm)

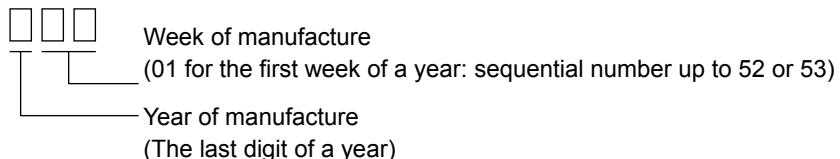
(b)

Note 3: $V_{DD} = -16$ V, $T_{ch} = 25^\circ\text{C}$ (initial), $L = 0.2$ mH, $R_G = 25 \Omega$, $I_{AR} = -10\text{A}$

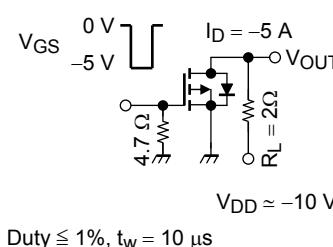
Note 4: Repetitive rating; pulse width limited by maximum channel temperature

Note 5: • on lower left of the marking indicates Pin 1.

※ Weekly code: (Three digits)

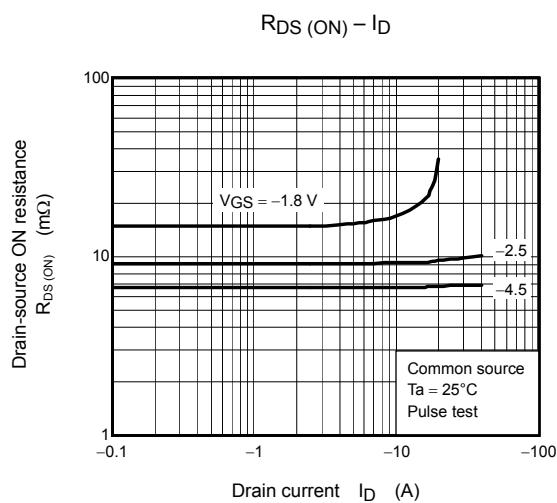
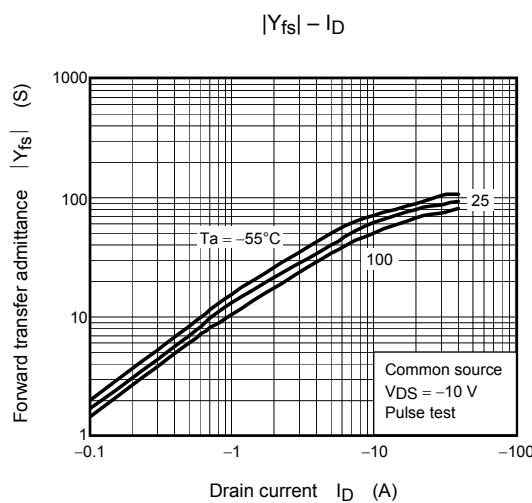
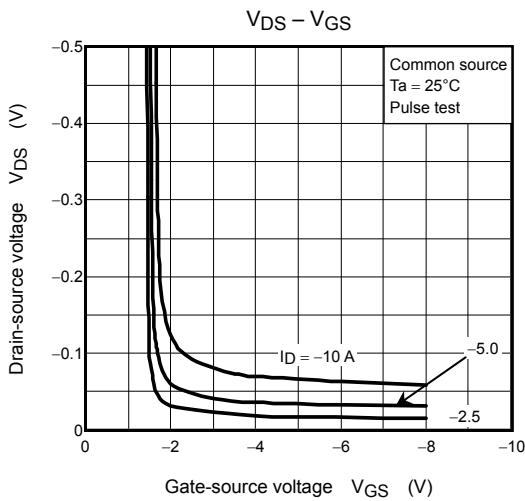
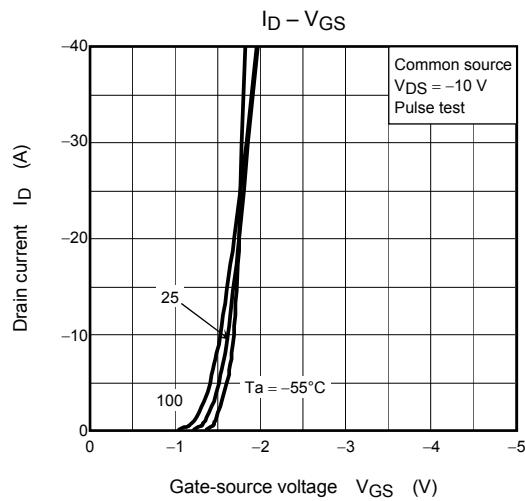
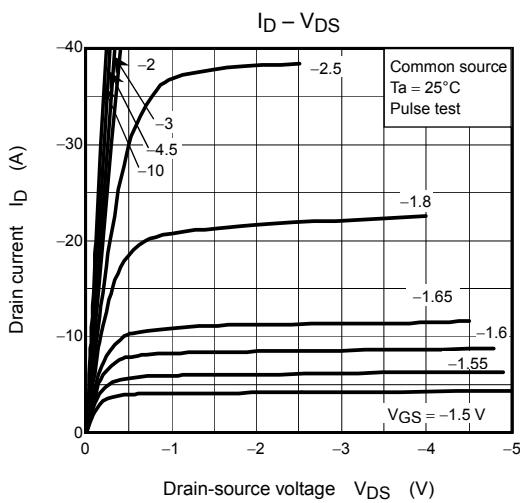
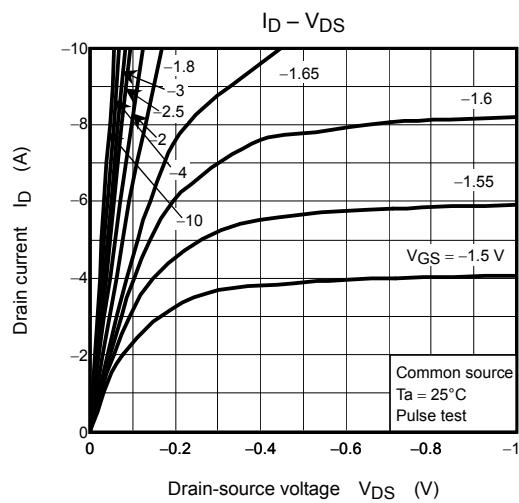


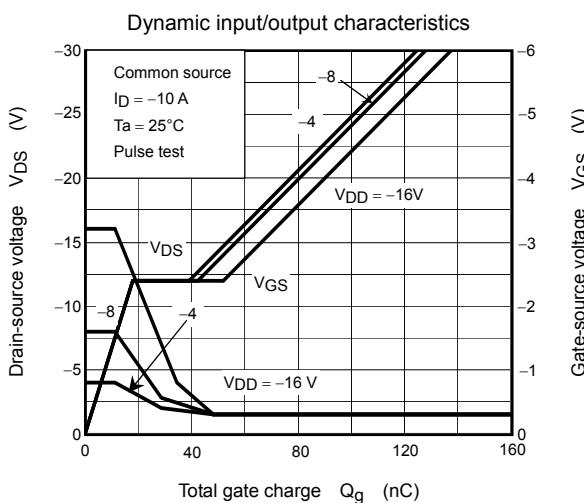
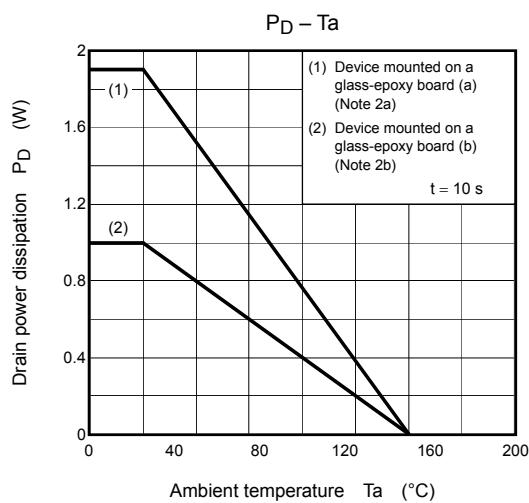
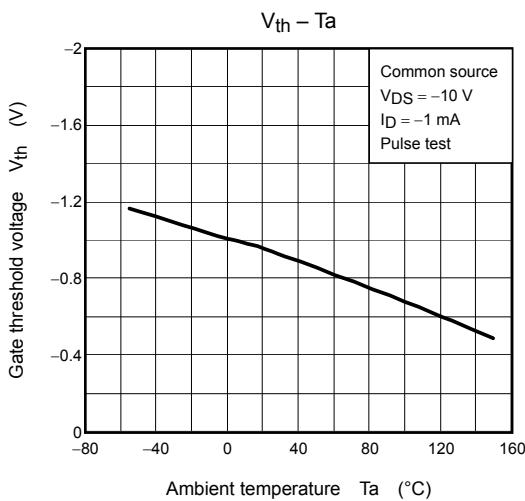
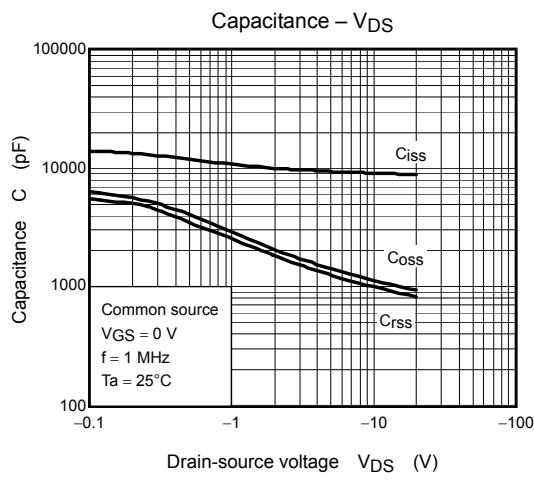
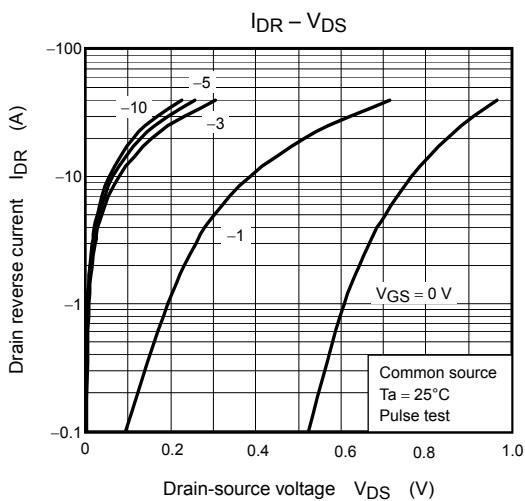
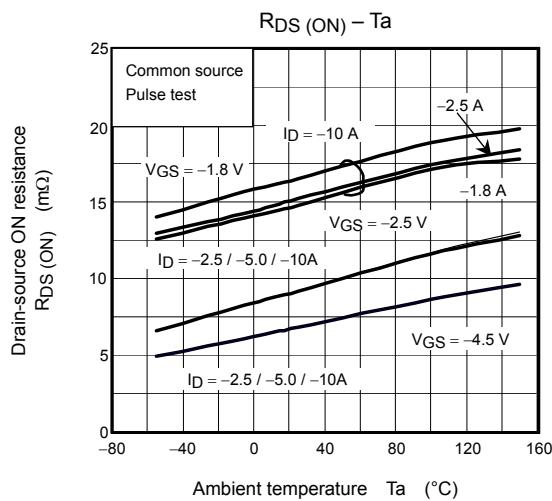
Electrical Characteristics ($T_a = 25^\circ\text{C}$)

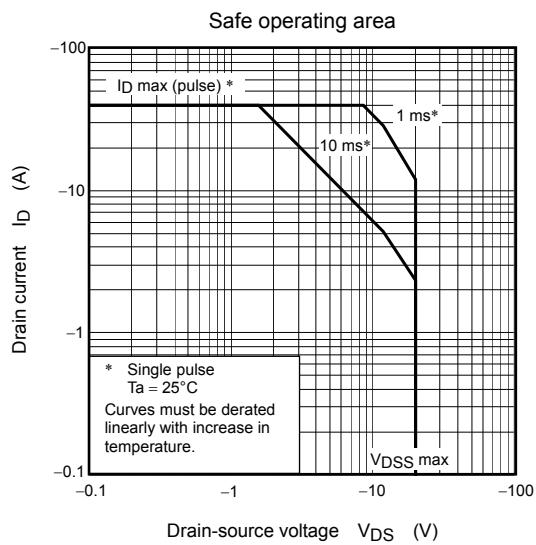
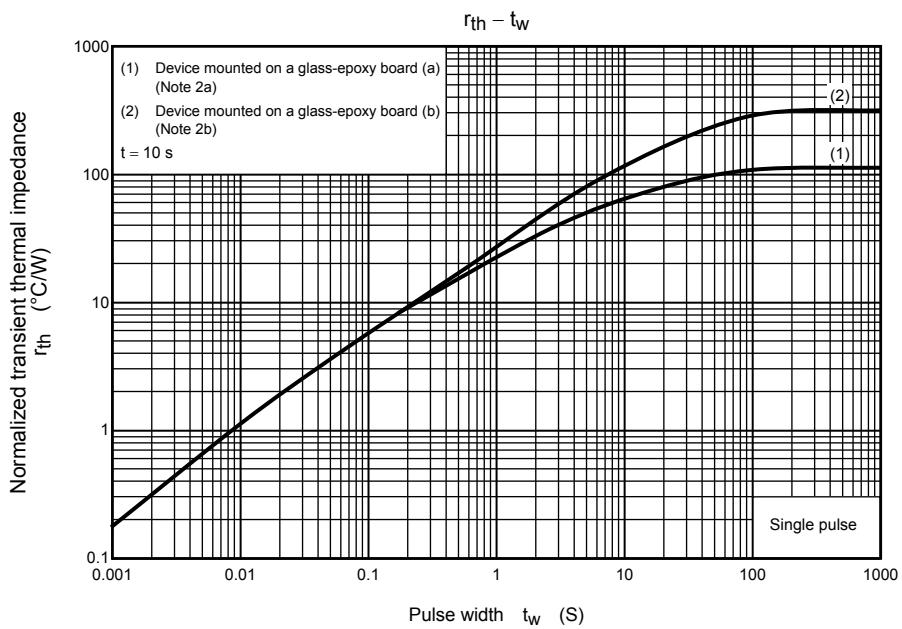
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit	
Gate leakage current	I_{GSS}	$V_{GS} = \pm 8 \text{ V}, V_{DS} = 0 \text{ V}$	—	—	± 10	μA	
Drain cut-OFF current	I_{DSS}	$V_{DS} = -20 \text{ V}, V_{GS} = 0 \text{ V}$	—	—	-10	μA	
Drain-source breakdown voltage	$V_{(\text{BR}) \text{ DSS}}$	$I_D = -10 \text{ mA}, V_{GS} = 0 \text{ V}$	-20	—	—	V	
	$V_{(\text{BR}) \text{ DSX}}$	$I_D = -10 \text{ mA}, V_{GS} = 8 \text{ V}$	-4	—	—		
Gate threshold voltage	V_{th}	$V_{DS} = -10 \text{ V}, I_D = -200 \mu\text{A}$	-0.5	—	-1.2	V	
Drain-source ON resistance	$R_{DS \text{ (ON)}}$	$V_{GS} = -1.8 \text{ V}, I_D = -5.0 \text{ A}$	—	15	30	$\text{m}\Omega$	
		$V_{GS} = -2.5 \text{ V}, I_D = -5.0 \text{ A}$	—	9.0	14		
		$V_{GS} = -4.5 \text{ V}, I_D = -5.0 \text{ A}$	—	6.5	10		
Forward transfer admittance	$ Y_{fs} $	$V_{DS} = -10 \text{ V}, I_D = -5.0 \text{ A}$	20	40	—	S	
Input capacitance	C_{iss}	$V_{DS} = -10 \text{ V}, V_{GS} = 0 \text{ V}, f = 1 \text{ MHz}$	—	9130	—	pF	
Reverse transfer capacitance	C_{rss}		—	1020	—		
Output capacitance	C_{oss}		—	1110	—		
Switching time	Rise time	t_r	 V_{GS} 0 V V_{GS} -5 V $I_D = -5 \text{ A}$ $R_L = 2 \Omega$ $V_{DD} \approx -10 \text{ V}$ Duty $\leq 1\%$, $t_w = 10 \mu\text{s}$	—	14	—	ns
	Turn-ON time	t_{on}		—	26	—	
	Fall time	t_f		—	228	—	
	Turn-OFF time	t_{off}		—	666	—	
Total gate charge (gate-source plus gate-drain)	Q_g	$V_{DD} \approx -16 \text{ V}, V_{GS} = -5 \text{ V},$ $I_D = -10 \text{ A}$	—	115	—	nC	
Gate-source charge 1	Q_{gs1}		—	18	—		
Gate-drain ("miller") charge	Q_{gd}		—	34	—		

Source-Drain Ratings and Characteristics ($T_a = 25^\circ\text{C}$)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Drain reverse current	I_{DRP}	—	—	—	-40	A
Forward voltage (diode)	V_{DSF}	$I_{DR} = -10 \text{ A}, V_{GS} = 0 \text{ V}$	—	—	1.2	V







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