

TPCF8003

Notebook PC Applications

Portable Equipment Applications

- Small footprint due to small and thin package
- Low drain-source ON-resistance: $R_{DS(ON)} = 14 \text{ m}\Omega$ (typ.)
($V_{GS} = 4.5 \text{ V}$)
- Low leakage current: $ID_{SS} = 10 \text{ }\mu\text{A}$ (max) ($V_{DS} = 20 \text{ V}$)
- Enhancement mode: $V_{th} = 0.5 \text{ to } 1.2 \text{ V}$
($V_{DS} = 10 \text{ V}$, $ID = 200 \text{ }\mu\text{A}$)

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}	±12	V
Drain current	DC (Note 1)	I _D	7	A
	Pulse (Note 1)	I _{DP}	28	
Drain power dissipation (t = 5 s) (Note 2a)		P _D	2.5	W
Drain power dissipation (t = 5 s) (Note 2b)		P _D	0.7	W
Single pulse avalanche energy (Note 3)		E _{AS}	3.2	mJ
Avalanche current		I _{AR}	3.5	A
Channel temperature		T _{ch}	150	°C
Storage temperature range		T _{stg}	-55 to 150	°C

Unit: mm

2.9 ± 0.1

0.3 +0.1/-0.05

0.025 M A

8 5

1 4

0.65

1.5 ± 0.1

1.9 ± 0.1

0.8 ± 0.05

0.05 S

0.71 +0.04/-0.16

0.475

0.24 +0.10/-0.09

1. Drain 5. Source
2. Drain 6. Drain
3. Drain 7. Drain
4. Gate 8. Drain

JEDEC

JEITA

TOSHIBA 2SK11A

Weight: 0.011 g (typ.)

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.).

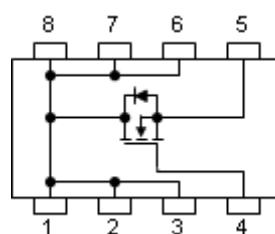
Thermal Characteristics

Characteristics	Symbol	Max	Unit
Thermal resistance, channel to ambient (t = 5 s) (Note 2a)	R _{th} (ch-a)	50.0	°C/W
Thermal resistance, channel to ambient (t = 5 s) (Note 2b)	R _{th} (ch-a)	178.6	°C/W

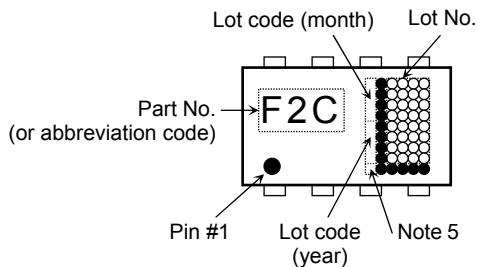
Note: For Notes 1 to 3, refer to the next page.

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

Circuit Configuration

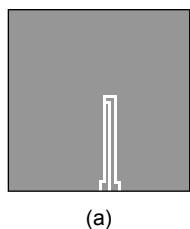


Start of commercial production 2009-10

Marking (Note 4)

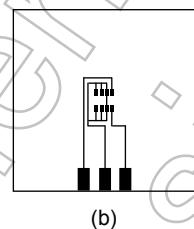
Note 1: Ensure that the channel temperature does not exceed 150°C.

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, $R_G = 25$ Ω , $I_{AR} = 3.5$ A

Note 4: • on lower left of the marking indicates Pin 1.

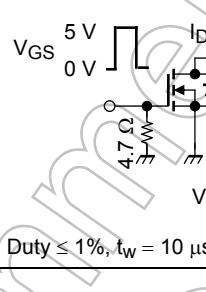
Note 5: A dot marking for identifying the indication of product Labels.

Without a dot: [[Pb]]/INCLUDES > MCV

With a dot: [[G]]/RoHS COMPATIBLE or [[G]]/RoHS [[Pb]]

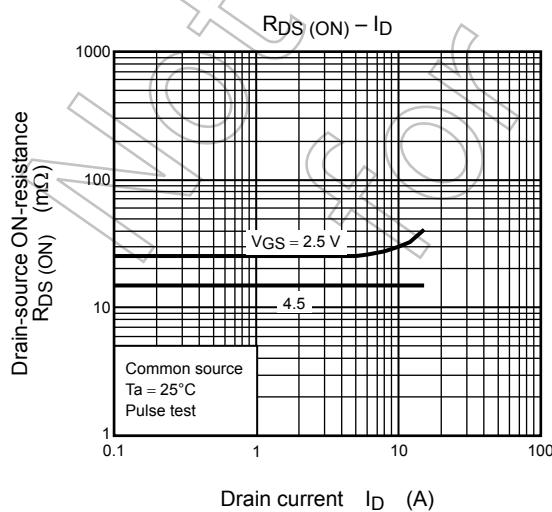
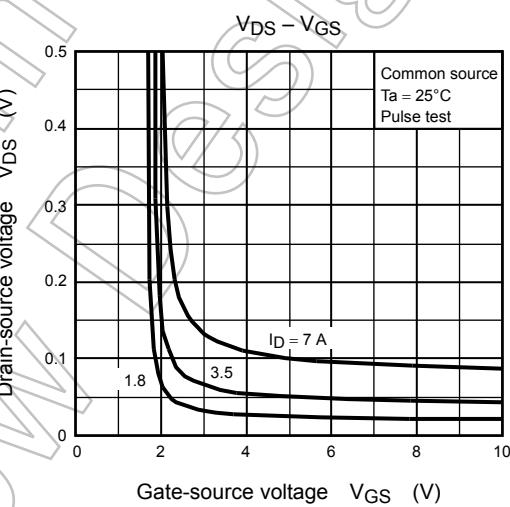
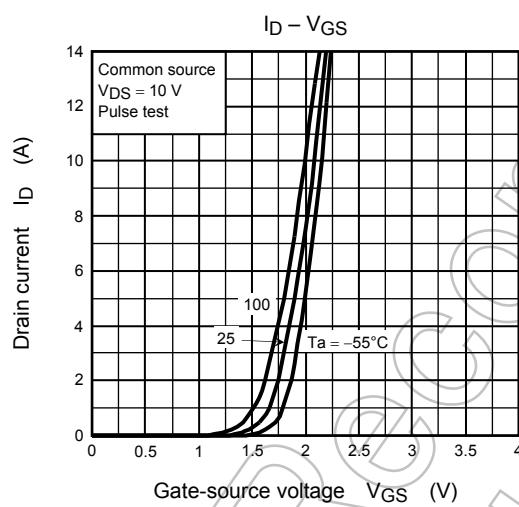
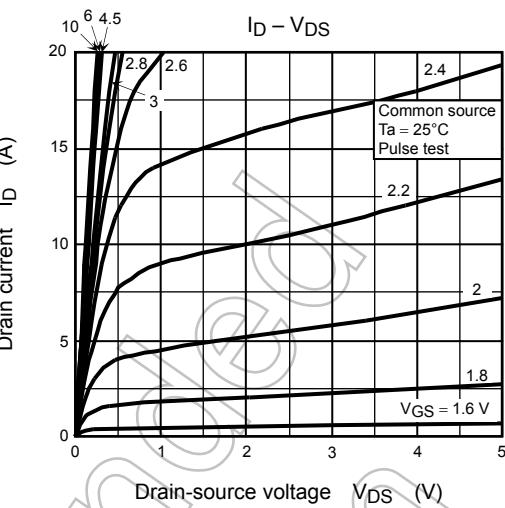
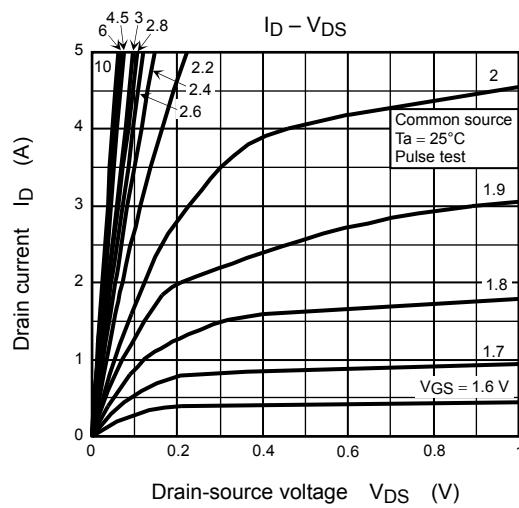
Please contact your TOSHIBA sales representative for details as to environmental matters such as the RoHS compatibility of Product. The RoHS is the Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

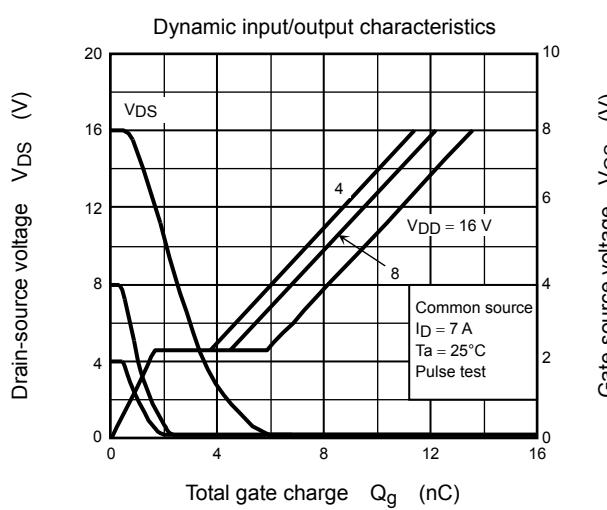
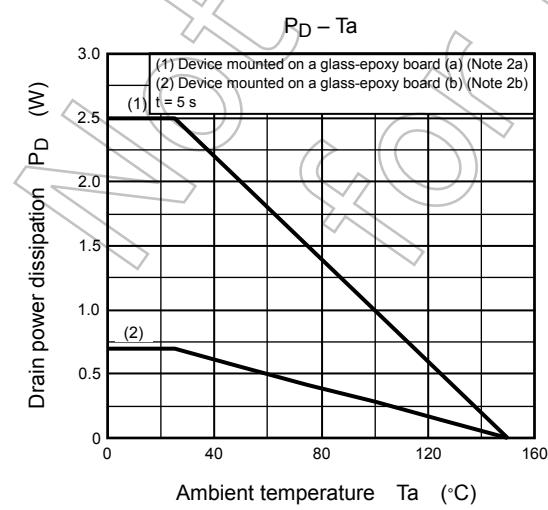
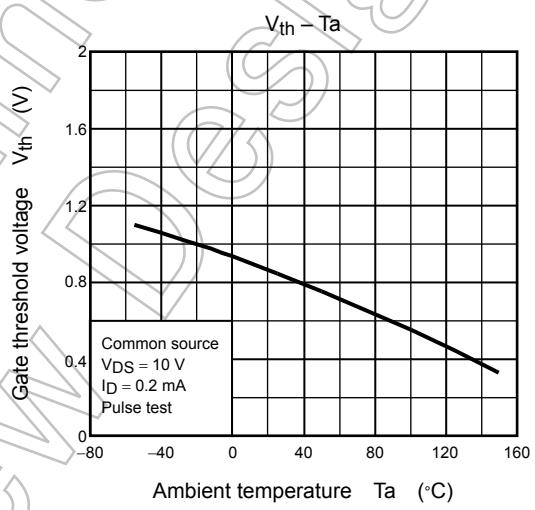
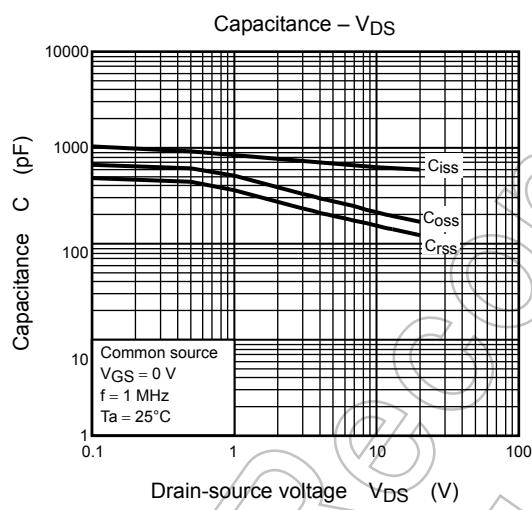
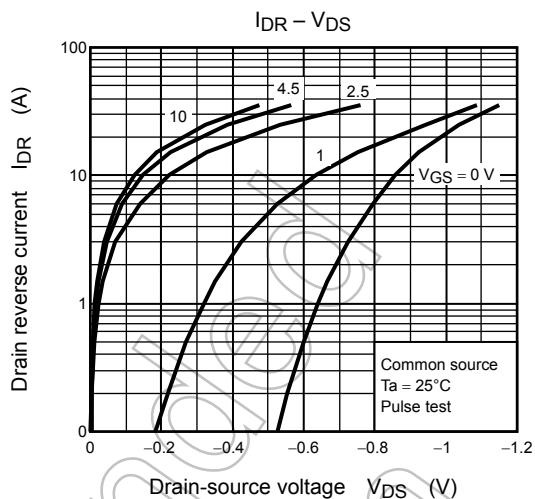
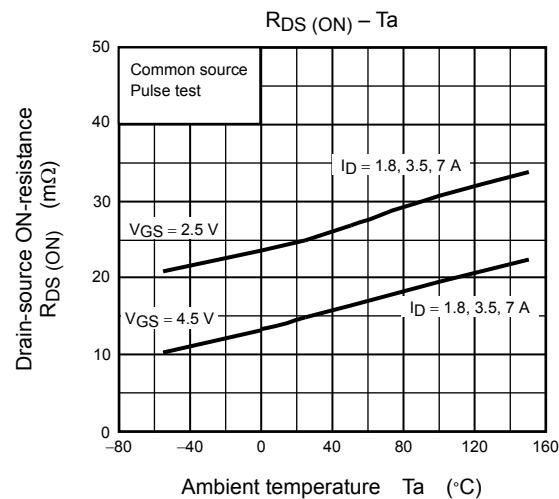
Electrical Characteristics ($T_a = 25^\circ\text{C}$)

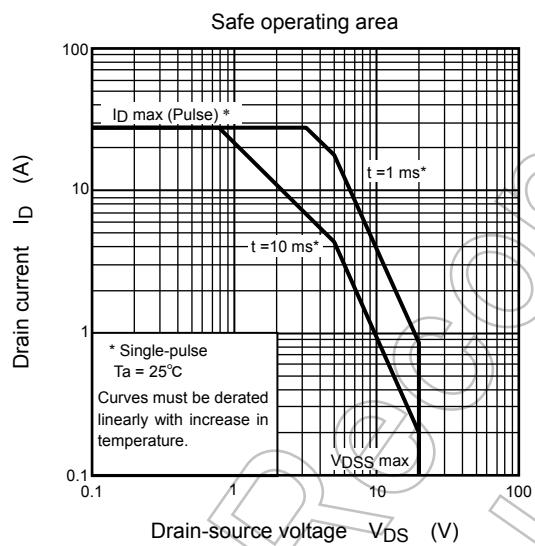
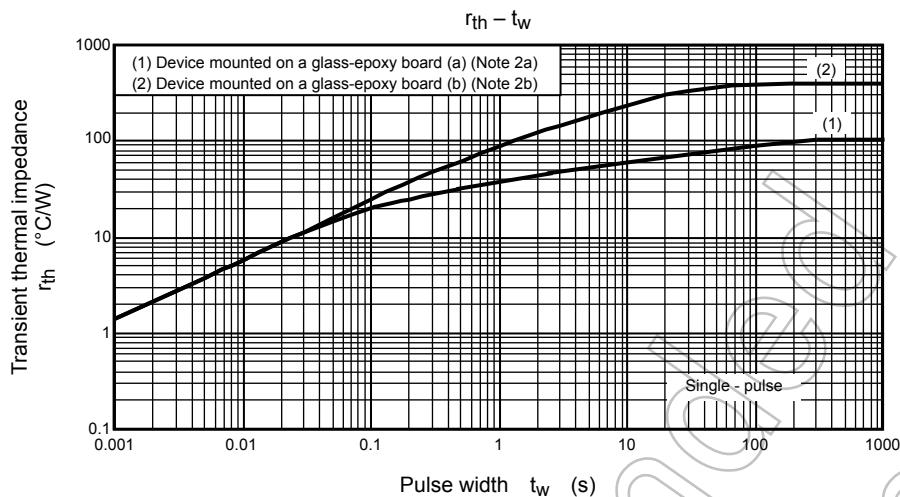
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current	I_{GSS}	$V_{GS} = \pm 12\text{ V}$, $V_{DS} = 0\text{ V}$	—	—	± 100	nA
Drain cut-off current	I_{DSS}	$V_{DS} = 20\text{ V}$, $V_{GS} = 0\text{ V}$	—	—	10	μA
Drain-source breakdown voltage	$V_{(\text{BR})\text{DSS}}$	$I_D = 10\text{ mA}$, $V_{GS} = 0\text{ V}$	20	—	—	V
	$V_{(\text{BR})\text{DSX}}$	$I_D = 10\text{ mA}$, $V_{GS} = -12\text{ V}$	8	—	—	
Gate threshold voltage	V_{th}	$V_{DS} = 10\text{ V}$, $I_D = 200\text{ }\mu\text{A}$	0.5	—	1.2	V
Drain-source ON-resistance	$R_{DS\text{ (ON)}}$	$V_{GS} = 2.5\text{ V}$, $I_D = 3.5\text{ A}$	—	24	34	$\text{m}\Omega$
		$V_{GS} = 4.5\text{ V}$, $I_D = 3.5\text{ A}$	—	14	18	
Input capacitance	C_{iss}	$V_{DS} = 10\text{ V}$, $V_{GS} = 0\text{ V}$, $f = 1\text{ MHz}$	—	500	—	pF
Reverse transfer capacitance	C_{rss}		—	155	—	
Output capacitance	C_{oss}		—	215	—	
Switching time	Rise time	t_r		—	5.2	—
	Turn-on time	t_{on}		—	11	—
	Fall time	t_f		—	10	—
	Turn-off time	t_{off}		—	23	—
Total gate charge (gate-source plus gate-drain)	Q_g	$V_{DD} \approx 16\text{ V}$, $V_{GS} = 5\text{ V}$, $I_D = 7.0\text{ A}$	—	9.5	—	nC
Gate-source charge 1	Q_{gs1}		—	1.6	—	
Gate-drain ("miller") charge	Q_{gd}		—	4	—	

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

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Drain reverse current Pulse (Note 1)	I_{DRP}	—	—	—	28	A
Forward voltage (diode)	V_{DSF}	$I_{DR} = 7.0\text{ A}$, $V_{GS} = 0\text{ V}$	—	—	-1.2	V







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