

TOSHIBA Field Effect Transistor Silicon P Channel MOS Type (U-MOSIV)

TPC6107

Notebook PC Applications
 Portable Equipment Applications

- Small footprint due to small and thin package
- Low drain-source ON resistance: $R_{DS(ON)} = 40\text{ m}\Omega$ (typ.)
- High forward transfer admittance: $|Y_{fs}| = 9.6\text{ S}$ (typ.)
- Low leakage current: $I_{DSS} = -10\text{ }\mu\text{A}$ (max) ($V_{DS} = -20\text{ V}$)
- Enhancement model: $V_{th} = -0.5\text{ to }-1.2\text{ V}$ ($V_{DS} = -10\text{ V}$, $I_D = -200\text{ }\mu\text{A}$)

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	-4.5	A
	Pulse (Note 1)	I_{DP}	-18	
Drain power dissipation	(t = 5 s) (Note 2a)	P_D	2.2	W
Drain power dissipation	(t = 5 s) (Note 2b)	P_D	0.7	W
Single pulse avalanche energy (Note 3)		E_{AS}	1.3	mJ
Avalanche current		I_{AR}	-2.25	A
Repetitive avalanche energy (Note 4)		E_{AR}	0.22	mJ
Channel temperature		T_{ch}	150	°C
Storage temperature range		T_{stg}	-55 to 150	°C

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).

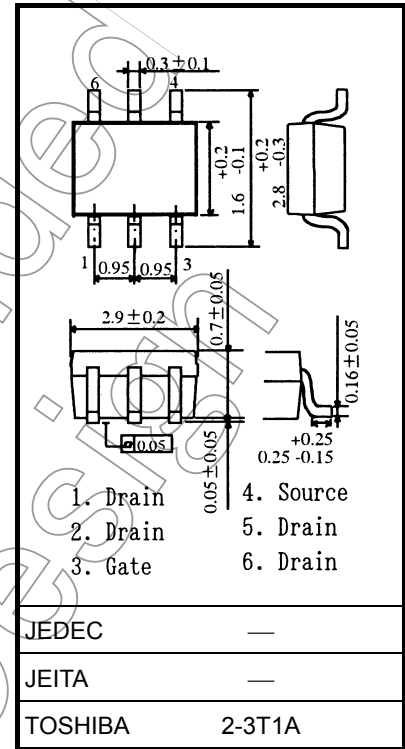
Thermal Characteristics

Characteristics	Symbol	Max	Unit
Thermal resistance, channel to ambient (t = 5 s) (Note 2a)	$R_{th(ch-a)}$	56.8	°C/W
Thermal resistance, channel to ambient (t = 5 s) (Note 2b)	$R_{th(ch-a)}$	178.5	°C/W

Note: For (Note 1), (Note 2), (Note 3) and (Note 4), see the third page.

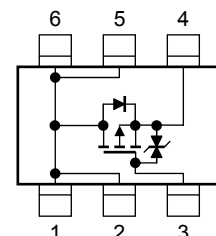
This transistor is an electrostatic-sensitive device. Please handle with caution.

Unit: mm



Weight: 0.011 g (typ.)

Circuit Configuration



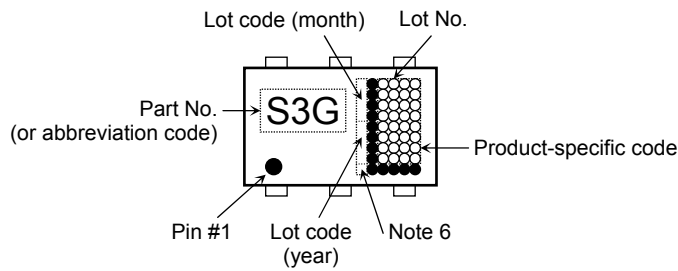
Electrical Characteristics (Ta = 25°C)

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current		I_{GSS}	$V_{GS} = \pm 10\text{ V}, V_{DS} = 0\text{ V}$	—	—	± 10	μA
Drain cut-OFF current		I_{DSS}	$V_{DS} = -20\text{ V}, V_{GS} = 0\text{ V}$	—	—	-10	μA
Drain-source breakdown voltage		$V_{(BR)DSS}$	$I_D = -10\text{ mA}, V_{GS} = 0\text{ V}$	-20	—	—	V
		$V_{(BR)DSX}$	$I_D = -10\text{ mA}, V_{GS} = 12\text{ V}$	-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		$R_{DS(ON)}$	$V_{GS} = -2\text{ V}, I_D = -2.2\text{ A}$	—	110	180	m Ω
		$R_{DS(ON)}$	$V_{GS} = -2.5\text{ V}, I_D = -2.2\text{ A}$	—	70	100	
		$R_{DS(ON)}$	$V_{GS} = -4.5\text{ V}, I_D = -2.2\text{ A}$	—	40	55	
Forward transfer admittance		$ Y_{fs} $	$V_{DS} = -10\text{ V}, I_D = -2.2\text{ A}$	4.8	9.6	—	S
Input capacitance		C_{iss}	$V_{DS} = -10\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$	—	680	—	pF
Reverse transfer capacitance		C_{rss}		—	130	—	
Output capacitance		C_{oss}		—	140	—	
Switching time	Rise time	t_r		—	6	—	ns
	Turn-ON time	t_{on}		—	16	—	
	Fall time	t_f		—	38	—	
	Turn-OFF time	t_{off}		Duty $\leq 1\%$, $t_w = 10\text{ }\mu\text{s}$	—	85	
Total gate charge (gate-source plus gate-drain)		Q_g	$V_{DD} \approx -16\text{ V}, V_{GS} = -5\text{ V}, I_D = -4.5\text{ A}$	—	9.8	—	nC
Gate-source charge		Q_{gs}		—	2	—	
Gate-drain ("miller") charge		Q_{gd}		—	3	—	

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

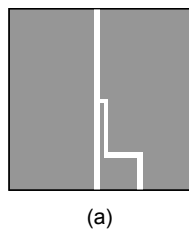
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Pulse drain reverse current (Note 1)	I_{DRP}	—	—	—	-18	A
Forward voltage (diode)	V_{DSF}	$I_{DR} = -4.5\text{ A}, V_{GS} = 0\text{ V}$	—	—	1.2	V

Marking (Note 5)

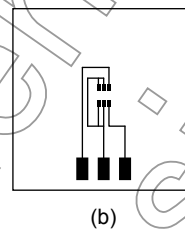


Note 1: Ensure that the channel temperature does not exceed 150°C.

Note 2: (a) Device mounted on a glass-epoxy board (a) ($t = 5$ s)
 (b) Device mounted on a glass-epoxy board (b) ($t = 5$ s)



FR-4
 $25.4 \times 25.4 \times 0.8$
 Unit: (mm)



FR-4
 $25.4 \times 25.4 \times 0.8$
 Unit: (mm)

Note 3: $V_{DD} = 16$ V, $T_{ch} = 25^\circ\text{C}$ (initial), $L = 0.2$ mH, $R_G = 25$ Ω , $I_{AR} = -2.25$ A

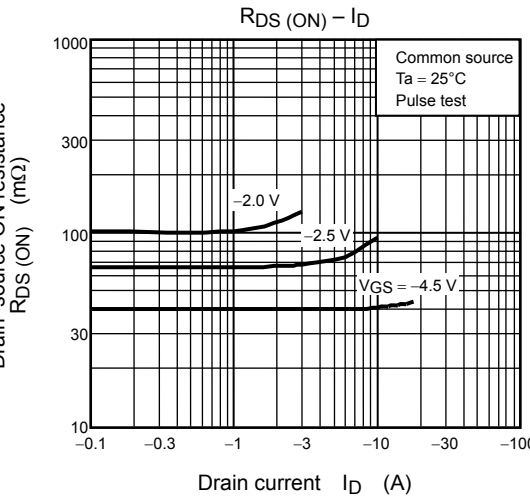
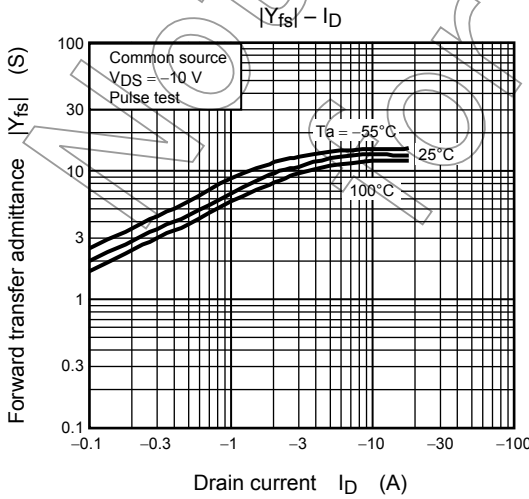
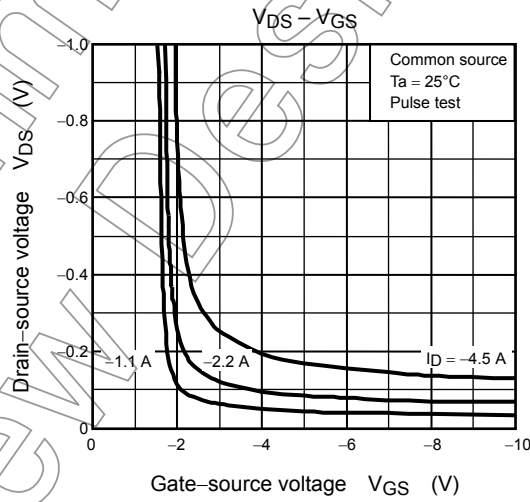
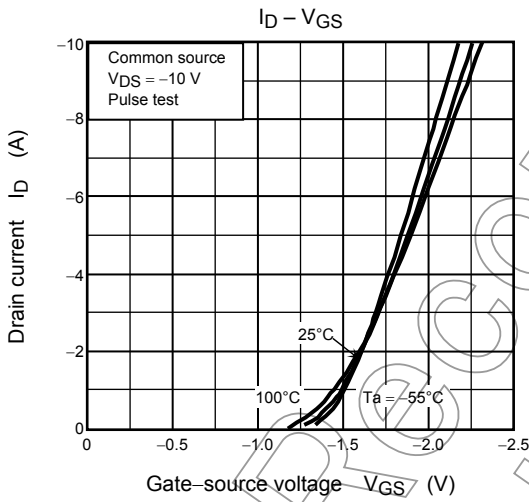
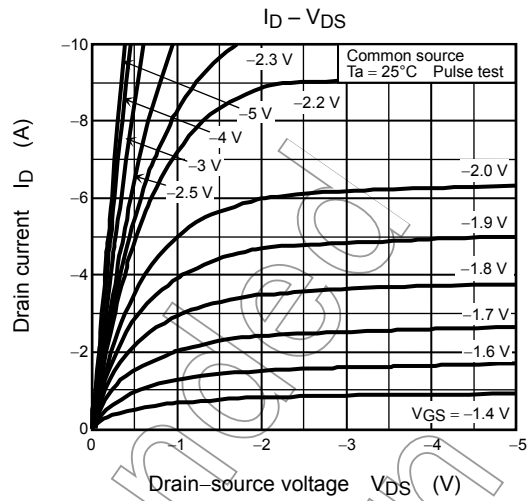
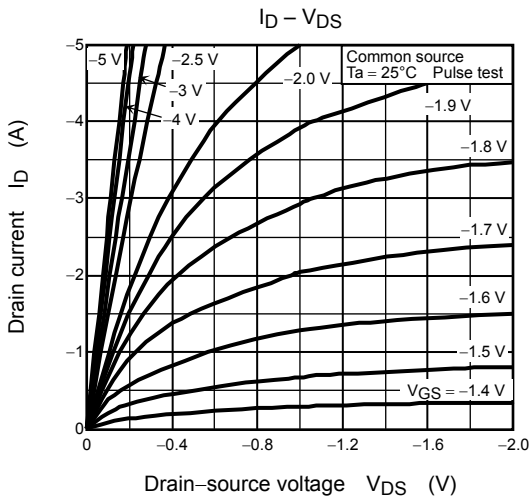
Note 4: Repetitive rating: pulse width limited by maximum channel temperature

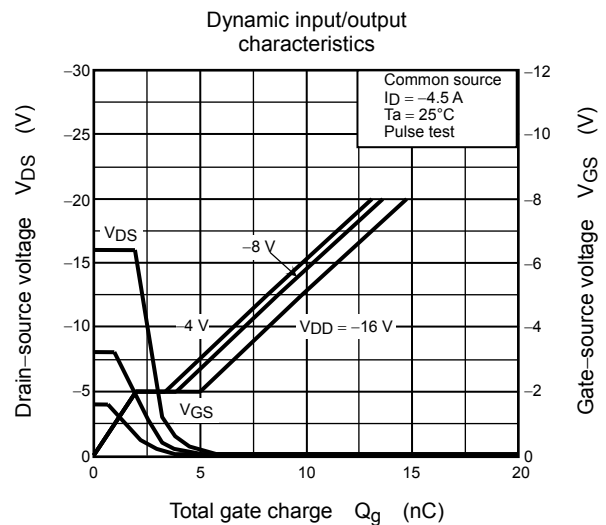
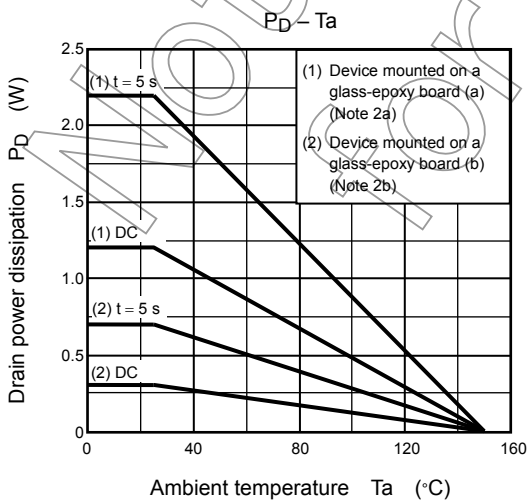
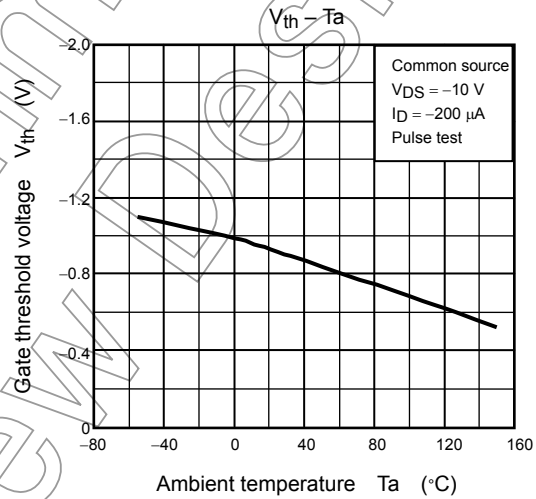
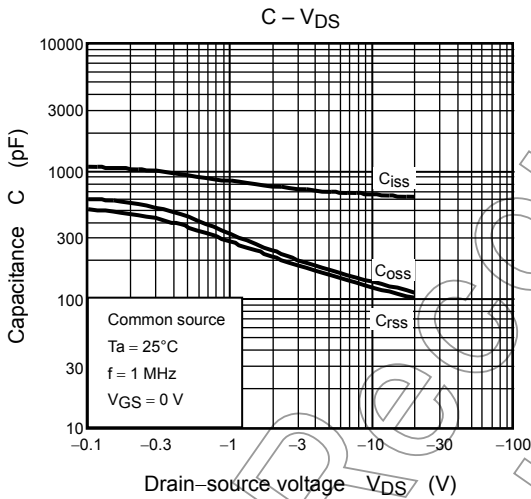
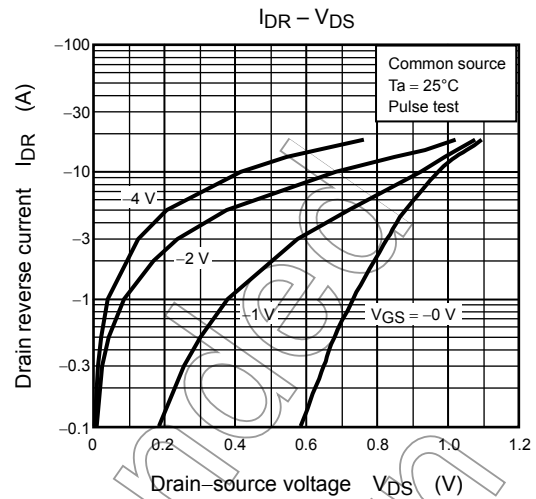
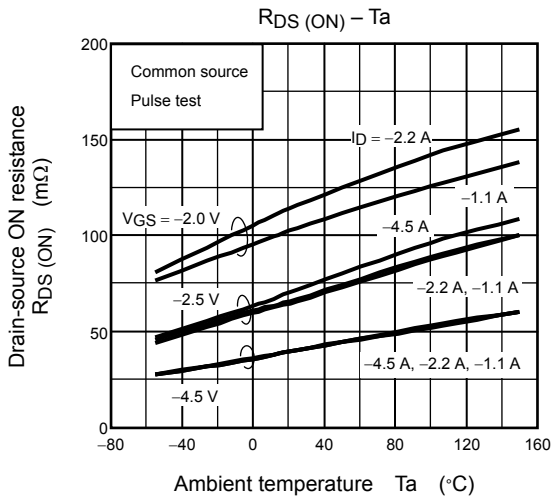
Note 5: • on lower left of the marking indicates Pin 1.

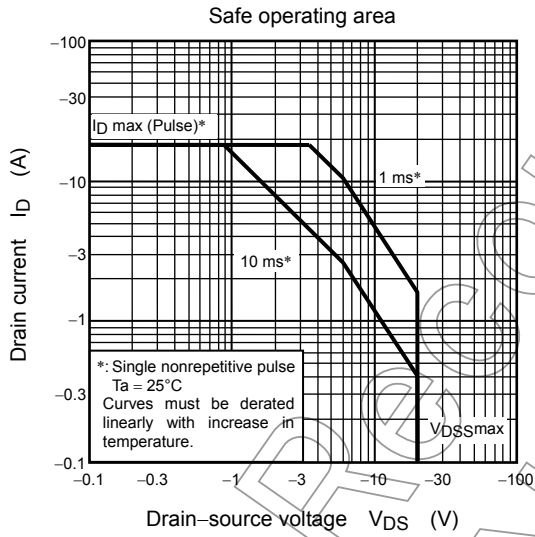
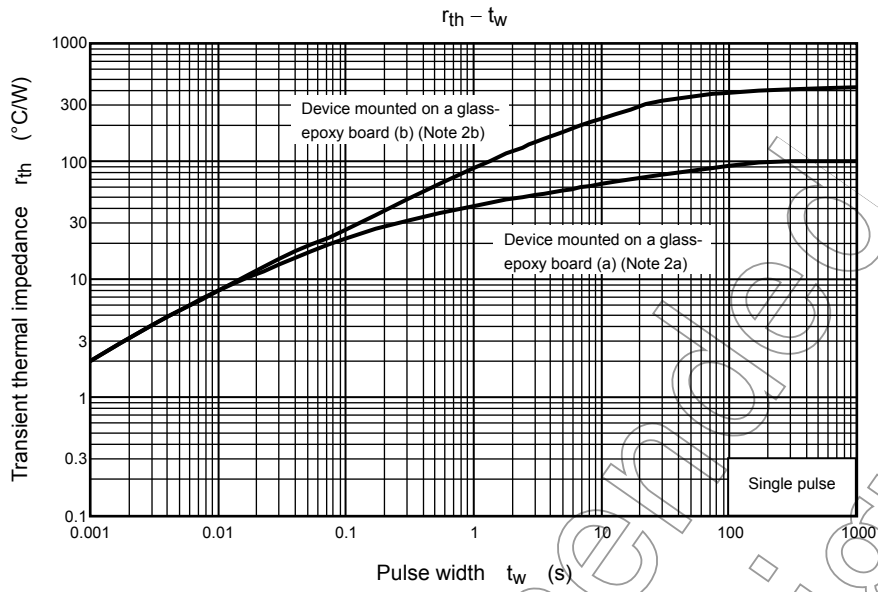
Note 6 A dot marking identifies the indication of product Labels.
 Without a dot: [[Pb]]/INCLUDES > MCV
 With a dot: [[G]]/RoHS COMPATIBLE or [[G]]/RoHS [[Pb]]

Please contact your TOSHIBA sales representative for details as to environmental matters such as the RoHS compatibility of Product. The RoHS is the Directive 2002/95/EC of the European Parliament and of the Council of 27 January 2003 on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

Not for New Design







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