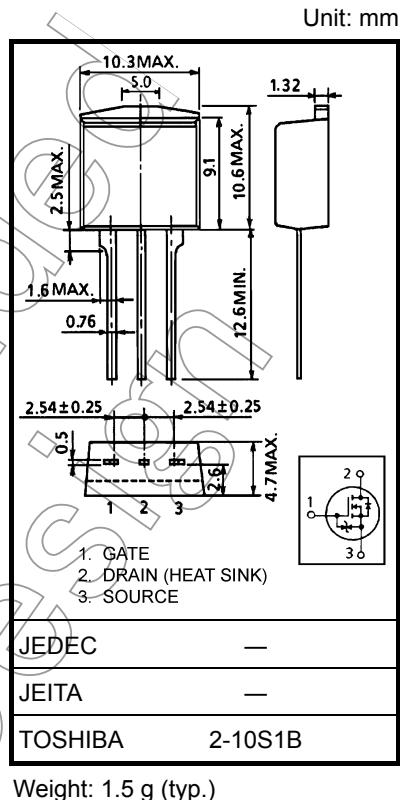


TOSHIBA Field Effect Transistor Silicon N Channel MOS Type (π -MOSV)

2SK3417

Switching Regulator Applications

- Reverse-recovery time: $t_{rr} = 60$ ns (typ.)
- Built-in high-speed flywheel diode
- Low drain-source ON resistance: $R_{DS(ON)} = 1.6 \Omega$ (typ.)
- High forward transfer admittance: $|Y_{fs}| = 4.0 \text{ S}$ (typ.)
- Low leakage current: $I_{DSS} = 100 \mu\text{A}$ (max) ($V_{DS} = 500$ V)
- Enhancement mode: $V_{th} = 2.0$ to 4.0 V ($V_{DS} = 10$ V, $I_D = 1$ mA)



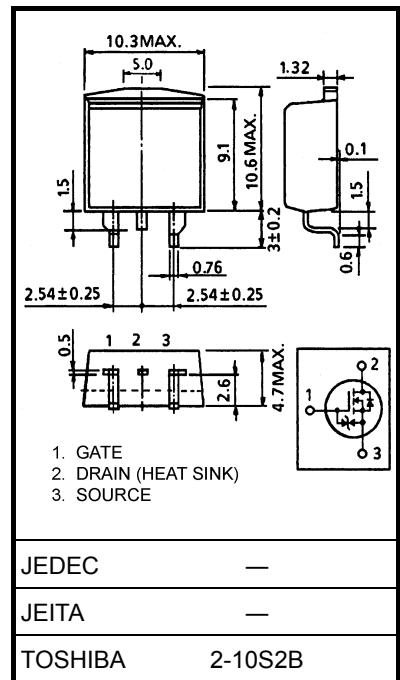
Unit: mm

Absolute Maximum Ratings ($T_a = 25^\circ\text{C}$)

Characteristics	Symbol	Rating	Unit
Drain-source voltage	V_{DSS}	500	V
Drain-gate voltage ($R_{GS} = 20 \text{ k}\Omega$)	V_{DGR}	500	V
Gate-source voltage	V_{GSS}	± 30	V
Drain current	DC (Note 1)	I_D	A
	Pulse (Note 1)	I_{DP}	
Drain power dissipation ($T_c = 25^\circ\text{C}$)	P_D	50	W
Single pulse avalanche energy (Note 2)	E_{AR}	180	mJ
Avalanche current	I_{AR}	5	A
Repetitive avalanche energy (Note 3)	E_{AR}	5	mJ
Channel temperature	T_{ch}	150	$^\circ\text{C}$
Storage temperature range	T_{stg}	-55 to 150	$^\circ\text{C}$

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.).

Weight: 1.5 g (typ.)



Thermal Characteristics

Characteristics	Symbol	Max	Unit
Thermal resistance, channel to case	R_{th} (ch-c)	2.5	$^\circ\text{C/W}$
Thermal resistance, channel to ambient	R_{th} (ch-a)	83.3	$^\circ\text{C/W}$

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

Note 2: $V_{DD} = 90$ V, $T_{ch} = 25^\circ\text{C}$ (initial), $L = 12.2$ mH, $R_G = 25 \Omega$, $I_{AR} = 5$ A

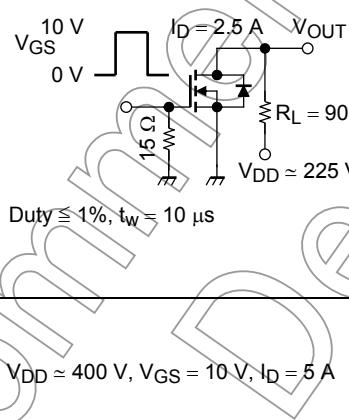
Note 3: Repetitive rating: pulse width limited by maximum channel temperature

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

Weight: 1.5 g (typ.)

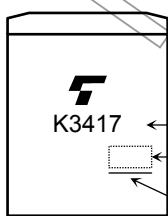
Electrical Characteristics ($T_a = 25^\circ\text{C}$)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current	I_{GSS}	$V_{GS} = \pm 25\text{ V}$, $V_{DS} = 0\text{ V}$	—	—	± 10	μA
Drain-source breakdown voltage	$V_{(\text{BR})\text{GSS}}$	$I_G = \pm 100\text{ }\mu\text{A}$, $V_{DS} = 0\text{ V}$	± 30	—	—	V
Drain cut-OFF current	I_{DSS}	$V_{DS} = 500\text{ V}$, $V_{GS} = 0\text{ V}$	—	—	100	μA
Drain-source breakdown voltage	$V_{(\text{BR})\text{DSS}}$	$I_D = 10\text{ mA}$, $V_{GS} = 0\text{ V}$	500	—	—	V
Gate threshold voltage	V_{th}	$V_{DS} = 10\text{ V}$, $I_D = 1\text{ mA}$	2.0	—	4.0	V
Drain-source ON resistance	$R_{DS(\text{ON})}$	$V_{GS} = 10\text{ V}$, $I_D = 2.5\text{ A}$	—	1.6	1.8	Ω
Forward transfer admittance	$ Y_{fs} $	$V_{DS} = 10\text{ V}$, $I_D = 2.5\text{ A}$	2.5	4.0	—	S
Input capacitance	C_{iss}	$V_{DS} = 10\text{ V}$, $V_{GS} = 0\text{ V}$, $f = 1\text{ MHz}$	—	780	—	pF
Reverse transfer capacitance	C_{rss}		—	60	—	
Output capacitance	C_{oss}		—	200	—	
Switching time	Rise time	t_r	—	12	—	ns
	Turn-ON time	t_{on}	—	25	—	
	Fall time	t_f	—	15	—	
	Turn-OFF time	t_{off}	—	60	—	
Total gate charge (gate-source plus gate-drain)	Q_g	$V_{DD} \approx 400\text{ V}$, $V_{GS} = 10\text{ V}$, $I_D = 5\text{ A}$	—	17	—	nC
Gate-source charge	Q_{gs}		—	11	—	
Gate-drain ("miller") charge	Q_{gd}		—	6	—	

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

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Continuous drain reverse current (Note 1)	I_{DR}	—	—	—	5	A
Pulse drain reverse current (Note 1)	I_{DRP}	—	—	—	20	A
Forward voltage (diode)	V_{DSF}	$I_{DR} = 5\text{ A}$, $V_{GS} = 0\text{ V}$	—	—	-1.7	V
Reverse recovery time	t_{rr}	$I_{DR} = 5\text{ A}$, $V_{GS} = 0\text{ V}$, $dI_{DR}/dt = 100\text{ A}/\mu\text{s}$	—	60	—	ns
Reverse recovery charge	Q_{rr}		—	0.1	—	μC

Marking

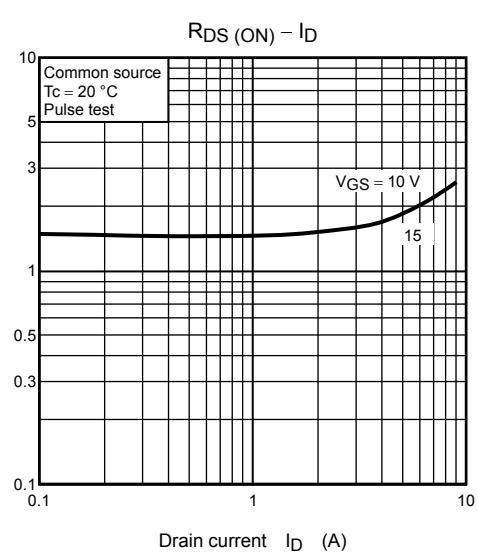
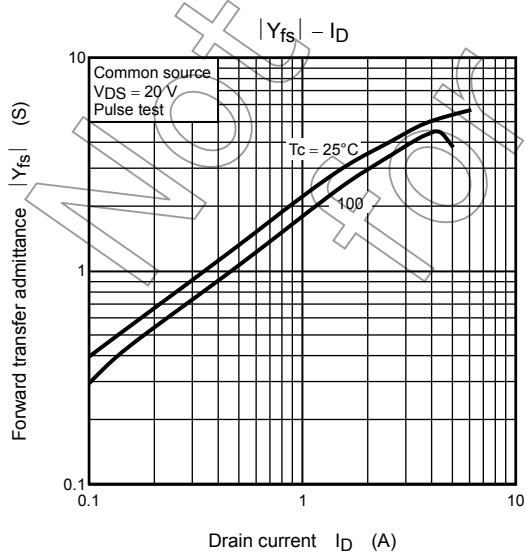
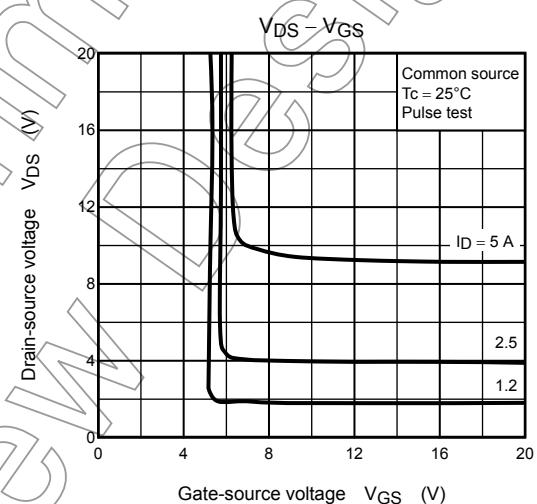
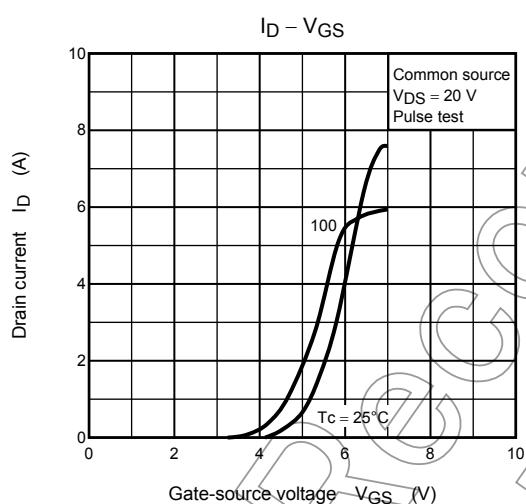
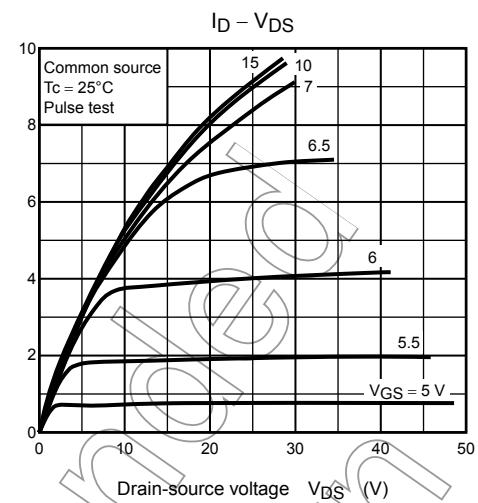
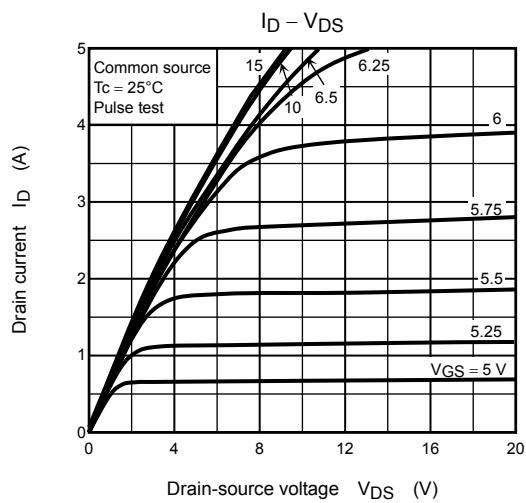


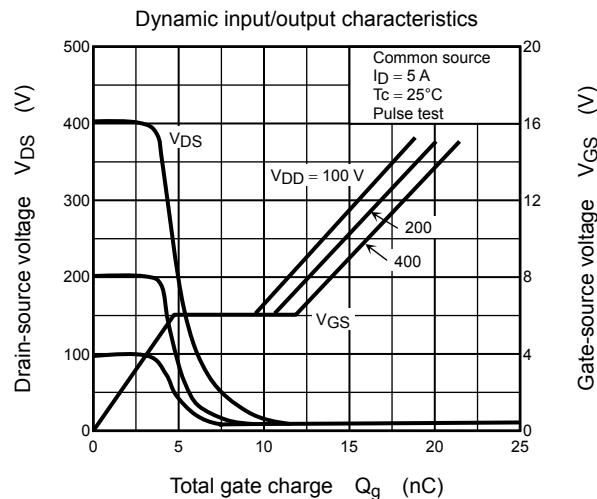
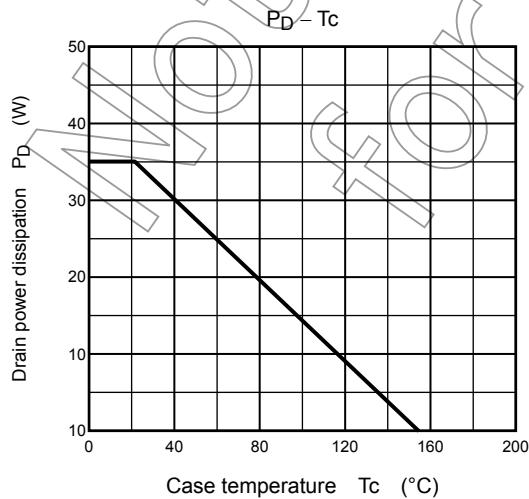
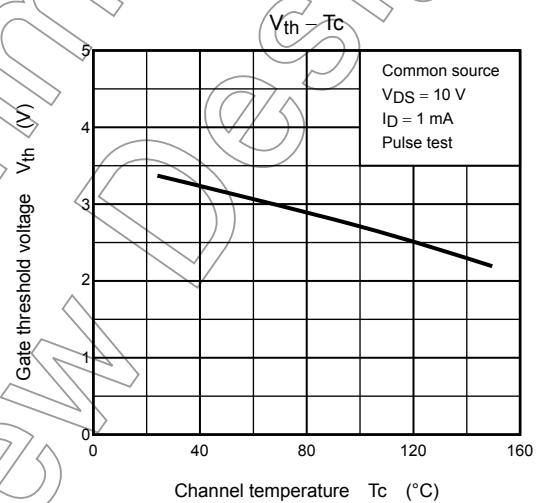
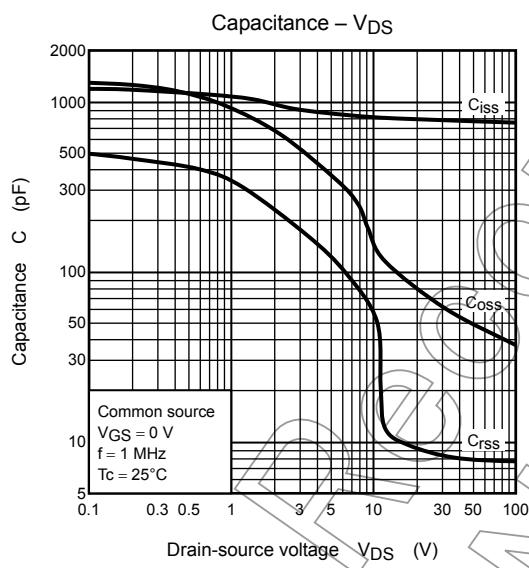
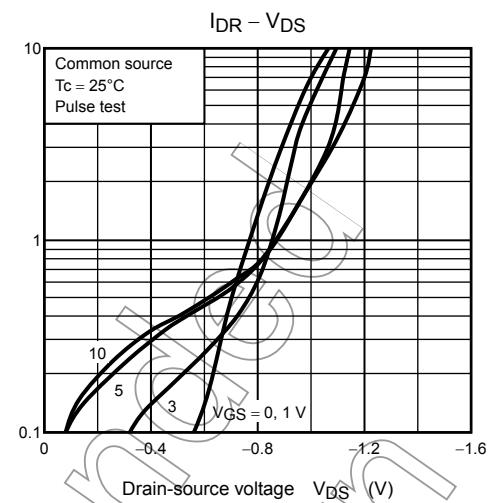
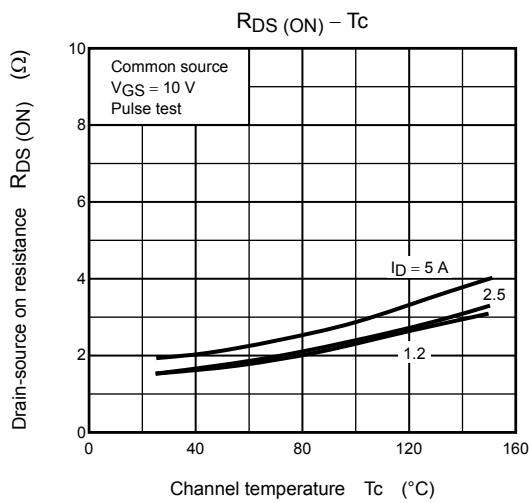
Note 4: A line under a Lot No. identifies the indication of product Labels.

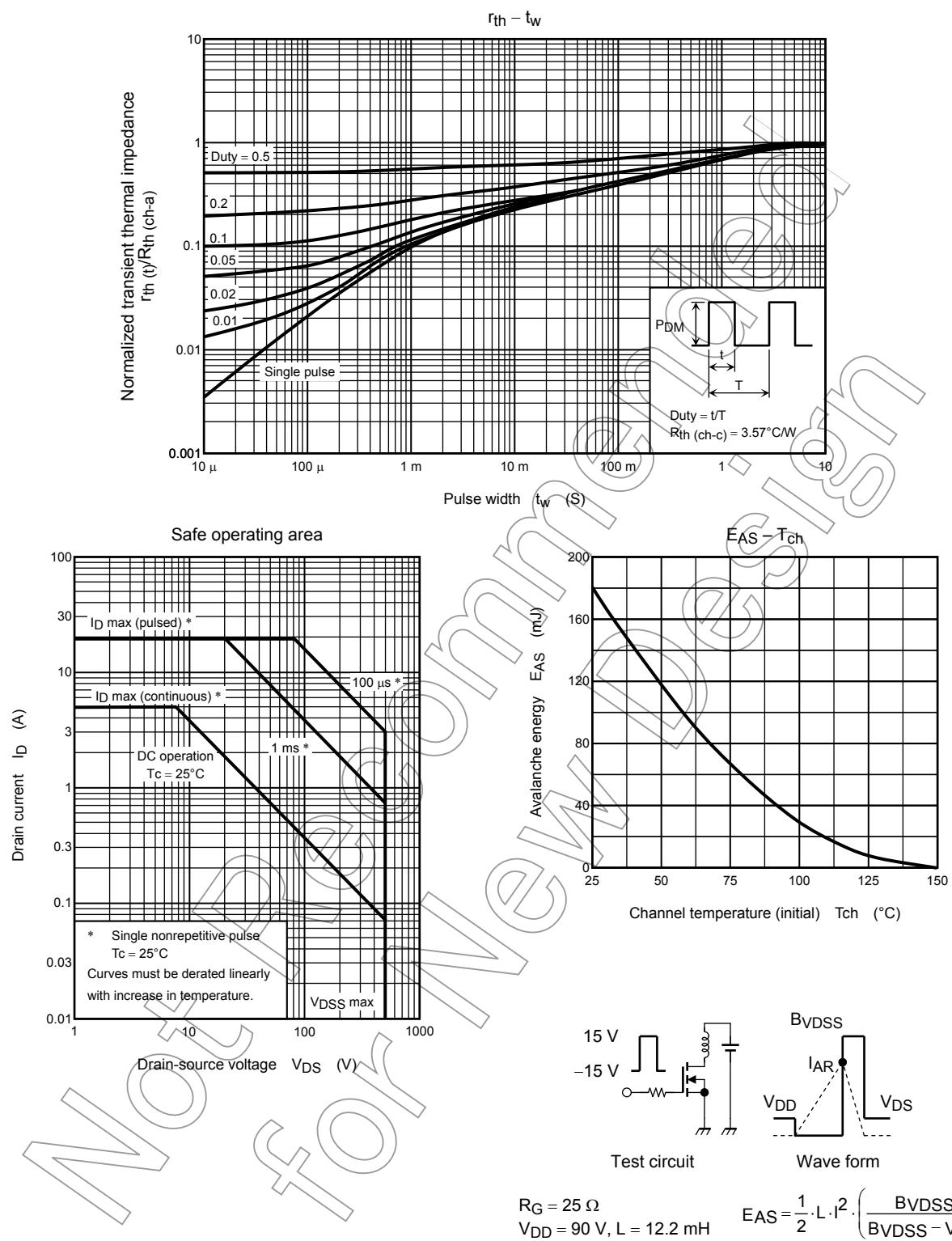
Not underlined: [[Pb]]/INCLUDES > MCV

Underlined: [[G]]/RoHS COMPATIBLE or [[G]]/RoHS [[Pb]]

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