

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

TPCA8103

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: $R_{DS(ON)} = 3.1 \text{ m}\Omega$ (typ.)
- High forward transfer admittance: $|Y_{fs}| = 45\text{S}$ (typ.)
- Low leakage current: $I_{DSS} = -10 \text{ }\mu\text{A}$ (max) ($V_{DS} = -30 \text{ V}$)
- Enhancement mode: $V_{th} = -0.8 \text{ to } -2.0 \text{ V}$ ($V_{DS} = -10 \text{ V}$, $I_D = -1 \text{ mA}$)

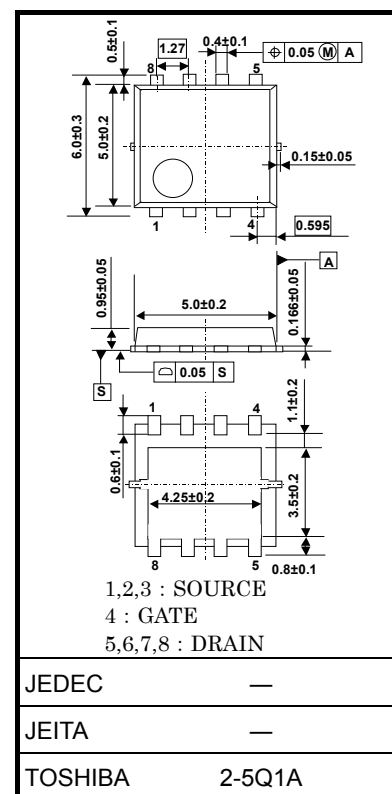
Absolute Maximum Ratings ($T_a = 25^\circ\text{C}$)

Characteristics	Symbol	Rating	Unit
Drain-source voltage	V_{DSS}	-30	V
Drain-gate voltage ($R_{GS} = 20 \text{ k}\Omega$)	V_{DGR}	-30	V
Gate-source voltage	V_{GSS}	± 20	V
Drain current	DC (Note 1)	I_D	A
	Pulsed (Note 1)	I_{DP}	
Drain power dissipation ($T_c = 25^\circ\text{C}$)	P_D	45	W
Drain power dissipation ($t = 10 \text{ s}$) (Note 2a)	P_D	2.8	W
Drain power dissipation ($t = 10 \text{ s}$) (Note 2b)	P_D	1.6	W
Single pulse avalanche energy (Note 3)	E_{AS}	208	mJ
Avalanche current	I_{AR}	-40	A
Repetitive avalanche energy ($T_c = 25^\circ\text{C}$) (Note 4)	E_{AR}	4.5	mJ
Channel temperature	T_{ch}	150	$^\circ\text{C}$
Storage temperature range	T_{stg}	-55 to 150	$^\circ\text{C}$

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

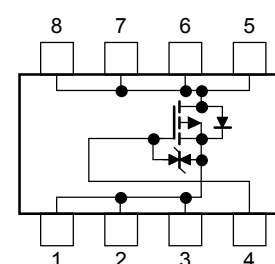
Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within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



Weight: 0.076 g (typ.)

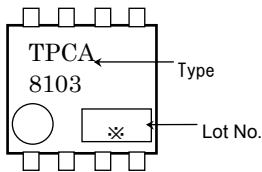
Circuit Configuration



Thermal Characteristics

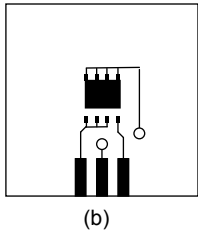
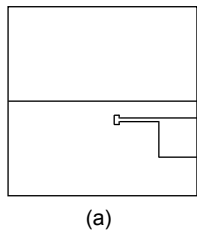
Characteristics	Symbol	Max	Unit
Thermal resistance, channel to case ($T_c=25^{\circ}\text{C}$)	$R_{th\ (ch-c)}$	2.78	$^{\circ}\text{C/W}$
Thermal resistance, channel to ambient ($t = 10\ \text{s}$) (Note 2a)	$R_{th\ (ch-a)}$	44.6	$^{\circ}\text{C/W}$
Thermal resistance, channel to ambient ($t = 10\ \text{s}$) (Note 2b)	$R_{th\ (ch-a)}$	78.1	$^{\circ}\text{C/W}$

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

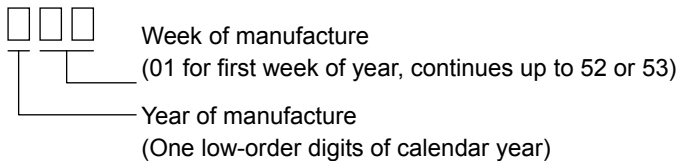


Note 3: $V_{DD} = 24\ \text{V}$, $T_{ch} = 25^{\circ}\text{C}$ (initial), $L = 100\ \mu\text{H}$, $R_G = 25\ \Omega$, $I_{AR} = -40\ \text{A}$

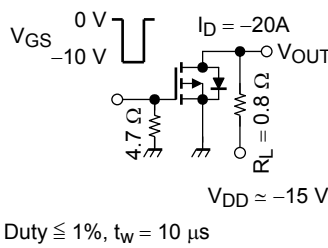
Note 4: Repetitive rating: pulse width limited by max channel temperature

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

※ Weekly code: (Three digits)

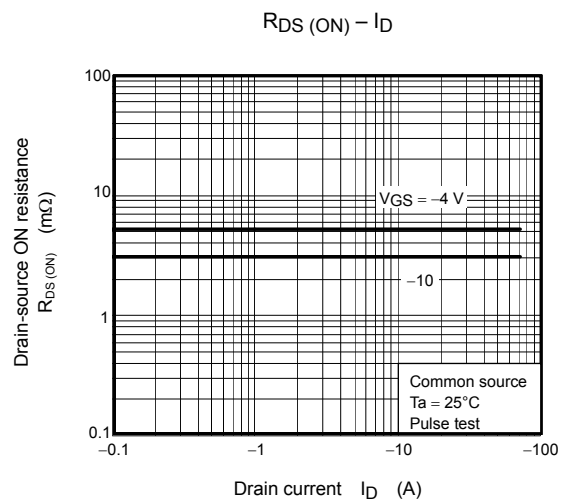
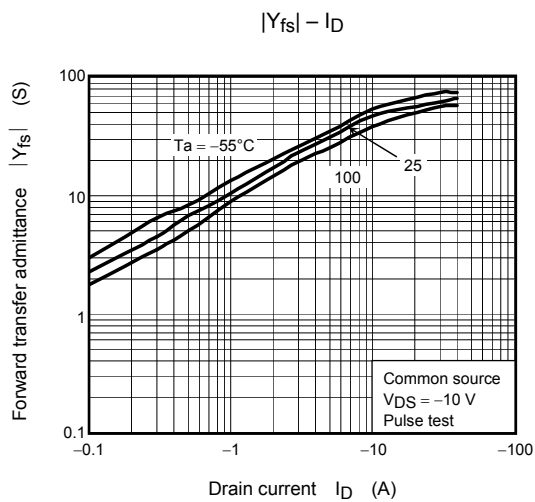
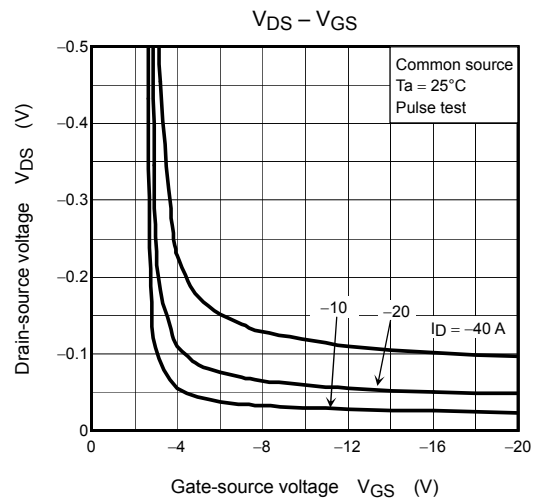
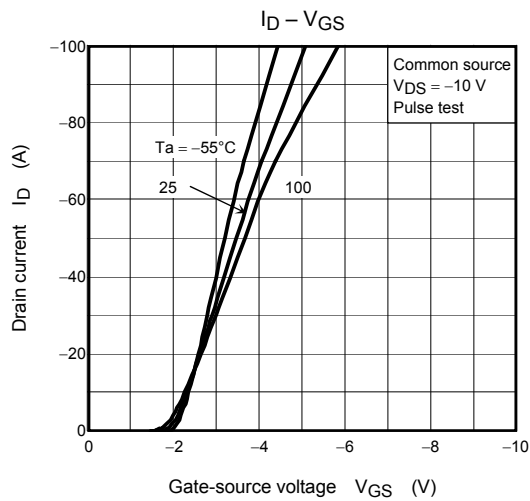
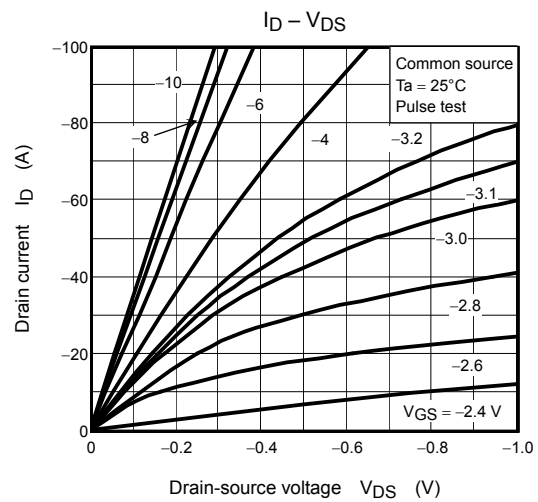
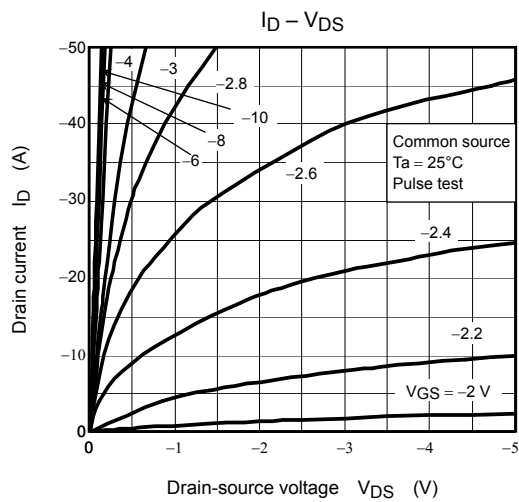


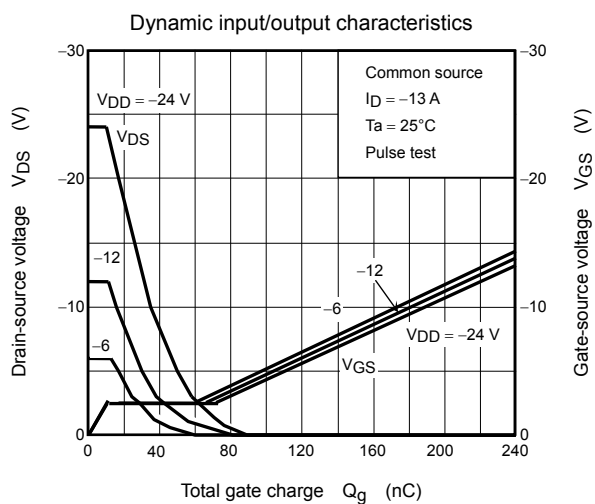
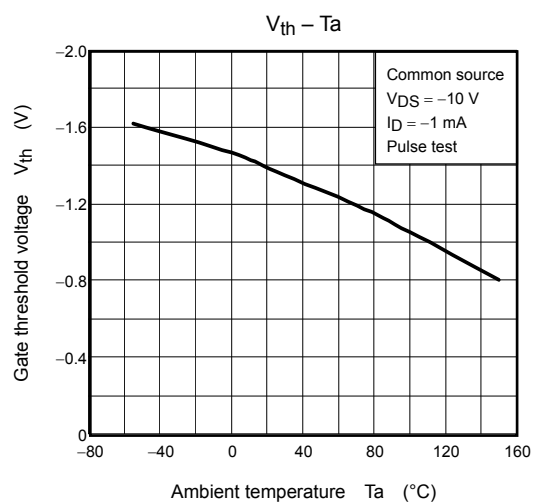
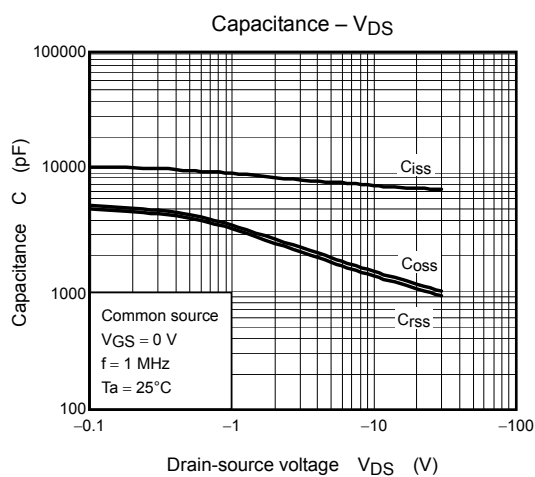
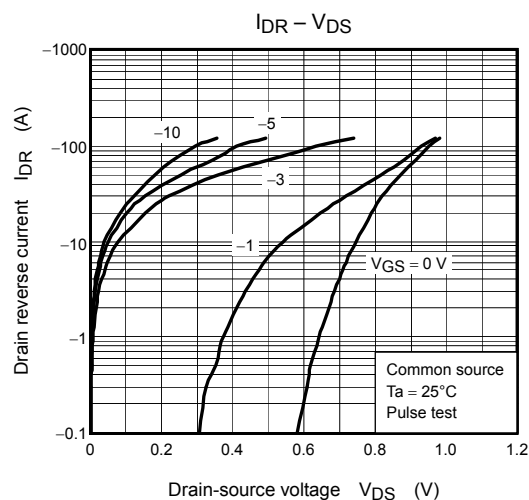
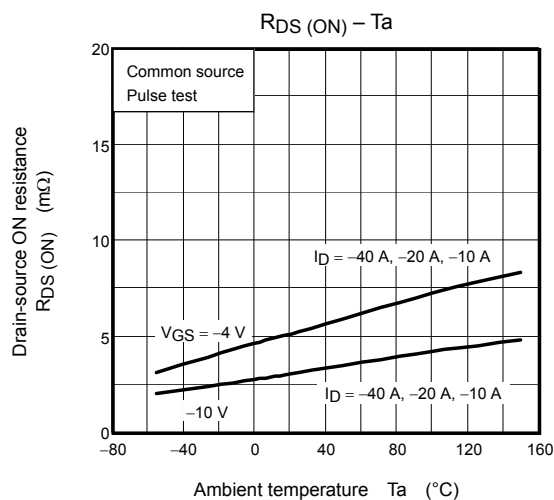
Electrical Characteristics (Ta = 25°C)

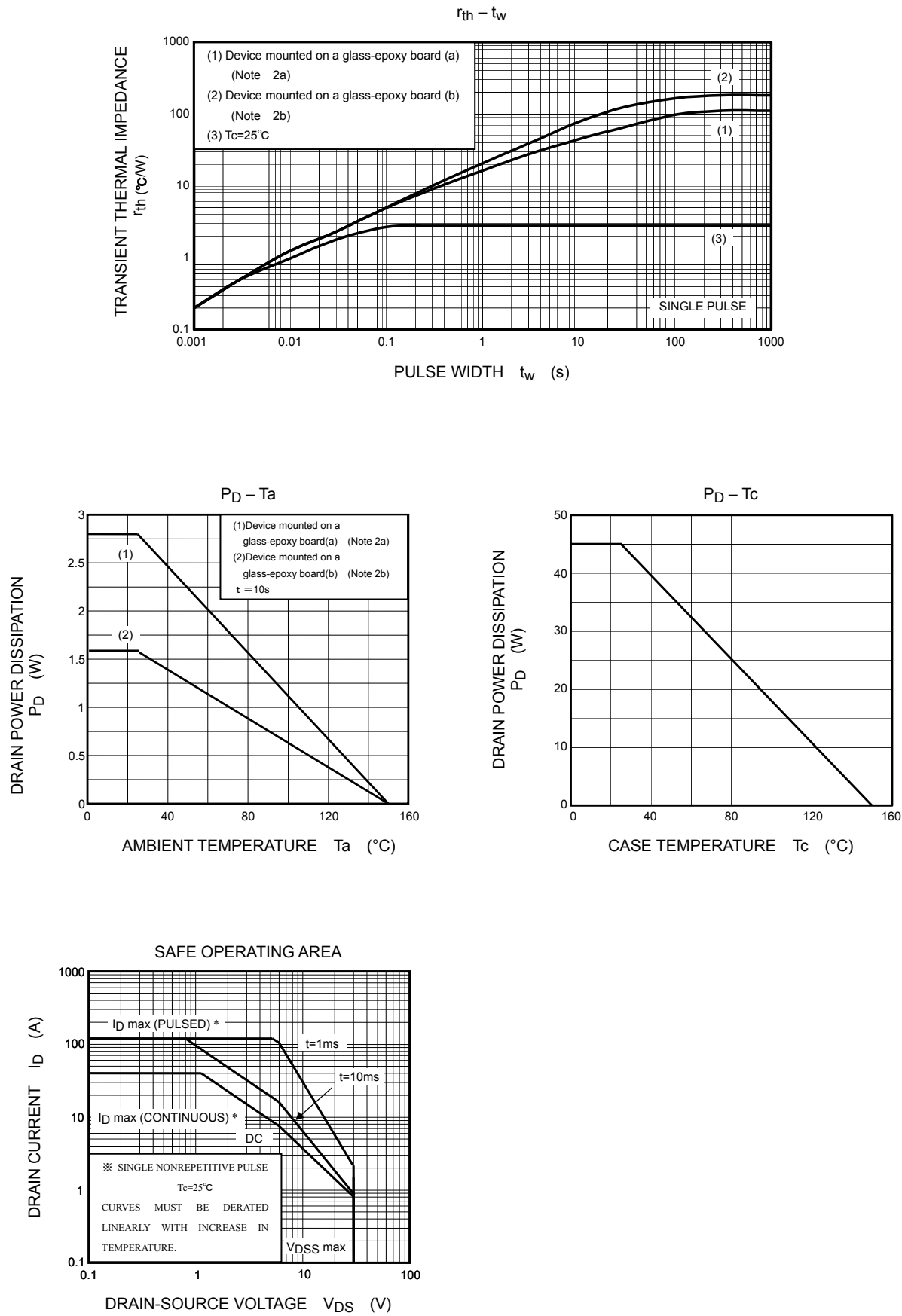
Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current		I _{GSS}	V _{GS} = ±16 V, V _{DS} = 0 V	—	—	±10	μA
Drain cut-OFF current		I _{DSS}	V _{DS} = -30 V, V _{GS} = 0 V	—	—	-10	μA
Drain-source breakdown voltage		V _{(BR) DSS}	I _D = -10 mA, V _{GS} = 0 V	-30	—	—	V
		V _{(BR) DSX}	I _D = -10 mA, V _{GS} = 20 V	-13	—	—	
Gate threshold voltage		V _{th}	V _{DS} = -10 V, I _D = - 1 mA	-0.8	—	-2.0	V
Drain-source ON resistance		R _{DS (ON)}	V _{GS} = -4 V, I _D = -20 A	—	5.2	6.8	mΩ
			V _{GS} = -10 V, I _D = -20 A	—	3.1	4.2	
Forward transfer admittance		Y _{fs}	V _{DS} = -10 V, I _D = -20 A	22.5	45	—	S
Input capacitance		C _{iss}	V _{DS} = -10 V, V _{GS} = 0 V, f = 1 MHz	—	7880	—	pF
Reverse transfer capacitance		C _{rss}		—	1340	—	
Output capacitance		C _{oss}		—	1450	—	
Switching time	Rise time	t _r		—	15	—	ns
	Turn-ON time	t _{on}		—	13	—	
	Fall time	t _f		—	251	—	
	Turn-OFF time	t _{off}		Duty ≤ 1%, t _w = 10 μs	—	596	
Total gate charge (gate-source plus gate-drain)		Q _g	V _{DD} ≈ -24 V, V _{GS} = -10 V, I _D = -40 A	—	184	—	nC
Gate-source charge 1		Q _{gs1}		—	12	—	
Gate-drain (“miller”) charge		Q _{gd}		—	58	—	

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

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Drain reverse current	Pulse (Note 1)	I_{DRP}	—	—	—	-120	A
Forward voltage (diode)		V_{DSF}	$I_{DR} = -40 \text{ A}, V_{GS} = 0 \text{ V}$	—	—	1.2	V







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20070701-EN

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