

TOSHIBA Field Effect Transistor Silicon N Channel MOS Type (π -MOSIV)**2SK3453**

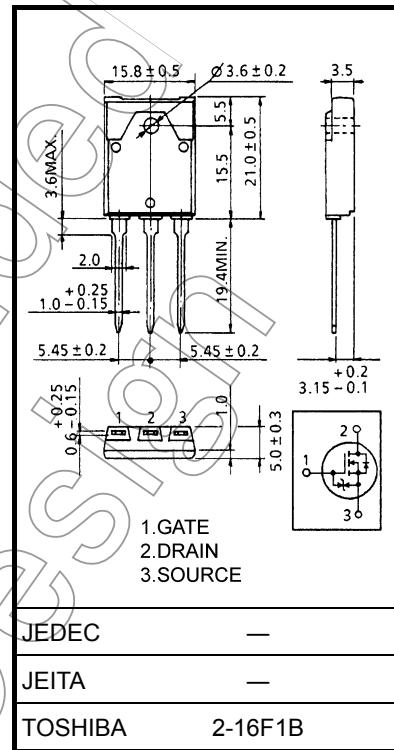
Switching Regulator Applications

Unit: mm

- Low drain-source ON-resistance: $R_{DS(ON)} = 0.72 \Omega$ (typ.)
- High forward transfer admittance: $|Y_{fs}| = 7.0 \text{ S}$ (typ.)
- Low leakage current: $I_{DSS} = 100 \mu\text{A}$ (max) ($V_{DS} = 700 \text{ V}$)
- Enhancement model: $V_{th} = 2.0$ to 4.0 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}	700	V
Drain-gate voltage ($R_{GS} = 20 \text{ k}\Omega$)	V_{DGR}	700	V
Gate-source voltage	V_{GSS}	± 30	V
Drain current	DC (Note 1)	I_D	A
	Pulse (Note 1)	I_{DP}	A
Drain power dissipation ($T_c = 25^\circ\text{C}$)	P_D	80	W
Single pulse avalanche energy (Note 2)	E_{AS}	420	mJ
Avalanche current	I_{AR}	10	A
Repetitive avalanche energy (Note 3)	E_{AR}	8	mJ
Channel temperature	T_{ch}	150	°C
Storage temperature range	T_{stg}	-55 to 150	°C



Weight: 5.8 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 case	$R_{th}(ch-c)$	1.56	°C/W
Thermal resistance, channel to ambient	$R_{th}(ch-a)$	41.6	°C/W

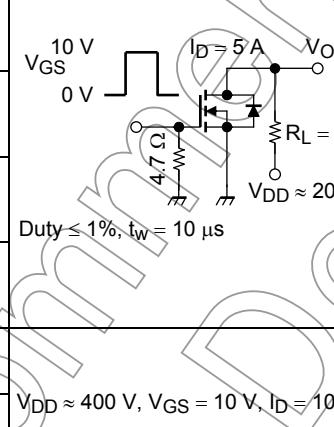
Note 1: Ensure that the channel temperature does not exceed 150°C.

Note 2: $V_{DD} = 90 \text{ V}$, $T_{ch} = 25^\circ\text{C}$ (initial), $L = 7.5 \text{ mH}$, $R_G = 25 \Omega$, $I_{AR} = 10 \text{ A}$

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

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

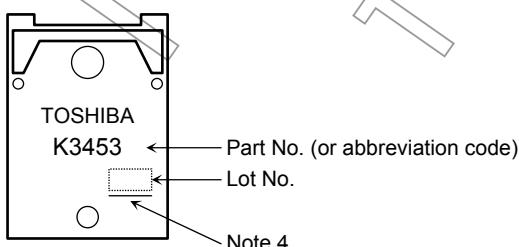
Electrical Characteristics ($T_a = 25^\circ\text{C}$)

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
Gate-source breakdown voltage	$V_{(\text{BR})\text{GSS}}$	$I_G = \pm 10\text{ }\mu\text{A}$, $V_{DS} = 0\text{ V}$	± 30	—	—	V
Drain cut-OFF current	I_{DSS}	$V_{DS} = 700\text{ V}$, $V_{GS} = 0\text{ V}$	—	—	100	μA
Drain-source breakdown voltage	$V_{(\text{BR})\text{DSS}}$	$I_D = 10\text{ mA}$, $V_{GS} = 0\text{ V}$	700	—	—	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	$R_{DS(\text{ON})}$	$V_{GS} = 10\text{ V}$, $I_D = 5\text{ A}$	—	0.72	1.0	Ω
Forward transfer admittance	$ Y_{fs} $	$V_{DS} = 10\text{ V}$, $I_D = 5\text{ A}$	4.0	7.0	—	S
Input capacitance	C_{iss}	$V_{DS} = 25\text{ V}$, $V_{GS} = 0\text{ V}$, $f = 1\text{ MHz}$	—	1700	—	pF
Reverse transfer capacitance	C_{rss}		—	40	—	
Output capacitance	C_{oss}		—	200	—	
Switching time	Rise time	t_r		—	40	—
	Turn-ON time	t_{on}		72	—	
	Fall time	t_f		42	—	
	Turn-OFF time	t_{off}		145	—	
Total gate charge (gate-source plus gate-drain)	Q_g	$V_{DD} \approx 400\text{ V}$, $V_{GS} = 10\text{ V}$, $I_D = 10\text{ A}$	—	53	—	nC
Gate-source charge	Q_{gs}		—	25	—	
Gate-drain ("miller") charge	Q_{gd}		—	28	—	

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}	—	—	—	10	A
Pulse drain reverse current (Note 1)	I_{DRP}	—	—	—	30	A
Forward voltage (diode)	V_{DSF}	$I_{DR} = 10\text{ A}$, $V_{GS} = 0\text{ V}$	—	—	-1.9	V
Reverse recovery time	t_{rr}	$I_{DR} = 10\text{ A}$, $V_{GS} = 0\text{ V}$, $dI_{DR}/dt = 100\text{ A}/\mu\text{s}$	—	1400	—	ns
Reverse recovery charge	Q_{rr}		—	17.5	—	μC

Marking

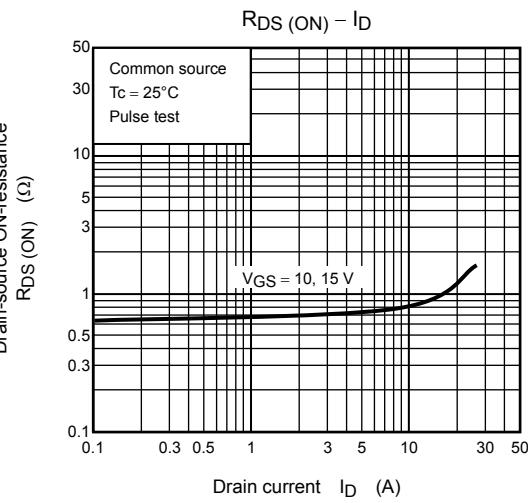
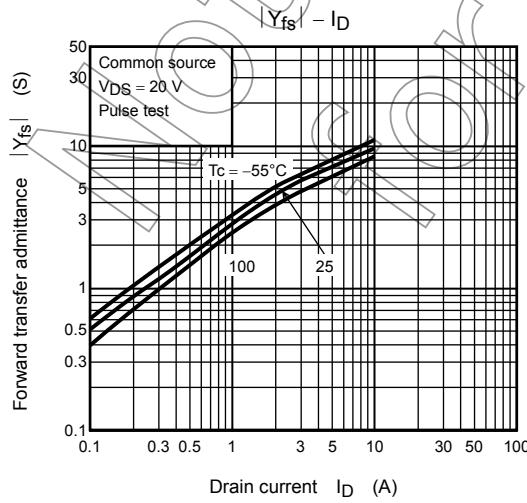
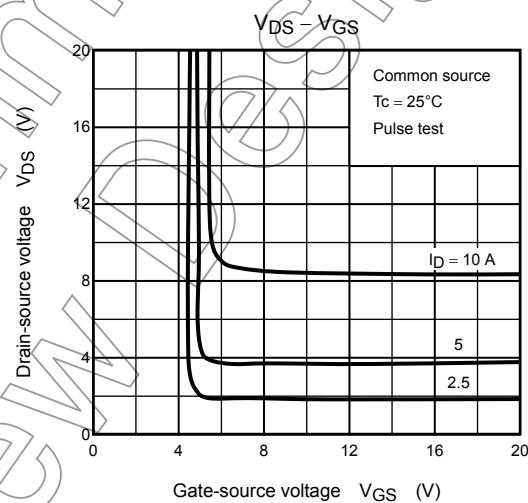
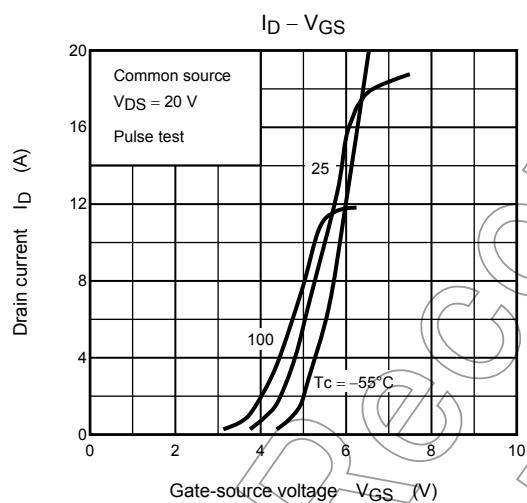
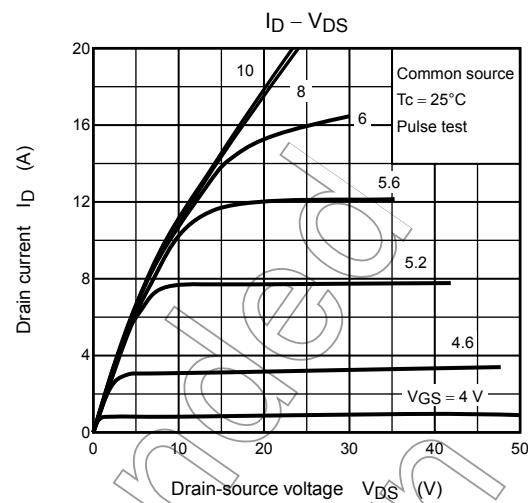
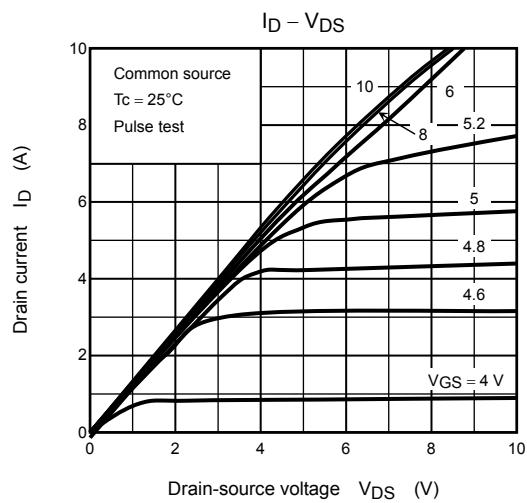


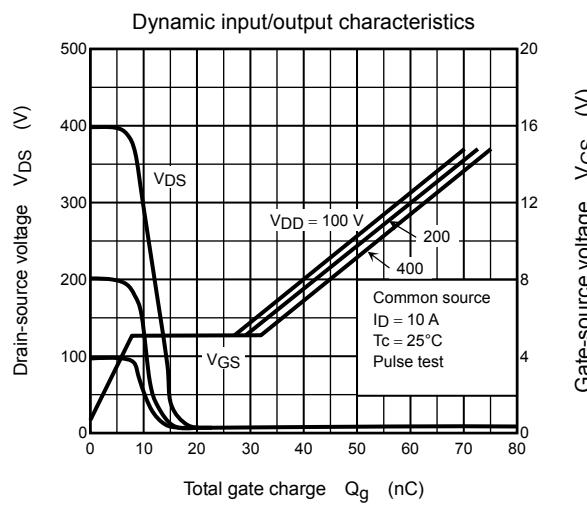
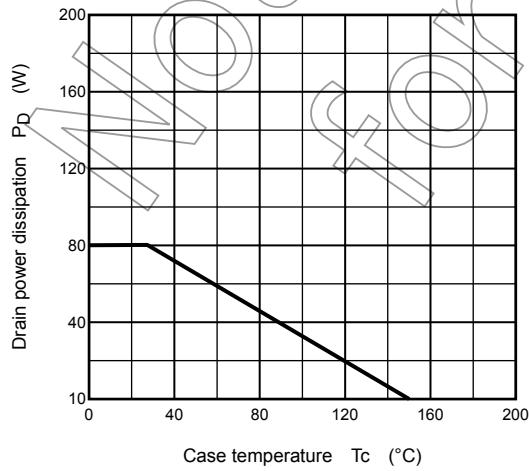
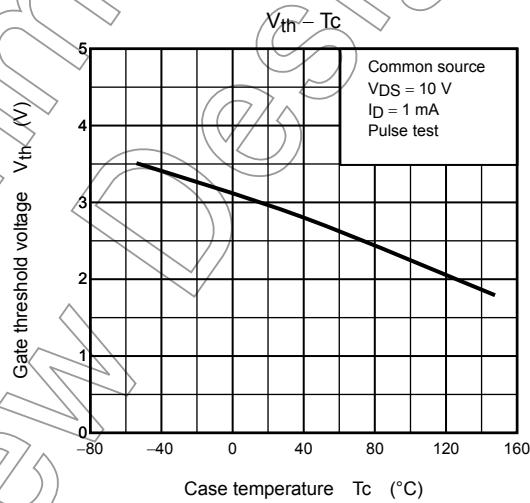
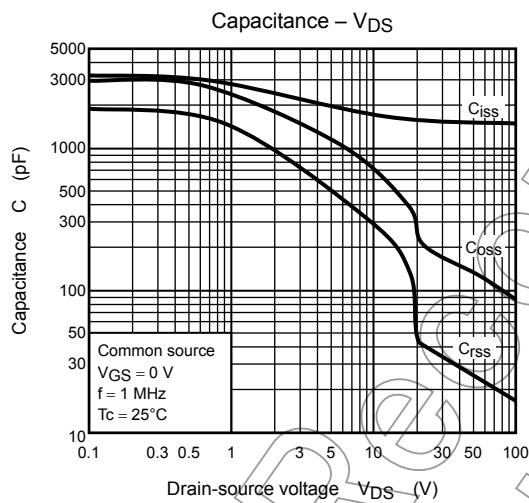
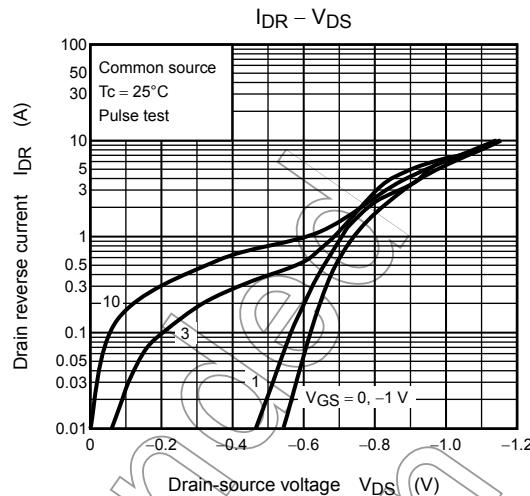
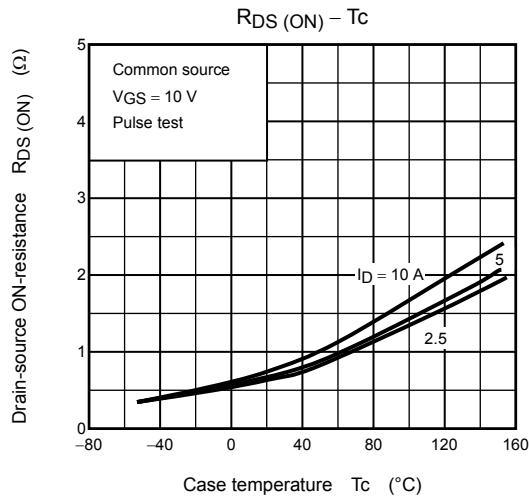
Note 4: A line under a Lot No. identifies the indication of product Labels.

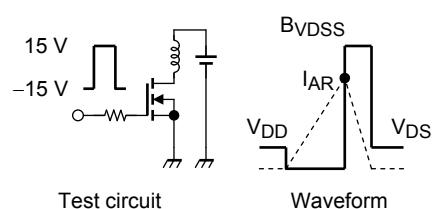
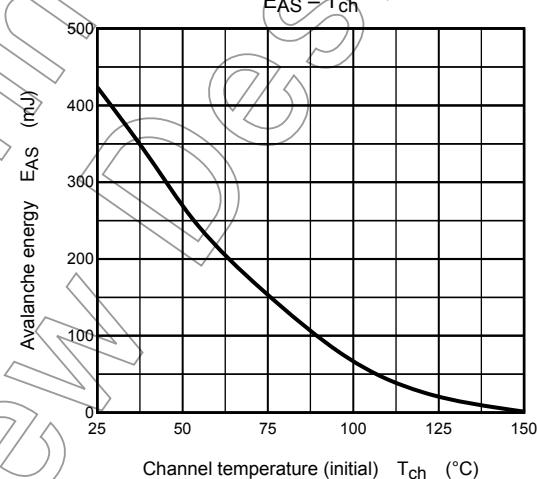
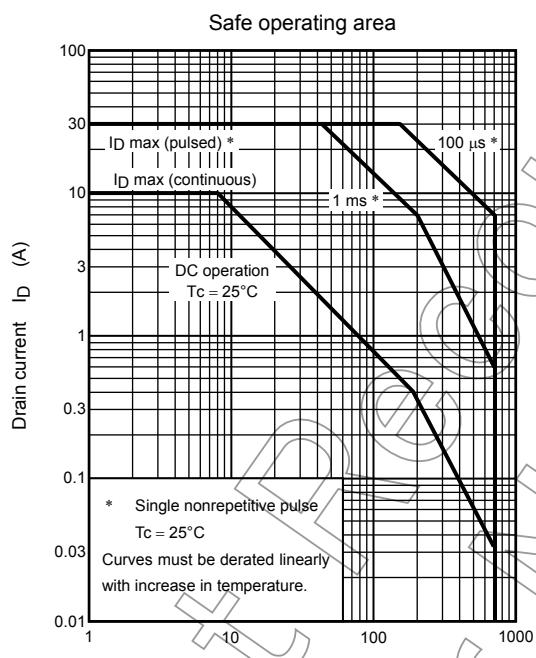
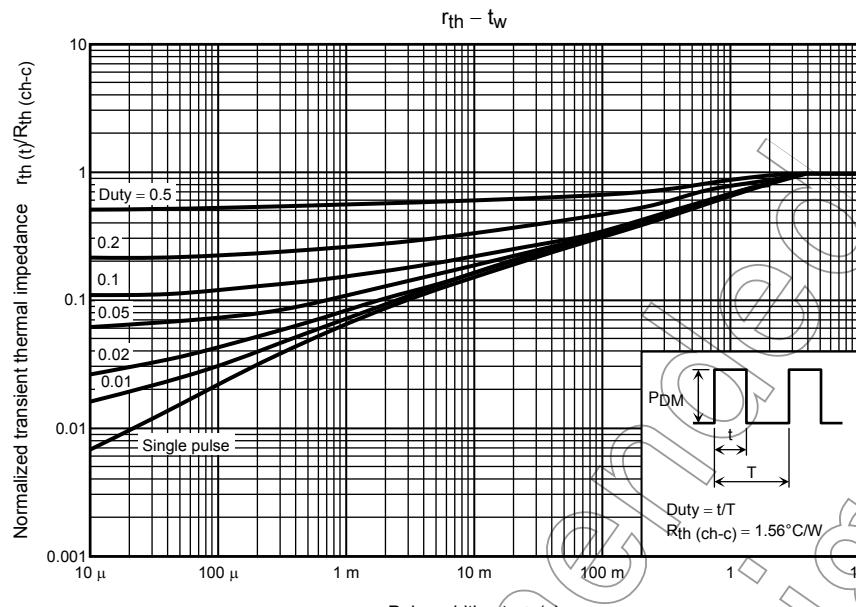
Not underlined: [[Pb]]/INCLUDES > MCV

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

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$$R_G = 25\ \Omega$$

$$V_{DD} = 90\ \text{V}, L = 7.5\ \text{mH}$$

$$E_{AS} = \frac{1}{2} \cdot L \cdot I^2 \cdot \left(\frac{B_{VDSS}}{B_{VDSS} - V_{DD}} \right)$$

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