

این دیتاشیت توسط توکل الکترونیک تهیه و ارائه شده است.

جهت مشاهده قیمت، موجودی و ثبت سفارش این قطعه به وبسایت توکل الکترونیک مراجعه فرمایید.

مشاهده قیمت و خرید
برای خرید و مشاهده سایر محصولات کلیک کنید

TOSHIBA

2SK2313

TOSHIBA Field Effect Transistor Silicon N Channel MOS Type ($L^2-\pi$ -MOS V)

2SK2313

1. Applications

Relay Drive, DC-DC Converter Applications
Motor Drive

2. Features

- 4-V gate drive
- Low drain-source ON-resistance : $R_{DS(ON)} = 8\text{ m}\Omega$ (typ.)
- High forward transfer admittance : $|Y_{fs}| = 60\text{ S}$ (typ.)
- Low leakage current : $I_{DSS} = 100\text{ }\mu\text{A}$ (max) ($V_{DS} = 60\text{ V}$)
- Enhancement mode : $V_{th} = 0.8\text{ to }2.0\text{ V}$ ($V_{DS} = 10\text{ V}$, $I_D = 1\text{ mA}$)

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

Characteristics	Symbol	Rating	Unit
Drain-source voltage	V_{DSS}	60	V
Drain-gate voltage ($R_{GS} = 20\text{ k}\Omega$)	V_{DGR}	60	V
Gate-source voltage	V_{GSS}	± 20	V
Drain current	DC (Note 1)	I_D	60
	Pulse (Note 1)	I_{DP}	240
Drain power dissipation ($T_c = 25^\circ\text{C}$)	P_D	150	W
Single pulse avalanche energy (Note 2)	EAS	1054	mJ
Avalanche current	IAR	60	A
Repetitive avalanche energy (Note 3)	EAR	15	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.).

4. Thermal Characteristics

Characteristics	Symbol	Max	Unit
Thermal resistance, channel to case	$R_{th(ch-c)}$	0.833	$^\circ\text{C/W}$
Thermal resistance, channel to ambient	$R_{th(ch-a)}$	50	$^\circ\text{C/W}$

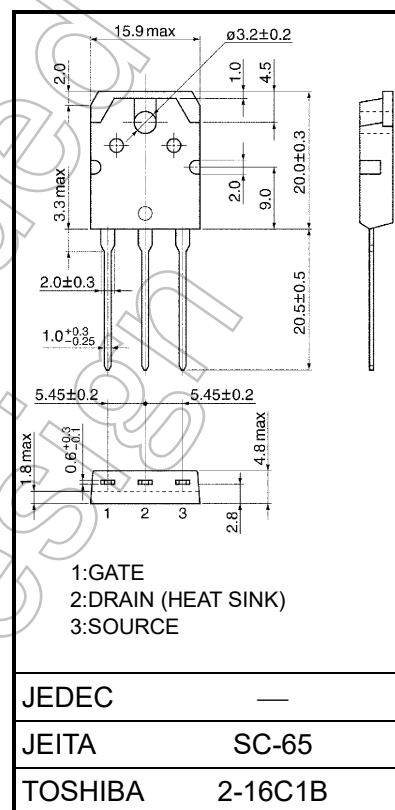
Note 1: Ensure that the channel temperature does not exceed 150°C Note 2: $V_{DD} = 25\text{ V}$, $T_{ch} = 25^\circ\text{C}$ (initial), $L = 398\text{ }\mu\text{H}$, $R_G = 25\text{ }\Omega$, $I_{AR} = 60\text{ A}$

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

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

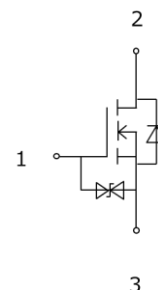
Start of commercial production
1994-02

Unit: mm

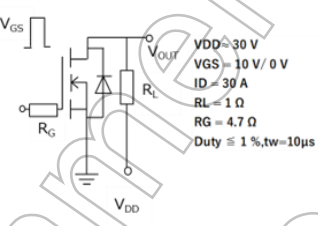


Weight: 4.6 g (typ.)

Circuit Configuration



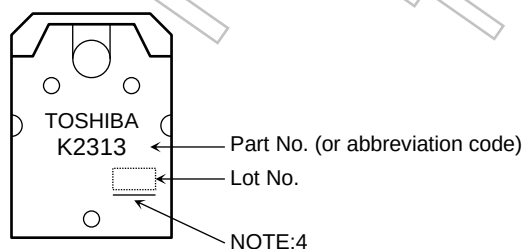
5. Electrical Characteristics (Ta = 25°C)

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current		I_{GSS}	$V_{GS} = \pm 16 \text{ V}, V_{DS} = 0 \text{ V}$	—	—	± 10	μA
Drain cut-OFF current		I_{DSS}	$V_{DS} = 60 \text{ V}, V_{GS} = 0 \text{ V}$	—	—	100	μA
Drain-source breakdown voltage		$V_{(BR) DSS}$	$I_D = 10 \text{ mA}, V_{GS} = 0 \text{ V}$	60	—	—	V
Gate threshold voltage		V_{th}	$V_{DS} = 10 \text{ V}, I_D = 1 \text{ mA}$	0.8	—	2.0	V
Drain-source ON-resistance		$R_{DS(ON)}$	$V_{GS} = 4 \text{ V}, I_D = 30 \text{ A}$	—	12	15	$\text{m}\Omega$
			$V_{GS} = 10 \text{ V}, I_D = 30 \text{ A}$	—	8	11	
Forward transfer admittance		$ Y_{fs} $	$V_{DS} = 10 \text{ V}, I_D = 30 \text{ A}$	40	60	—	S
Input capacitance		C_{iss}	$V_{DS} = 10 \text{ V}, V_{GS} = 0 \text{ V}, f = 1 \text{ MHz}$	—	5400	—	pF
Reverse transfer capacitance		C_{rss}		—	920	—	
Output capacitance		C_{oss}		—	2600	—	
Switching time	Rise time	t_r		—	30	—	ns
	Turn-ON time	t_{on}		—	60	—	
	Fall time	t_f		—	65	—	
	Turn-OFF time	t_{off}		—	220	—	
Total gate charge (gate-source plus gate-drain)		Q_g	$V_{DD} \approx 48 \text{ V}, V_{GS} = 10 \text{ V}, I_D = 60 \text{ A}$	—	170	—	nC
Gate-source charge		Q_{gs}		—	110	—	
Gate-drain ("miller") charge		Q_{gd}		—	60	—	

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

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Continuous drain reverse current (Note 1)	I_{DR}	—	—	—	60	A
Pulse drain reverse current (Pulse) (Note 1)	I_{DRP}	—	—	—	240	A
Forward voltage (diode)	V_{DSF}	$I_{DR} = 60 \text{ A}, V_{GS} = 0 \text{ V}$	—	—	-1.7	V
Reverse recovery time	t_{rr}	$I_{DR} = 60 \text{ A}, V_{GS} = 0 \text{ V}$ $-dI_{DR} / dt = 50 \text{ A} / \mu\text{s}$	—	150	—	ns
Reverse recovered charge	Q_{rr}		—	0.3	—	μC

7. Marking



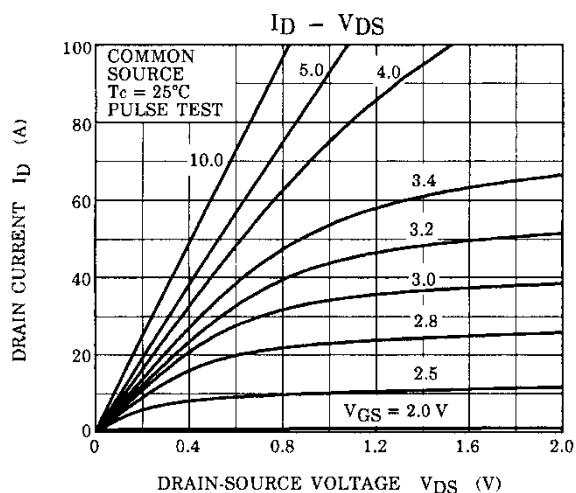
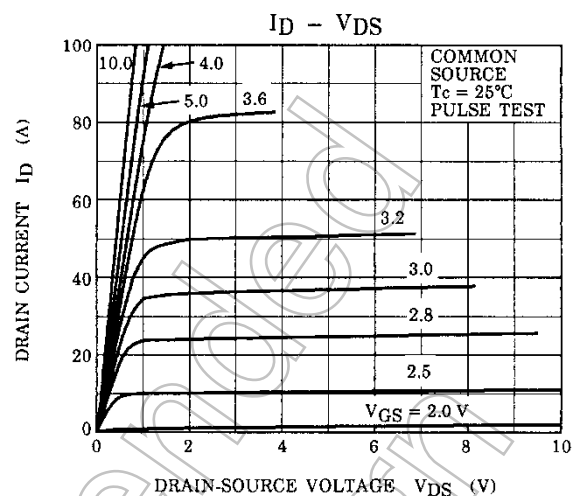
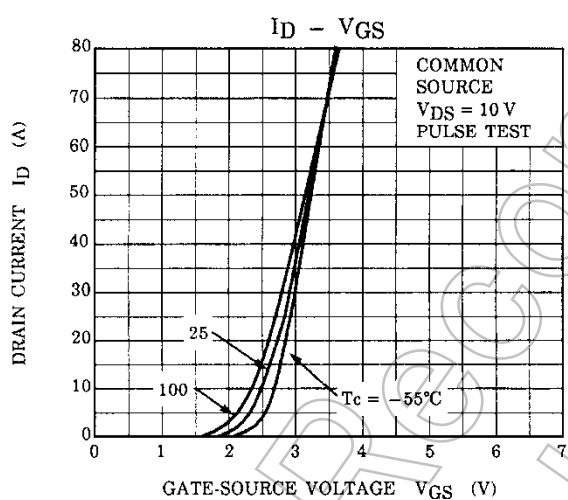
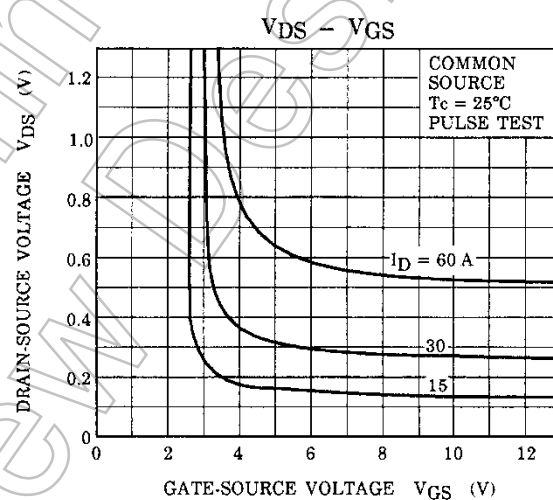
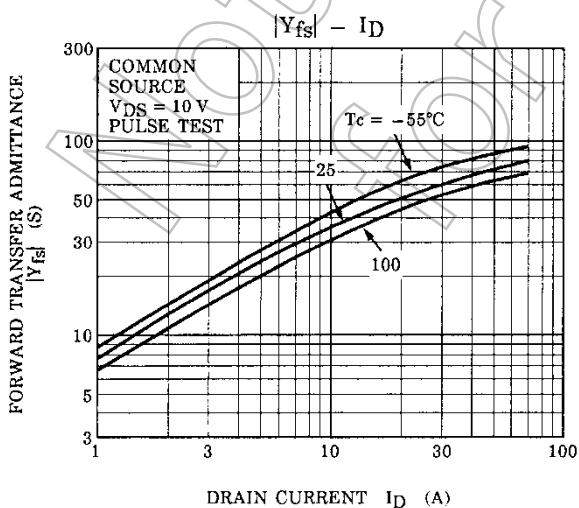
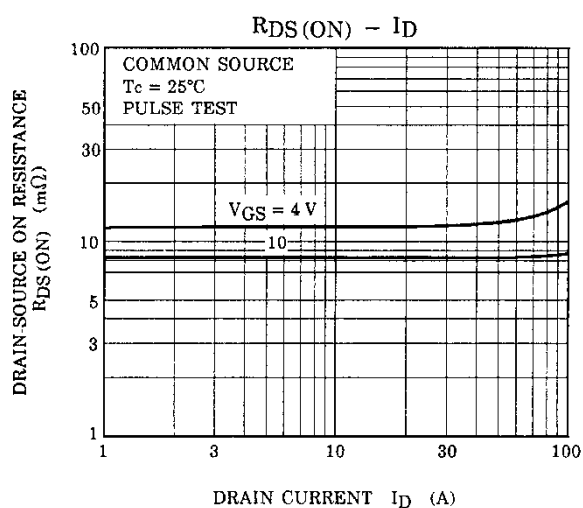
Note 4: A line under a Lot No. identifies the indication of product Labels.

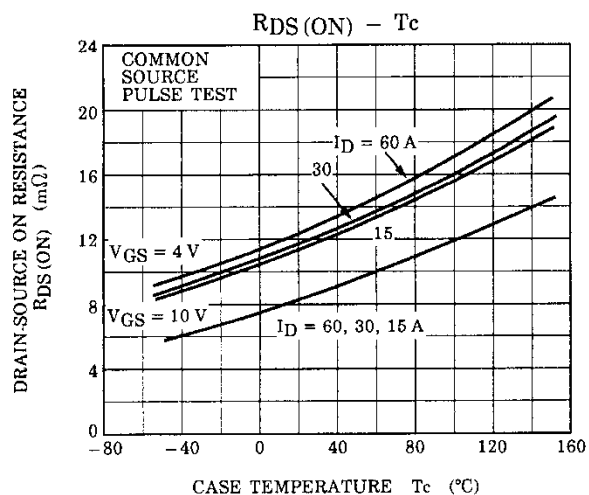
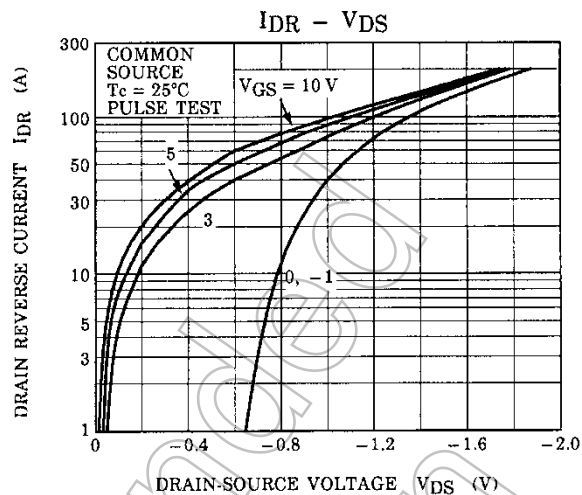
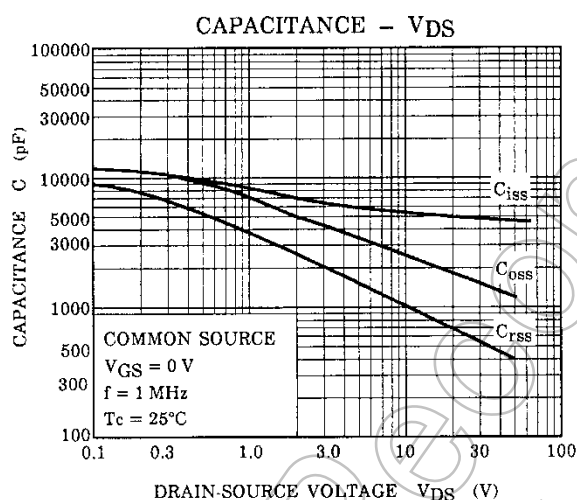
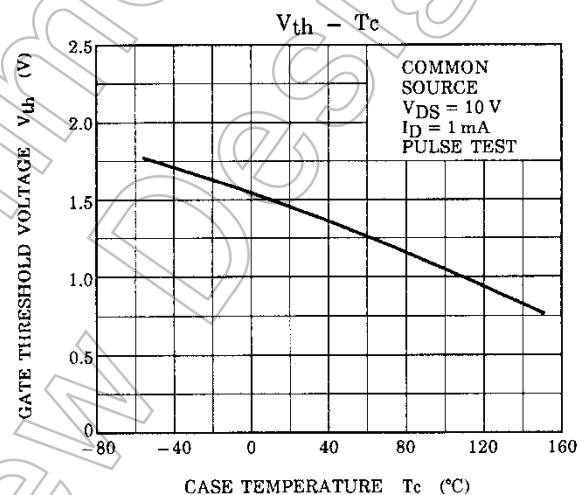
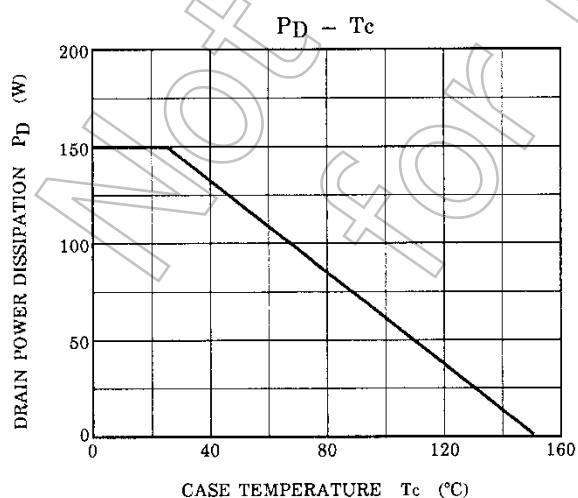
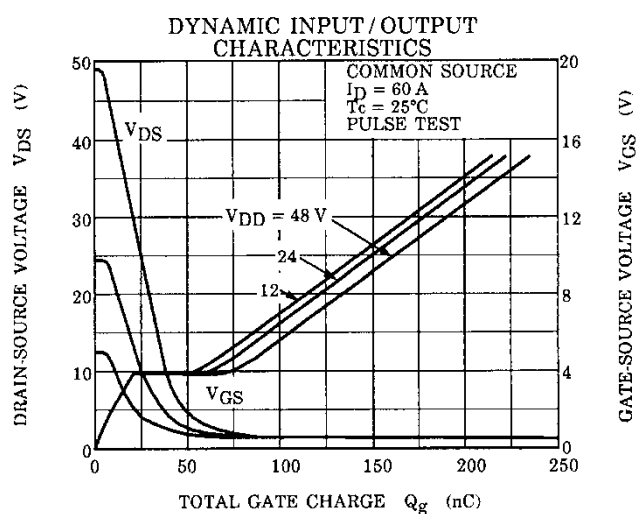
Not underlined: $[[Pb]]/INCLUDES > MCV$

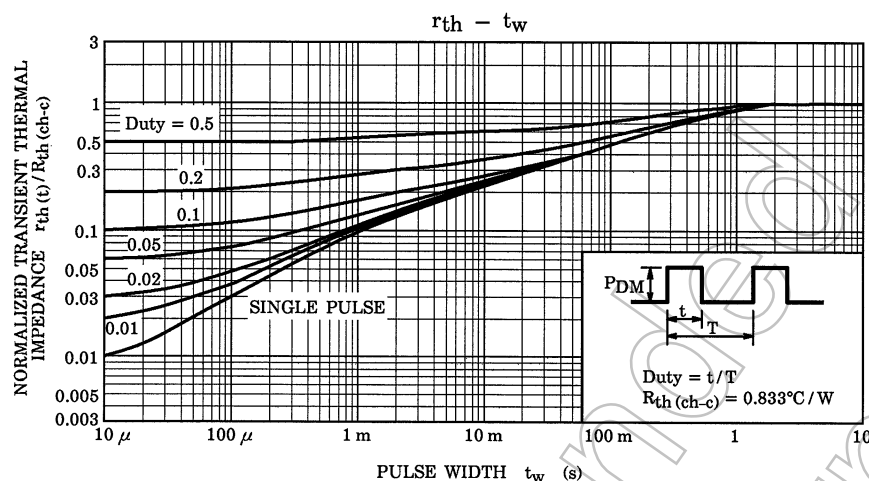
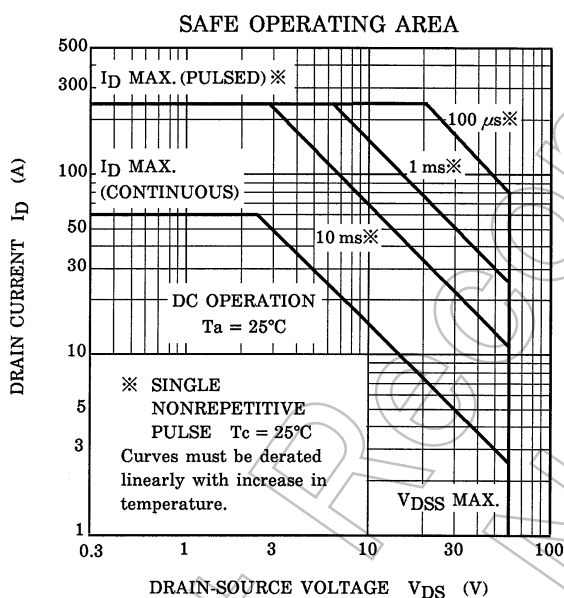
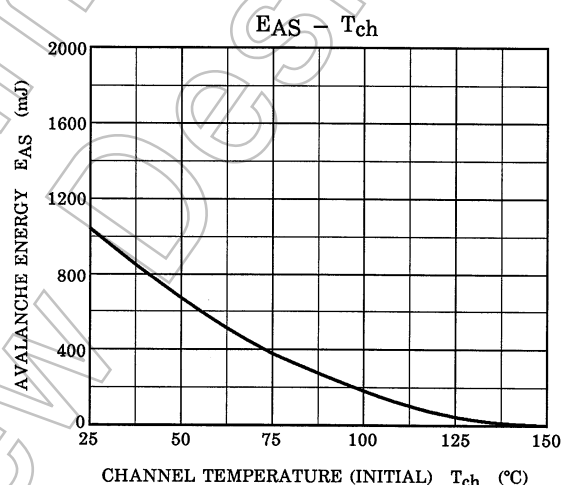
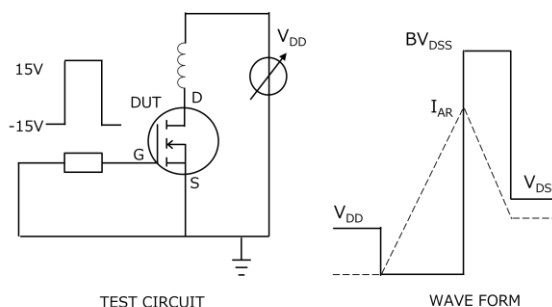
Underlined: $[[G]]/RoHS \text{ COMPATIBLE}$ or $[[G]]/RoHS [[Pb]]$

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8. Characteristic Chart(Note)







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

Note: The above characteristics curves are presented for reference only and not guaranteed by production test, unless otherwise noted.

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