

TOSHIBA FIELD EFFECT TRANSISTOR SILICON N CHANNEL MOS TYPE (π -MOSVI)

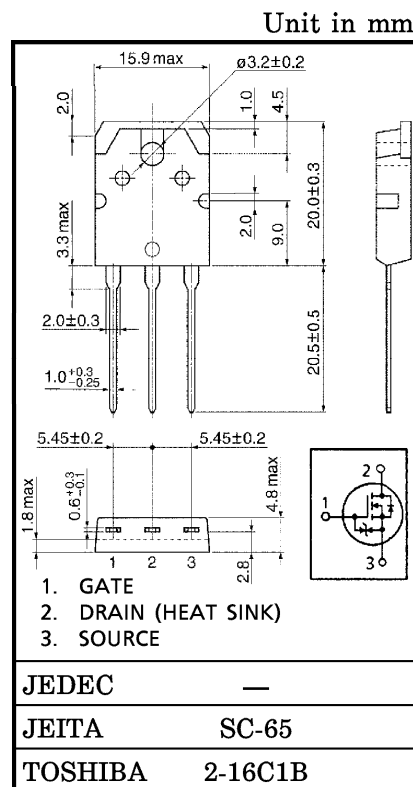
2SK3129

CHOPPER REGULATOR, DC-DC CONVERTER AND MOTOR DRIVE APPLICATIONS

- Low Drain-Source ON Resistance : $R_{DS(ON)} = 5.5 \text{ m}\Omega$ (Typ.)
- High Forward Transfer Admittance : $|Y_{fs}| = 70 \text{ S}$ (Typ.)
- Low Leakage Current : $I_{DSS} = 100 \mu\text{A}$ (Max.) ($V_{DS} = 30 \text{ V}$)
- Enhancement-Mode : $V_{th} = 0.8 \sim 2.0 \text{ V}$
($V_{DS} = 10 \text{ V}$, $I_D = 1 \text{ mA}$)

MAXIMUM RATINGS ($T_a = 25^\circ\text{C}$)

| CHARACTERISTIC | | SYMBOL | RATING | UNIT |
|--|----------------|-----------|----------------|------------------|
| Drain-Source Voltage | | V_{DSS} | 50 | V |
| Drain-Gate Voltage ($R_{GS} = 20 \text{ k}\Omega$) | | V_{DGR} | 50 | V |
| Gate-Source Voltage | | V_{GSS} | ± 20 | V |
| Drain Current | DC (Note 1) | I_D | 60 | A |
| | Pulse (Note 1) | I_{DP} | 240 | A |
| Drain Power Dissipation ($T_c = 25^\circ\text{C}$) | | P_D | 150 | W |
| Single Pulse Avalanche Energy (Note 2) | | E_{AS} | 721 | mJ |
| Avalanche Current | | I_{AR} | 60 | A |
| Repetitive Avalanche Energy (Note 3) | | E_{AR} | 12 | mJ |
| Channel Temperature | | T_{ch} | 150 | $^\circ\text{C}$ |
| Storage Temperature Range | | T_{stg} | $-55 \sim 150$ | $^\circ\text{C}$ |



Weight : 4.6 g (Typ.)

THERMAL CHARACTERISTICS

| CHARACTERISTIC | 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) : Please use devices on condition that the channel temperature is below 150°C .

(Note 2) : $V_{DD} = 25 \text{ V}$, $T_{ch} = 25^\circ\text{C}$ (initial), $L = 246 \mu\text{H}$, $R_G = 25 \Omega$, $I_{AR} = 60 \text{ A}$

(Note 3) : Repetitive rating ; Pulse Width Limited by maximum junction temperature.

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

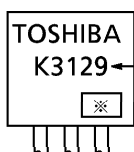
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

| CHARACTERISTIC | | 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} | $V_{DS} = 30\text{ V}, V_{GS} = 0\text{ V}$ | — | — | 100 | μA |
| Drain-Source Breakdown Voltage | | $V_{(BR)DSS}$ | $I_D = 10\text{ mA}, V_{GS} = 0\text{ V}$ | 50 | — | — | 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 | | $R_{DS(ON)}$ | $V_{GS} = 10\text{ V}, I_D = 30\text{ A}$ | — | 5.5 | 7 | $\text{m}\Omega$ |
| Forward Transfer Admittance | | $ Y_{fs} $ | $V_{DS} = 10\text{ V}, I_D = 30\text{ A}$ | 40 | 70 | — | S |
| Input Capacitance | | C_{iss} | $V_{DS} = 10\text{ V}, V_{GS} = 0\text{ V}$ $f = 1\text{ MHz}$ | — | 3700 | — | pF |
| Reverse Transfer Capacitance | | C_{rss} | | — | 650 | — | |
| Output Capacitance | | C_{oss} | | — | 1800 | — | |
| Switching Time | Rise Time | t_r | | — | 20 | — | ns |
| | Turn-on Time | t_{on} | | — | 35 | — | |
| | Fall Time | t_f | | — | 160 | — | |
| | Turn-off Time | t_{off} | | — | 480 | — | |
| Total Gate Charge (Gate-Source Plus Gate-Drain) | | Q_g | $V_{DD} \doteq 40\text{ V}, V_{GS} = 10\text{ V}$ $I_D = 60\text{ A}$ | — | 135 | — | nC |
| Gate-Source Charge | | Q_{gs} | | — | 90 | — | |
| Gate-Drain (“Miller”) Charge | | Q_{gd} | | — | 45 | — | |

SOURCE-DRAIN RATINGS AND CHARACTERISTICS (Ta = 25°C)

| CHARACTERISTIC | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|---|-----------|---|------|------|------|---------------|
| Continuous Drain Reverse Current (Note 1) | I_{DR} | — | — | — | 60 | A |
| Pulse Drain Reverse Current (Note 1) | I_{DRP} | — | — | — | 240 | A |
| Forward Voltage (Diode) | V_{DSF} | $I_{DR} = 60\text{ A}, V_{GS} = 0\text{ V}$ | — | — | -1.4 | V |
| Reverse Recovery Time | t_{rr} | $I_{DR} = 60\text{ A}, V_{GS} = 0\text{ V}$ | — | 180 | — | ns |
| Reverse Recovery Charge | Q_{rr} | $dI_{DR}/dt = 50\text{ A}/\mu\text{s}$ | — | 0.32 | — | μC |

MARKING



※ Lot Number

□ □ — Month (Starting from Alphabet A)

— Year (Last Number of the Christian Era)

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