

TOSHIBA FIELD EFFECT TRANSISTOR SILICON N CHANNEL MOS TYPE ( $\pi$ -MOSVI)

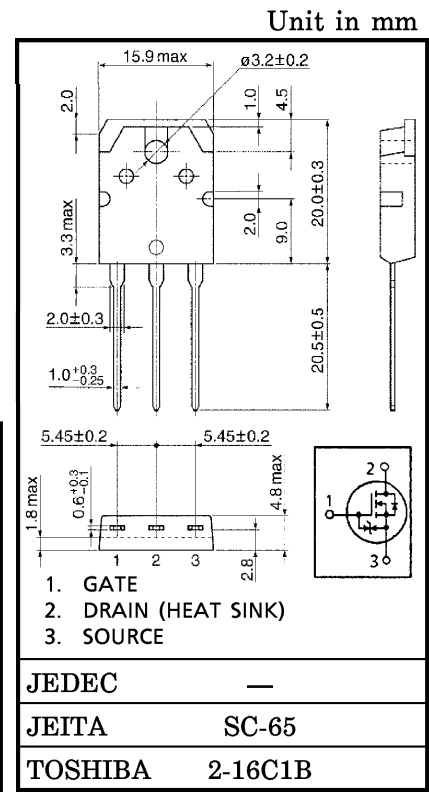
# 2SK3129

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		$V_{GSS}$	$\pm 20$	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  $150^\circ\text{C}$ .

(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.**

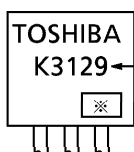
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Gate Leakage Current		$I_{GSS}$	$V_{GS} = \pm 16\text{ V}, V_{DS} = 0\text{ V}$	—	—	$\pm 10$	$\mu\text{A}$
Drain Cut-off Current		$I_{DSS}$	$V_{DS} = 30\text{ V}, V_{GS} = 0\text{ V}$	—	—	100	$\mu\text{A}$
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	—	$\mu\text{C}$

MARKING



※ Lot Number

□ □ — Month (Starting from Alphabet A)

— Year (Last Number of the Christian Era)

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