

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

2SK3127

CHOPPER REGULATOR, DC-DC CONVERTER AND MOTOR DRIVE APPLICATIONS

- Low Drain-Source ON Resistance : $R_{DS(ON)} = 9.5 \text{ m}\Omega$ (Typ.)
- High Forward Transfer Admittance : $|Y_{fs}| = 38 \text{ S}$ (Typ.)
- Low Leakage Current : $I_{DSS} = 100 \mu\text{A}$ (Max.) ($V_{DS} = 30 \text{ V}$)
- Enhancement-Mode : $V_{th} = 1.5 \sim 3.0 \text{ V}$ ($V_{DS} = 10 \text{ V}$, $I_D = 1 \text{ mA}$)

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

CHARACTERISTIC	SYMBOL	RATING	UNIT
Drain-Source Voltage	V_{DSS}	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	45
	Pulse (Note 1)	I_{DP}	135
Drain Power Dissipation ($T_c = 25^\circ\text{C}$)	P_D	65	W
Single Pulse Avalanche Energy (Note 2)	E_{AS}	524	mJ
Avalanche Current	I_{AR}	45	A
Repetitive Avalanche Energy (Note 3)	E_{AR}	6	mJ
Channel Temperature	T_{ch}	150	$^\circ\text{C}$
Storage Temperature Range	T_{stg}	$-55 \sim 150$	$^\circ\text{C}$

THERMAL CHARACTERISTICS

CHARACTERISTIC	SYMBOL	MAX.	UNIT
Thermal Resistance, Channel to Case	$R_{th(ch-c)}$	1.92	$^\circ\text{C/W}$
Thermal Resistance, Channel to Ambient	$R_{th(ch-a)}$	83.3	$^\circ\text{C/W}$

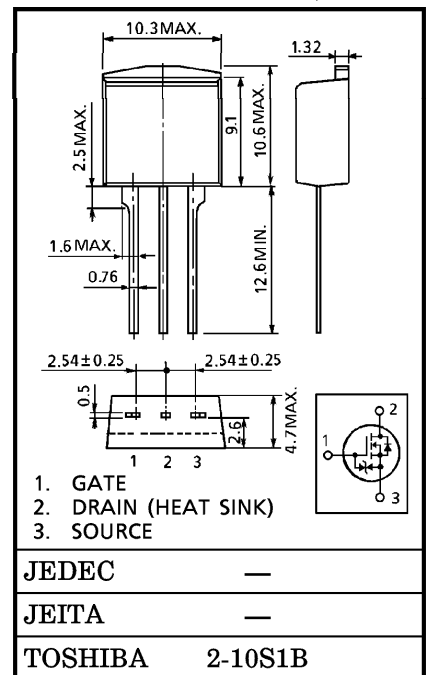
(Note 1) : Please use devices on condition that the channel temperature is below 150°C .

(Note 2) : $V_{DD} = 25 \text{ V}$, $T_{ch} = 25^\circ\text{C}$ (initial), $L = 186 \mu\text{H}$, $R_G = 25 \Omega$, $I_{AR} = 45 \text{ A}$

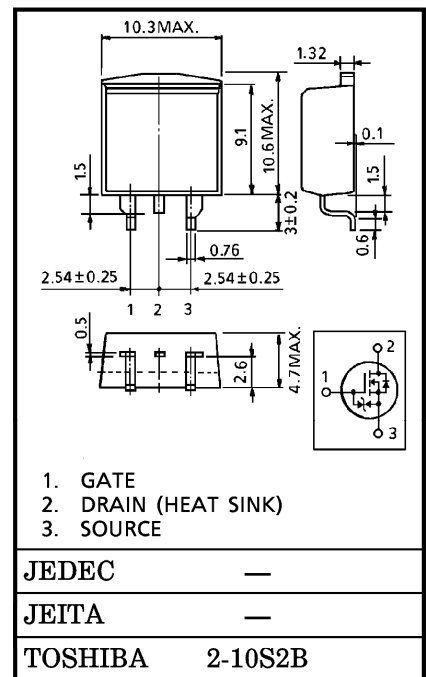
(Note 3) : Repetitive rating ; Pulse Width Limited by maximum junction temperature.

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

Unit in mm



Weight : 1.5 g (Typ.)



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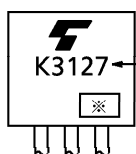
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC		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	—	—	100	μA
Drain-Source Breakdown Voltage		V _{(BR) DSS}	I _D = 10 mA, V _{GS} = 0 V	30	—	—	V
Gate Threshold Voltage		V _{th}	V _{DS} = 10 V, I _D = 1 mA	1.5	—	3.0	V
Drain-Source ON Resistance		R _{DS(ON)}	V _{GS} = 10 V, I _D = 25 A	—	9.5	12	mΩ
Forward Transfer Admittance		Y _{fs}	V _{DS} = 10 V, I _D = 25 A	19	40	—	S
Input Capacitance		C _{iss}	V _{DS} = 10 V, V _{GS} = 0 V, f = 1 MHz	—	2300	—	pF
Reverse Transfer Capacitance		C _{rss}		—	380	—	
Output Capacitance		C _{oss}		—	1100	—	
Switching Time	Rise Time	t _r		—	12	—	ns
	Turn-on Time	t _{on}		—	25	—	
	Fall Time	t _f		—	75	—	
	Turn-off Time	t _{off}		Duty ≤ 1%, t _w = 10 μs	—	200	
Total Gate Charge (Gate-Source Plus Gate-Drain)		Q _g	V _{DD} ≅ 24 V, V _{GS} = 10 V I _D = 45 A	—	66	—	nC
Gate-Source Charge		Q _{gs}		—	45	—	
Gate-Drain ("Miller") Charge		Q _{gd}		—	21	—	

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

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Continuous Drain Reverse Current (Note 1)	I _{DR}	—	—	—	45	A
Pulse Drain Reverse Current (Note 1)	I _{DRP}	—	—	—	135	A
Forward Voltage (Diode)	V _{DSF}	I _{DR} = 45 A, V _{GS} = 0 V	—	—	-1.7	V
Reverse Recovery Time	t _{rr}	I _{DR} = 45 A, V _{GS} = 0 V dI _{DR} /dt = 50 A/μs	—	150	—	ns
Reverse Recovery Charge	Q _{rr}		—	270	—	nC

MARKING



※ Lot Number

□ □ — Month (Starting from Alphabet A)

— Year (Last Number of the Christian Era)

RESTRICTIONS ON PRODUCT USE

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