2SK2842

Chopper Regulator, DC−DC Converter and Motor Drive Applications

Unit: mm

- Low drain−source ON resistance : $R_{DS (ON)}$ = 0.4 Ω (typ.)
- High forward transfer admittance : $|Y_{fs}|$ = 9.0 S (typ.)
- Low leakage current : I_{DSS} = 100 μA (max) (V_{DS} = 500 V)
- Enhancement mode : V_{th} = 2.0~4.0 V (V_{DS} = 10 V, I_D = 1 mA)

Absolute Maximum Ratings (Ta = 25°C)

Characteristics		Symbol	Rating	Unit
Drain−source voltage		V_{DSS}	500	V
Drain−gate voltage (R_{GS} = 20 kΩ)		V_{DGR}	500	V
Gate−source voltage		V_{GSS}	±30	V
Drain current	DC (Note 1)	I_D	12	A
	Pulse (Note 1)	I_{DP}	48	A
Drain power dissipation (Tc = 25°C)		P_D	40	W
Single pulse avalanche energy (Note 2)		E_{AS}	364	mJ
Avalanche current		I_{AR}	12	A
Repetitive avalanche energy (Note 3)		E_{AR}	4.0	mJ
Channel temperature		T_{ch}	150	°C
Storage temperature range		T_{stg}	−55~150	°C

1. GATE
2. DRAIN
3. SOURCE

JEDEC	—
JEITA	SC-67
TOSHIBA	2-10R1B
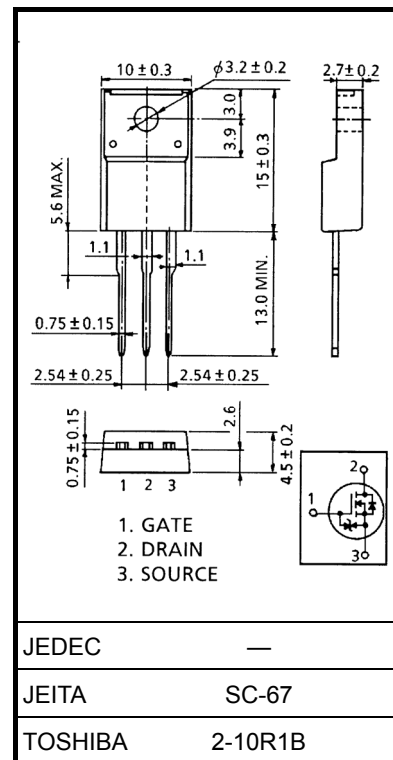
Weight: 1.9 g (typ.)

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

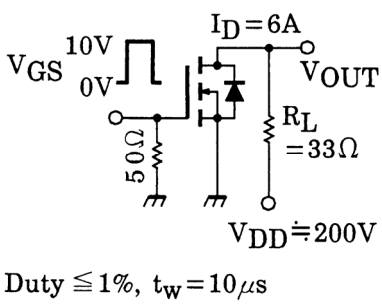| Characteristics	Symbol	Max	Unit
Thermal resistance, channel to case	$R_{th (ch−c)}$	3.125	°C / W
Thermal resistance, channel to ambient	$R_{th (ch−a)}$	62.5	°C / W

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

Note 2: V_{DD} = 90 V, T_{ch} = 25°C (initial), L = 4.3 mH, R_G = 25 Ω, I_{AR} = 12 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 (Ta = 25°C)

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Gate leakage current		I_{GSS}	$V_{GS} = \pm 25$ V, $V_{DS} = 0$ V	—	—	±10	μA
Gate−source breakdown voltage		$V_{(BR)GSS}$	$I_G = \pm 10$ μA, $V_{DS} = 0$ V	±30	—	—	V
Drain cut−off current		I_{DSS}	$V_{DS} = 500$ V, $V_{GS} = 0$ V	—	—	100	μA
Drain−source breakdown voltage		$V_{(BR)DSS}$	$I_D = 10$ mA, $V_{GS} = 0$ V	500	—	—	V
Gate threshold voltage		V_{th}	$V_{DS} = 10$ V, $I_D = 1$ mA	2.0	—	4.0	V
Drain−source ON resistance		$R_{DS(ON)}$	$V_{GS} = 10$ V, $I_D = 6$ A	—	0.4	0.52	Ω
Forward transfer admittance		$\lvert Y_{fs} \rvert$	$V_{DS} = 10$ V, $I_D = 6$ A	4.0	9.0	—	S
Input capacitance		C_{iss}		—	2040	—	pF
Reverse transfer capacitance		C_{rss}	$V_{DS} = 10$ V, $V_{GS} = 0$ V, f = 1 MHz	—	200	—	
Output capacitance		C_{oss}		—	640	—	
Switching time	Rise time	t_r		—	22	—	ns
	Turn−on time	t_{on}		—	58	—	
	Fall time	t_f		—	36	—	
	Turn−off time	t_{off}		—	180	—	
Total gate charge (gate−source plus gate−drain)		Q_g	$V_{DD} \approx 400$ V, $V_{GS} = 10$ V, $I_D = 12$ A	—	45	—	nC
Gate−source charge		Q_{gs}		—	25	—	
Gate−drain ("miller") Charge		Q_{gd}		—	20	—	

Source−Drain Ratings and Characteristics (Ta = 25°C)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Continuous drain reverse current (Note 1)	I_{DR}	—	—	—	12	A
Pulse drain reverse current (Note 1)	I_{DRP}	—	—	—	48	A
Forward voltage (diode)	V_{DSF}	$I_{DR} = 12$ A, $V_{GS} = 0$ V	—	—	−1.7	V
Reverse recovery time	t_{rr}	$I_{DR} = 12$ A, $V_{GS} = 0$ V $dI_{DR} / dt = 100$ A / μs	—	1200	—	ns
Reverse recovery charge	Q_{rr}		—	16	—	μC

Marking

K2842 ← Part No. (or abbreviation code)
← Lot No.

A line indicates lead (Pb)-free package or lead (Pb)-free finish.

$I_D - V_{DS}$

COMMON
SOURCE
Tc = 25°C
PULSE
TEST

DRAIN CURRENT I_D (A)

DRAIN-SOURCE VOLTAGE V_{DS} (V)

$I_D - V_{DS}$

COMMON
SOURCE
Tc = 25°C
PULSE
TEST

DRAIN CURRENT I_D (A)

$V_{GS} = 4$ V

DRAIN-SOURCE VOLTAGE V_{DS} (V)

$I_D - V_{GS}$

COMMON
SOURCE
$V_{DS} = 20$ V
PULSE TEST

DRAIN CURRENT I_D (A)

Tc = −55°C

100
25

GATE-SOURCE VOLTAGE V_{GS} (V)

$V_{DS} - V_{GS}$

COMMON
SOURCE
Tc = 25°C
PULSE TEST

DRAIN-SOURCE VOLTAGE V_{DS} (V)

$I_D = 12$ A

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GATE-SOURCE VOLTAGE V_{GS} (V)

$|Y_{fs}| - I_D$

COMMON
SOURCE
$V_{DS} = 20$ V
PULSE TEST

FORWARD TRANSFER ADMITTANCE $|Y_{fs}|$ (S)

Tc = −55°C

100
25

DRAIN CURRENT I_D (A)

$R_{DS(ON)} - I_D$

COMMON
SOURCE
Tc = 25°C
PULSE TEST

DRAIN-SOURCE ON RESISTANCE $R_{DS(ON)}$ (Ω)

$V_{GS} = 10, 15$ V

DRAIN CURRENT I_D (A)

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