

T-39-13

HIGH SPEED, HIGH CURRENT SWITCHING APPLICATIONS.
CHOPPER REGULATOR, DC-DC CONVERTER AND MOTOR
DRIVE APPLICATIONS.

FEATURES:

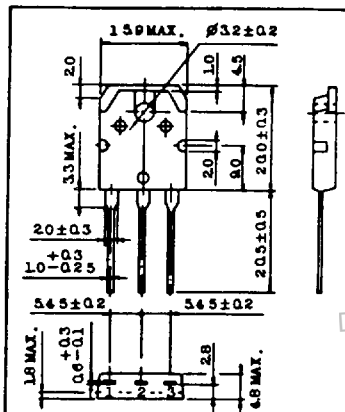
- Low Drain-Source ON Resistance : $R_{DS(ON)}=0.045\Omega$ (Typ.)
- High Forward Transfer Admittance : $|Y_{fs}|=11S$ (Typ.)
- Low Leakage Current : $I_{GSS}=\pm 500nA$ (Max.) @ $V_{GS}=\pm 20V$
 $I_{DSS}=250\mu A$ (Max.) @ $V_{DS}=60V$
- Enhancement-Mode : $V_{th}=2.0\sim 4.0V$ @ $V_{DS}=V_{GS}, I_D=250\mu A$

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

CHARACTERISTIC		SYMBOL	RATING	UNIT
Drain-Source Voltage		V_{DSX}	60	V
Drain-Gate Voltage ($R_{GS}=20k\Omega$)		V_{DGR}	60	V
Gate-Source Voltage		V_{GSS}	± 20	V
Drain Current	DC	I_D	40	A
	Pulse	I_{DP}	160	
Drain Power Dissipation ($T_c=25^\circ C$)		P_D	150	W
Channel Temperature		T_{ch}	150	$^\circ C$
Storage Temperature Range		T_{stg}	$-55\sim 150$	$^\circ C$

INDUSTRIAL APPLICATIONS

Unit in mm



- 1 GATE
- 2 DRAIN (HEAT SINK)
- 3 SOURCE

JEDEC

EIAJ

TOSHIBA

Weight : 4.6g

THERMAL CHARACTERISTICS

CHARACTERISTIC	SYMBOL	MAX.	UNIT
Thermal Resistance, Junction to Case	$R_{th(j-c)}$	0.83	$^\circ C/W$
Thermal Resistance, Junction to Ambient	$R_{th(j-a)}$	50	$^\circ C/W$
Maximum Lead Temperature for Soldering Purposes (1.6mm from case for 10 seconds)	T_L	300	$^\circ C$

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ELECTRICAL CHARACTERISTICS (Ta=25°C)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Gate Leakage Current		I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 500	nA
Drain Cut-off Current		I_{DSS}	$V_{DS}=60V, V_{GS}=0V$	-	-	250	μA
Drain-Source Breakdown Voltage		$V_{(BR)DSS}$	$I_D=250\mu A, V_{GS}=0V$	60	-	-	V
Gate Threshold Voltage		V_{th}	$V_{DS}=V_{GS}, I_D=250\mu A$	2.0	-	4.0	V
Forward Transfer Admittance		$ Y_{fs} $	$V_{DS}=10V, I_D=20A$	9.0	11	-	S
Drain-Source ON Resistance		$R_{DS(ON)}$	$I_D=20A, V_{GS}=10V$	-	0.045	0.055	Ω
Drain-Source ON Voltage		$V_{DS(ON)}$	$I_D=40A, V_{GS}=10V$	-	2.0	3.0	V
Input Capacitance		C_{iss}	$V_{DS}=25V, V_{GS}=0V, f=1MHz$	-	1700	3000	pF
Reverse Transfer Capacitance		C_{rss}		-	180	500	
Output Capacitance		C_{oss}		-	850	1500	
Switching Time	Rise Time	t_r	<p>$I_D=20A$ V_{IN} $10\mu s$ $4.7k\Omega$ $V_{IN}: t_r, t_f < 5ns$ $Duty \leq 1\%$ V_{OUT} $V_{DD}=24V$</p>	-	50	100	ns
	Turn-on Time	t_{on}		-	65	135	
	Fall Time	t_f		-	50	100	
	Turn-off Time	t_{off}		-	110	225	
Total Gate Charge (Gate-Source Plus Gate-Drain)		Q_g	$I_D=50A, V_{GS}=10V$ $V_{DD}=48V$	-	63	120	nC
Gate-Source Charge		Q_{gs}		-	27	-	
Gate-Drain ("Miller") Charge		Q_{gd}		-	36	-	

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

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Continuous Drain Reverse Current	I_{DR}	--	-	-	60	A
Pulse Drain Reverse Current	I_{DRP}	--	-	-	160	A
Diode Forward Voltage	V_{DSF}	$I_{DR}=40A, V_{GS}=0V$	-	-	2.5	V
Reverse Recovery Time	t_{rr}	$I_{DR}=40A$	-	600	-	ns
Reverse Recovered Charge	Q_{rr}	$dI_{DR}/dt=100A/\mu s$	-	3.3	-	μC