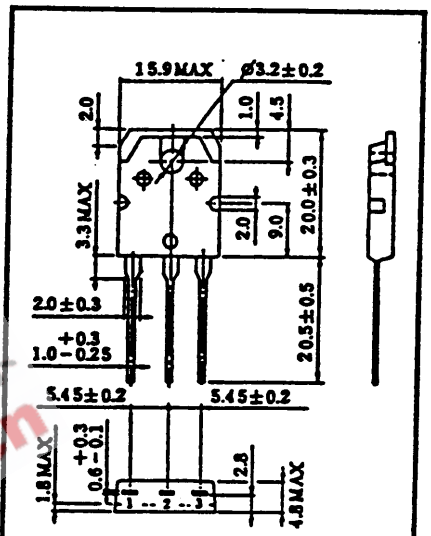
TOSHIBA FIELD EFFECT TRANSISTOR
2SK2150
SILICON N CHANNEL MOS TYPE
(π – MOS IV)

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

INDUSTRIAL APPLICATIONS

UNIT in mm

- Low Drain-Source ON Resistance : RDS(ON)=0.29Ω (Typ.)
- High Forward Transfer Admittance : |Yfs| = 14 S (Typ.)
- Low Leakage Current : IDSS= 100 μA (Max.) (VDS= 500V)
- Enhancement-Mode : Vth= 2.0 ~ 4.0V (VDS= 10V, ID= 1mA)



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

JEDEC	—
EIAJ	SC-65
TOSHIBA	2-16C1B

Weight : 4.6g

MAXIMUM RATINGS (Ta= 25 °C)

CHARACTERISTIC		SYMBOL	RATING	UNIT
Drain-Source Voltage		VDSS	500	V
Drain-Gate Voltage (RGS=20KΩ)		VDGR	500	V
Gate-Source Voltage		VGSS	±30	V
Drain Current	DC	ID	15	A
	Pulse	IDP	60	A
Drain Power Dissipation (Tc=25°C)		PD	150	W
Channel Temperature		Tch	150	°C
Storage Temperature Range		Tstg	-55~150	°C

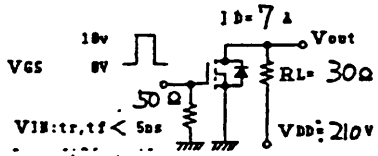
THERMAL CHARACTERISTICS

CHARACERISTIC	SYMBOL	MAX.	UNIT
Thermal Resistance, Channel To Case	Rth(ch-c)	0.833	°C/W
Thermal Resistance, Channel to Ambient	Rth(ch-a)	50	°C/W

THIS TRANSISTOR IS AN ELECTROSTATIC SENSITIVE DEVICE. PLEASE HANDLE WITH CAUTION.

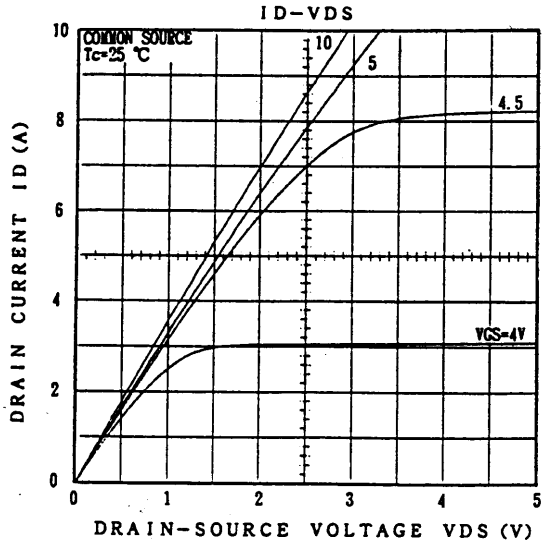
TOSHIBA CORPORATION

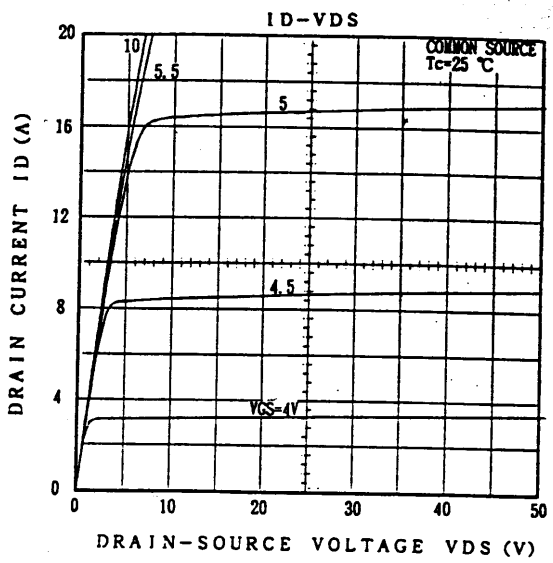
ELECTRICAL CHARACTERISTICS (Ta=25℃)

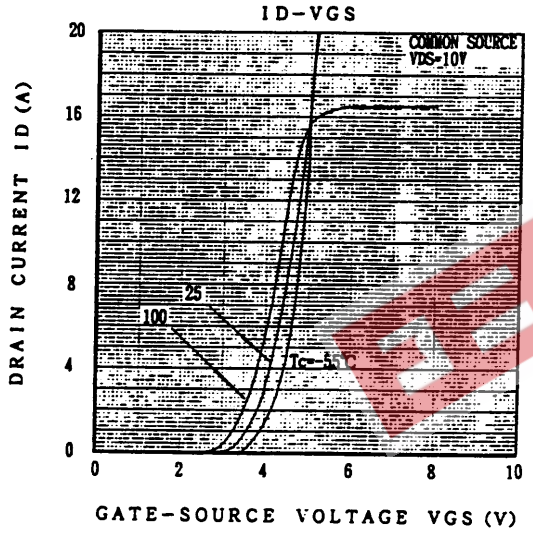
CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Gate Leakage Current		IGSS	VGS= ±25V, VDS= 0V	—	—	±10	μA
Gate-Source Breakdown Voltage		V(BR)GSS	IG= ±100μA, VDS= 0V	±30	—	—	
Drain Cut-off Current		IDSS	VDS= 500V, VGS= 0V	—	—	100	μA
Drain-Source Breakdown Voltage		V(BR)DSS	ID= 10mA, VGS= 0V	500	—	—	V
Gate Threshold Voltage		Vth	VDS= 10V, ID= 1mA	2.0	—	4.0	V
Drain-Source ON Resistance		RDS(ON)	VGS= 10V, ID= 7A	—	0.29	0.40	Ω
Forward Transfer Admittance		|Yfs|	VDS= 10V, ID= 7A		14	—	S
Input Capacitance		Ciss	VDS= 10V, VGS= 0V f= 1MHz	—	2350	—	pF
Reverse Transfer Capacitance		Crss		—	200	—	
Output Capacitance		Coss		—	730	—	
Swithing Time	Rise Time	tr		—	20	—	nS
	Turn-on Time	ton		—	55	—	
	Fall Time	tf		—	40	—	
	Turn-off Time	toff		—	235	—	
Total Gate Charge (Gate-Source Plus Gate-Drain)		Qg	VDD= 400V, VGS= 10V ID= 15A	—	50	—	nC
Gate-Source Charge		Qgs		—	30	—	
Gate-Drain ("Miller") Charge		Qgd		—	20	—	

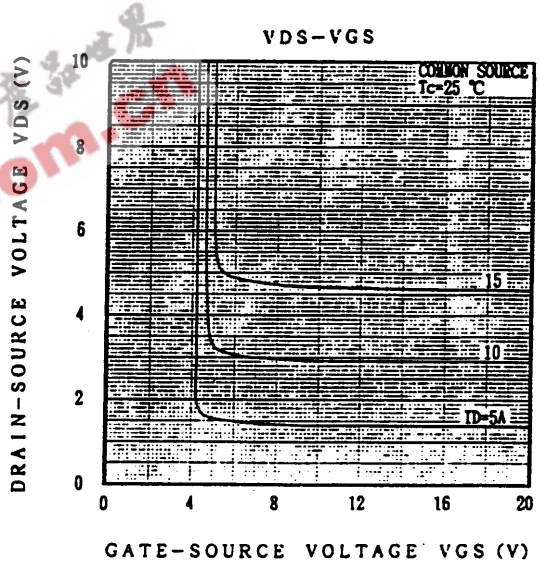
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (Ta=25℃)

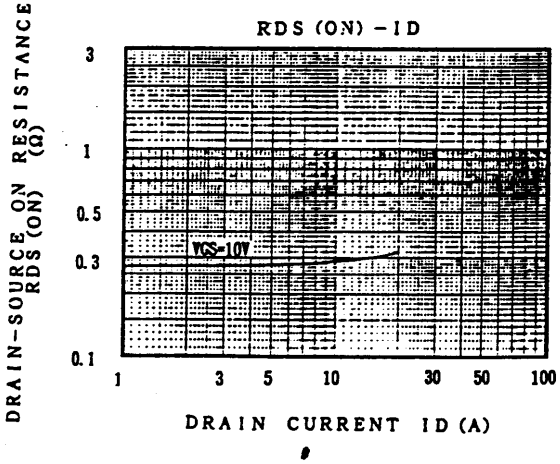
CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Continuous Drain Reverse Current	IDR	—	—	—	15	A
Pulse Drain Reverse Current	IDRP	—	—	—	60	A
Diode Foward Voltage	VDSF	IDR= 15A, VGS= 0V	—	—	-1.7	V
Reverse Recovery Time	trr	IDR= 15A, VGS= 0V dIDR/dt= 100A/μS	—	490	—	nS
Reverse Recovery Charge	Qrr		—	5.4	—	μC

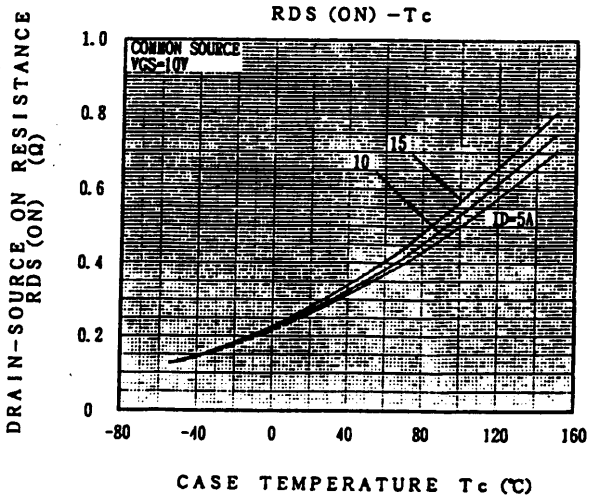

ID–VDS
COMMON SOURCE
Tc=25 °C
10
5
4.5
VGS=4V
DRAIN CURRENT ID (A)
DRAIN–SOURCE VOLTAGE VDS (V)

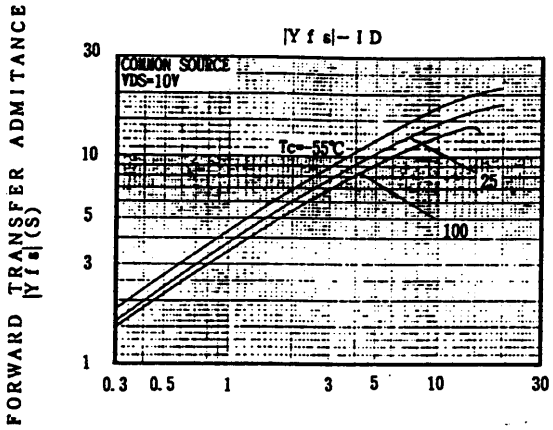

ID–VDS
COMMON SOURCE
Tc=25 °C
10
5.5
5
4.5
VGS=4V
DRAIN CURRENT ID (A)
DRAIN–SOURCE VOLTAGE VDS (V)

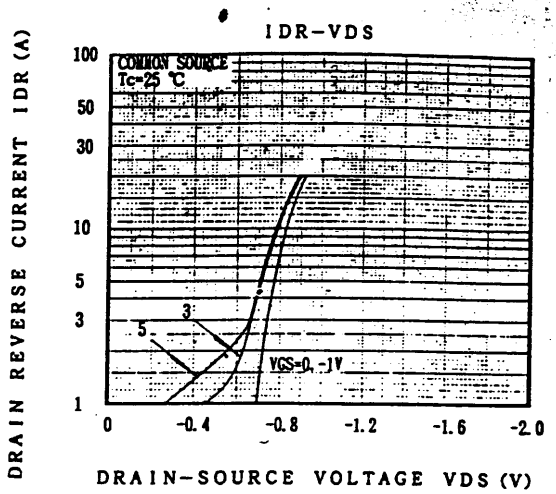

ID–VGS
COMMON SOURCE
VDS=10V
25
100
Tc=–55°C
DRAIN CURRENT ID (A)
GATE–SOURCE VOLTAGE VGS (V)

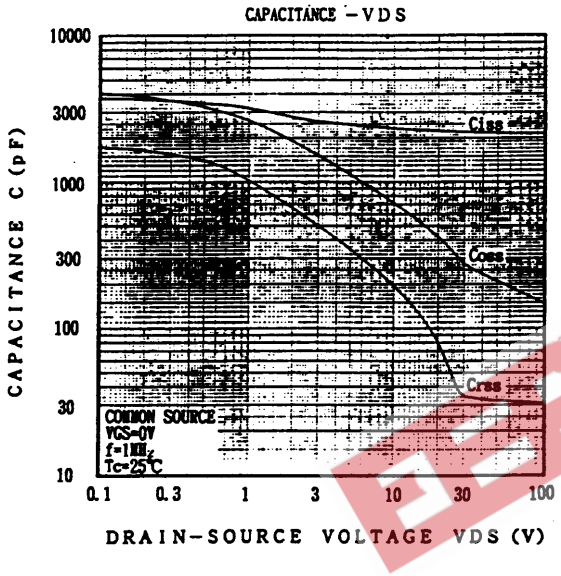

VDS–VGS
COMMON SOURCE
Tc=25 °C
15
10
ID=5A
DRAIN–SOURCE VOLTAGE VDS (V)
GATE–SOURCE VOLTAGE VGS (V)

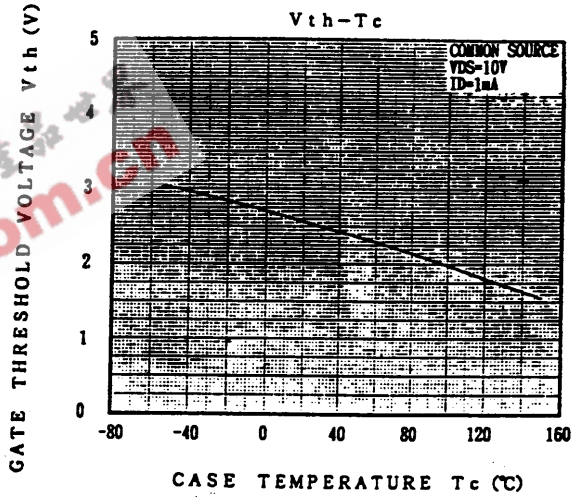

RDS (ON) – ID
VGS=10V
DRAIN–SOURCE ON RESISTANCE RDS (ON) (Ω)
DRAIN CURRENT ID (A)

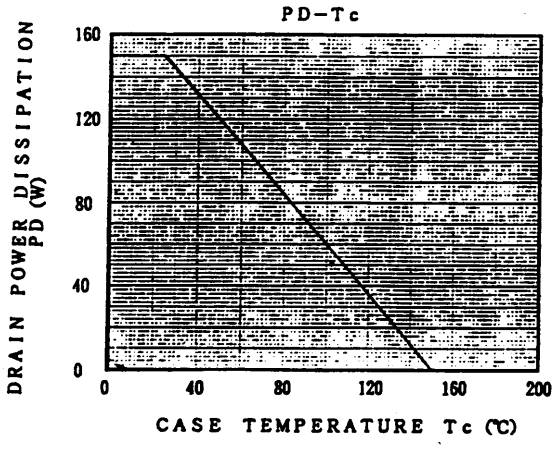

RDS (ON) – Tc
COMMON SOURCE
VGS=10V
15
10
ID=5A
DRAIN–SOURCE ON RESISTANCE RDS (ON) (Ω)
CASE TEMPERATURE Tc (°C)

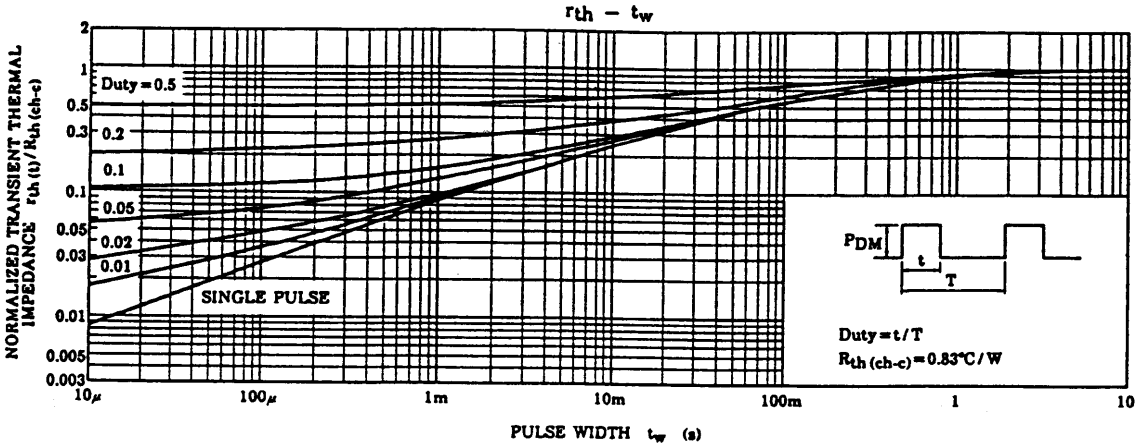

|Yfs|-ID
FORWARD TRANSFER ADMITTANCE |Yfs| (S)
COMMON SOURCE
VDS=10V
Tc=-55°C
25
100
30
10
5
3
1
0.3
0.5
1
3
5
10
30

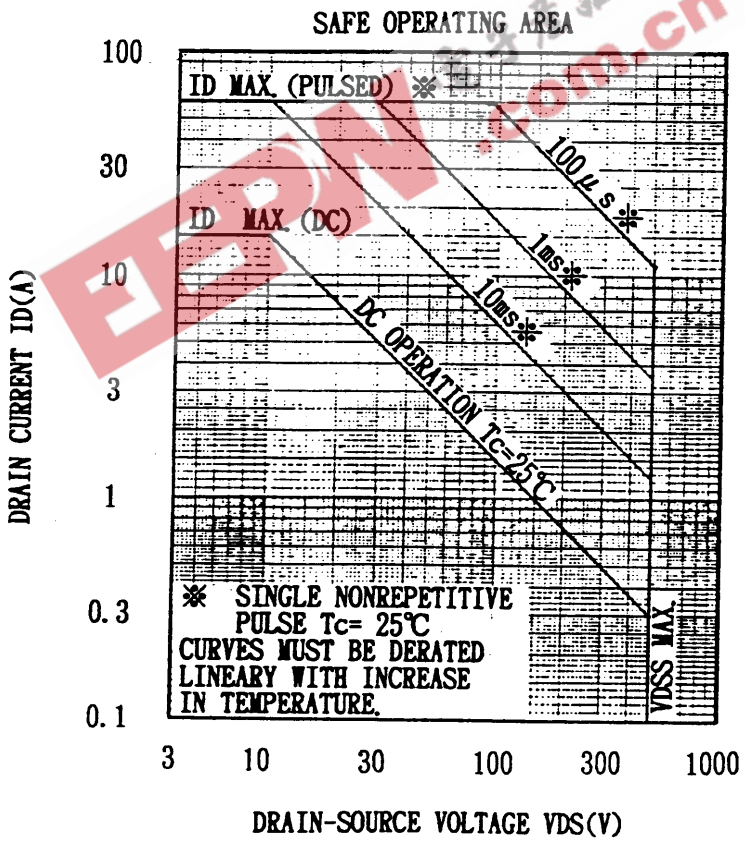

IDR-VDS
DRAIN REVERSE CURRENT IDR (A)
COMMON SOURCE
Tc=25°C
VGS=0, -1V
3
5
100
50
30
10
5
3
1
0
-0.4
-0.8
-1.2
-1.6
-2.0
DRAIN-SOURCE VOLTAGE VDS (V)


CAPACITANCE -VDS
CAPACITANCE C (pF)
Ciss
Coss
Crss
COMMON SOURCE
VGS=0V
f=1MHz
Tc=25°C
10000
3000
1000
300
100
30
10
0.1
0.3
1
3
10
30
100
DRAIN-SOURCE VOLTAGE VDS (V)


Vth-Tc
GATE THRESHOLD VOLTAGE Vth (V)
COMMON SOURCE
VDS=10V
ID=1mA
5
4
3
2
1
0
-80
-40
0
40
80
120
160
CASE TEMPERATURE Tc (°C)


PD-Tc
DRAIN POWER DISSIPATION PD (W)
160
120
80
40
0
0
40
80
120
160
200
CASE TEMPERATURE Tc (°C)


rth – tw
NORMALIZED TRANSIENT THERMAL IMPEDANCE rth (t)/Rth (ch-c)
Duty = 0.5
0.2
0.1
0.05
0.02
0.01
SINGLE PULSE
PDM
t
T
Duty = t/T
Rth (ch-c) = 0.83°C/W
PULSE WIDTH tw (s)


SAFE OPERATING AREA
ID MAX. (PULSED) ※
100μs※
ID MAX. (DC)
1ms※
10ms※
DC OPERATION Tc=25°C
VDSS MAX.
※ SINGLE NONREPETITIVE PULSE Tc= 25°C
CURVES MUST BE DERATED LINEARY WITH INCREASE IN TEMPERATURE.
DRAIN CURRENT ID(A)
DRAIN-SOURCE VOLTAGE VDS(V)