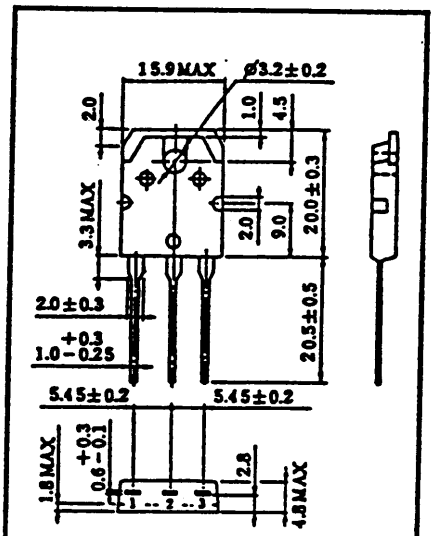
TOSHIBA FIELD EFFECT TRANSISTOR
2SK2150
SILICON N CHANNEL MOS TYPE
(π – MOS IV)

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

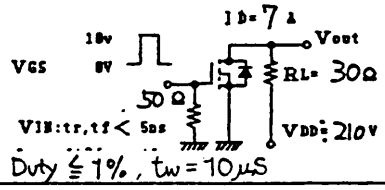
CHARACERISTIC	SYMBOL	MAX.	UNIT
Thermal Resistance, Channel To Case	Rth(ch-c)	0.833	°C/W
Thermal Resistance, Channel to Ambient	Rth(ch-a)	50	°C/W

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

⊙ The information contained herein is presented only as a guide for the applications of our products. No responsibility is assumed by TOSHIBA for any infringements of patents or other rights of the third parties which may result from its use. No license is granted by implication or otherwise under any patents or other rights of TOSHIBA or others.

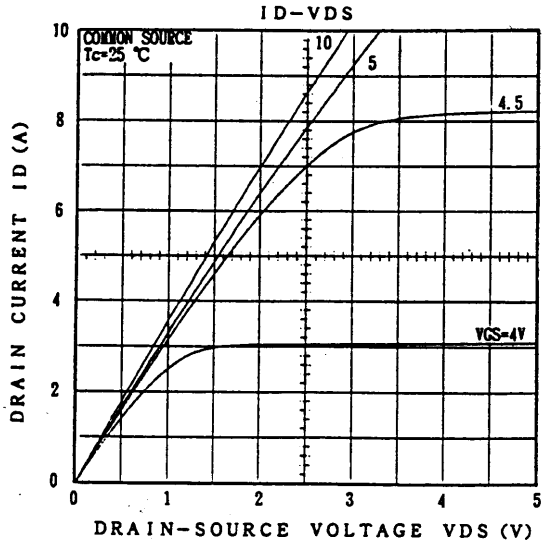
TOSHIBA CORPORATION

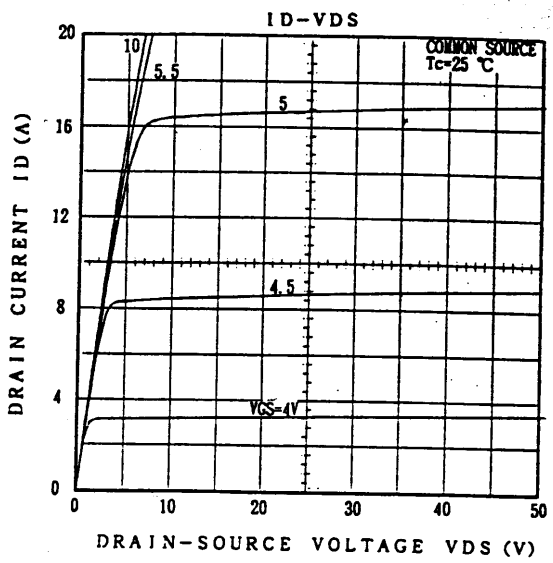
ELECTRICAL CHARACTERISTICS (Ta=25℃)

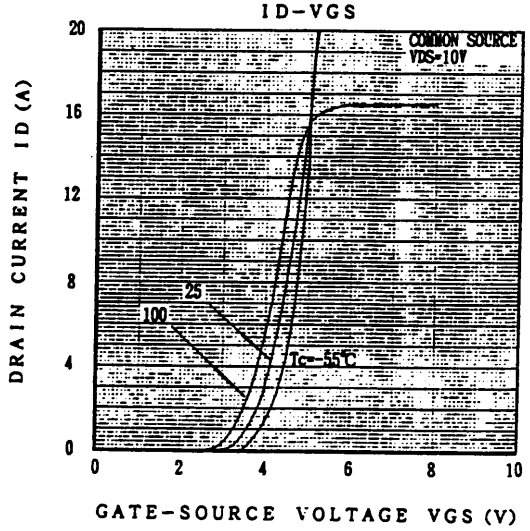
CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Gate Leakage Current		IGSS	VGS= ±25V, VDS= 0V	—	—	±10	μA
Gate-Source Breakdown Voltage		V(BR)GSS	IG= ±100μA, VDS= 0V	±30	—	—	
Drain Cut-off Current		IDSS	VDS= 500V, VGS= 0V	—	—	100	μA
Drain-Source Breakdown Voltage		V(BR)DSS	ID= 10mA, VGS= 0V	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	—	

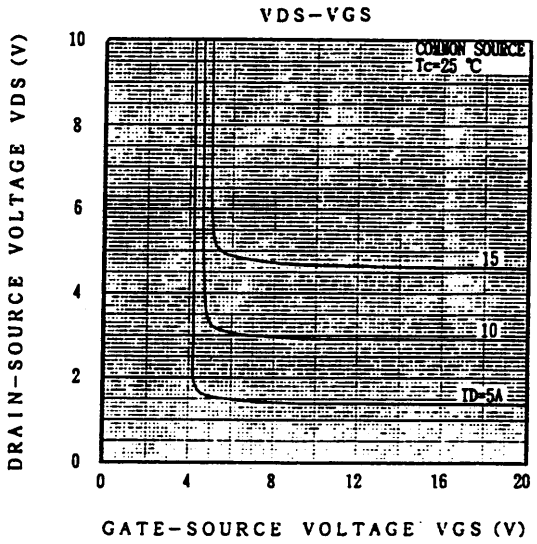
SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS (Ta=25℃)

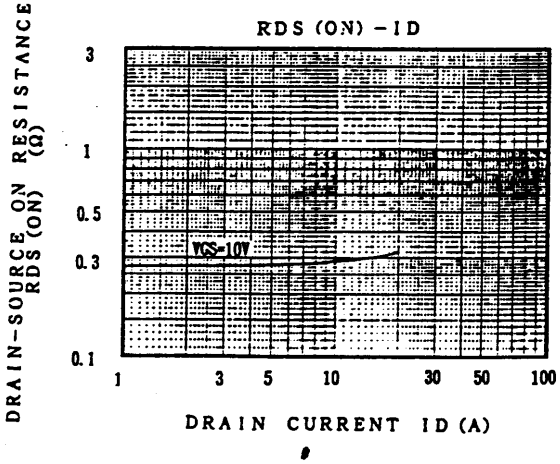
CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Continuous Drain Reverse Current	IDR	—	—	—	15	A
Pulse Drain Reverse Current	IDRP	—	—	—	60	A
Diode Foward Voltage	VDSF	IDR= 15A, VGS= 0V	—	—	-1.7	V
Reverse Recovery Time	trr	IDR= 15A, VGS= 0V dIDR/dt= 100A/μS	—	490	—	nS
Reverse Recovery Charge	Qrr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

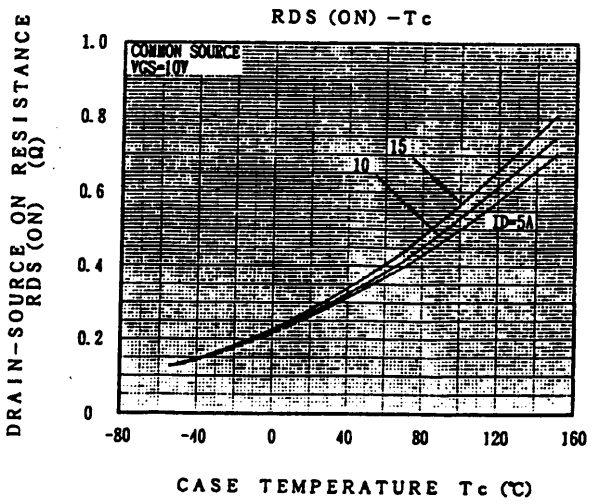

ID–VDS
COMMON SOURCE
Tc=25 °C
10
5
4.5
VGS=4V
DRAIN CURRENT ID (A)
DRAIN–SOURCE VOLTAGE VDS (V)

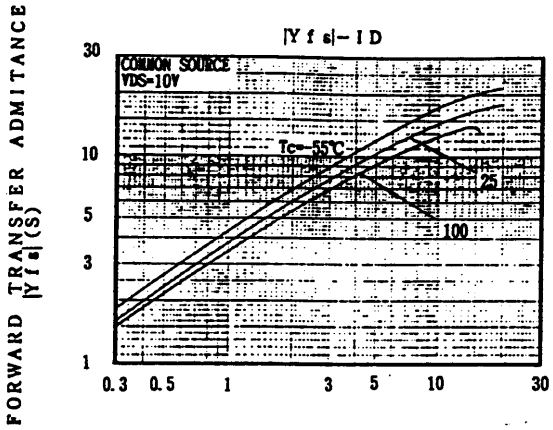

ID–VDS
COMMON SOURCE
Tc=25 °C
10
5.5
5
4.5
VGS=4V
DRAIN CURRENT ID (A)
DRAIN–SOURCE VOLTAGE VDS (V)

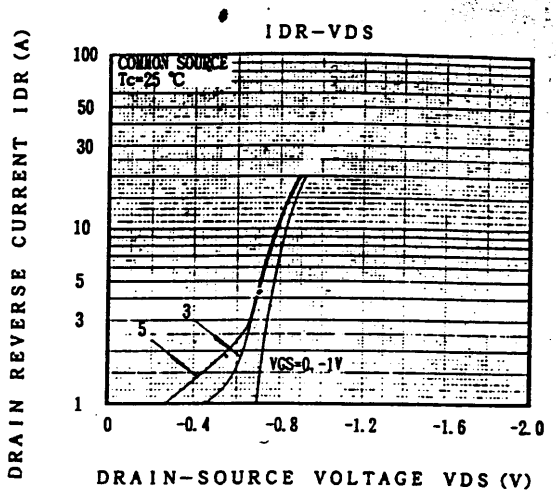

ID–VGS
COMMON SOURCE
VDS=10V
25
100
Tc=–55°C
DRAIN CURRENT ID (A)
GATE–SOURCE VOLTAGE VGS (V)

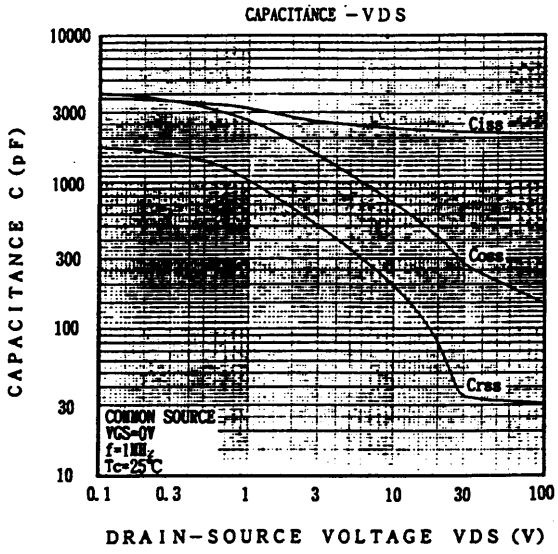

VDS–VGS
COMMON SOURCE
Tc=25 °C
15
10
ID=5A
DRAIN–SOURCE VOLTAGE VDS (V)
GATE–SOURCE VOLTAGE VGS (V)

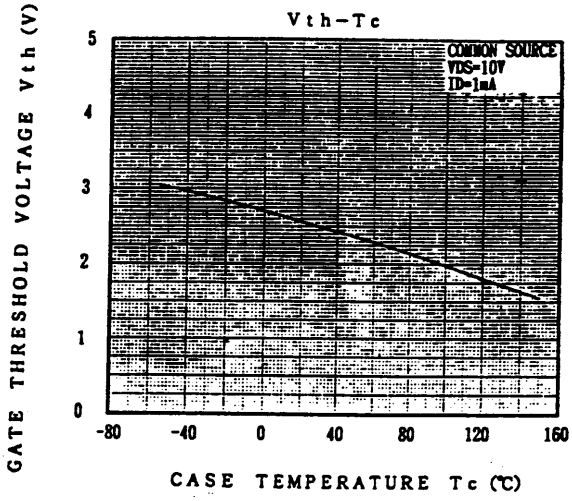

RDS (ON) – ID
VGS=10V
DRAIN–SOURCE ON RESISTANCE RDS (ON) (Ω)
DRAIN CURRENT ID (A)

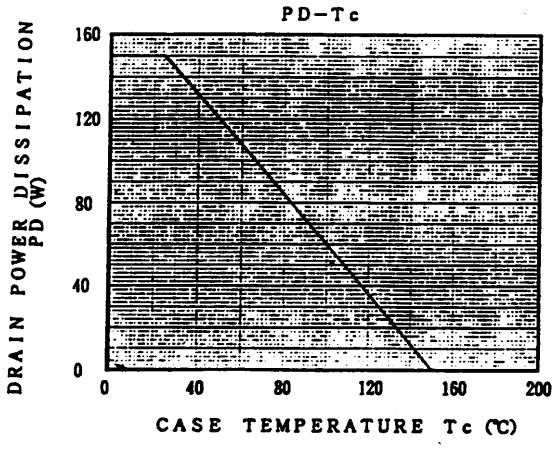

RDS (ON) – Tc
COMMON SOURCE
VGS=10V
15
10
ID=5A
DRAIN–SOURCE ON RESISTANCE RDS (ON) (Ω)
CASE TEMPERATURE Tc (°C)

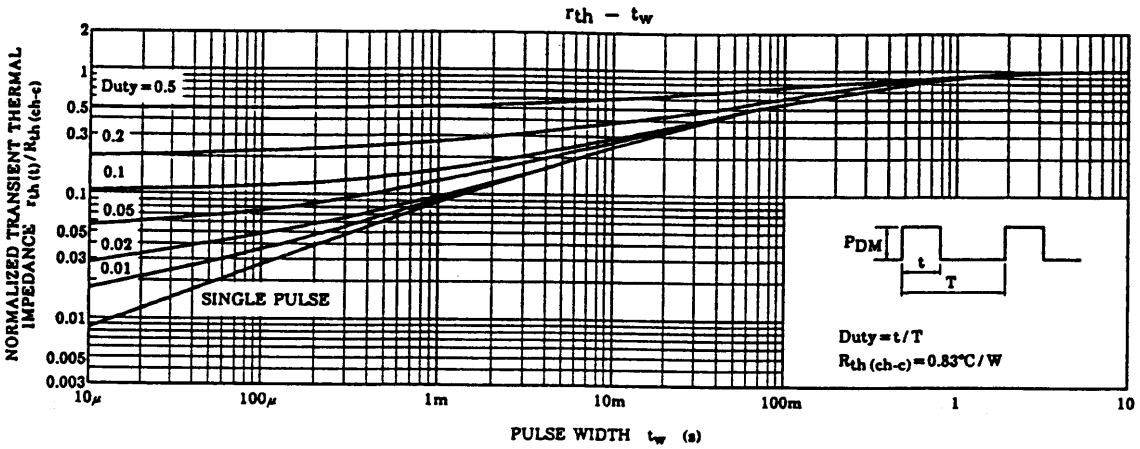

|Yfs|-ID
FORWARD TRANSFER ADMITANCE |Yfs| (S)
COMMON SOURCE
VDS=10V
Tc=-55℃
25
100
30
10
5
3
1
0.3
0.5
1
3
5
10
30

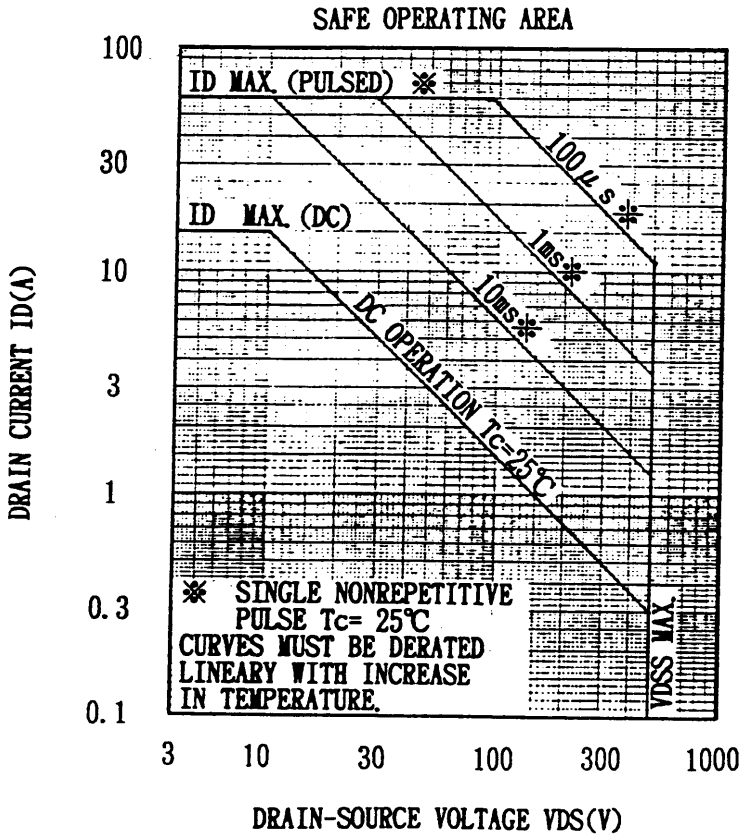

IDR-VDS
DRAIN REVERSE CURRENT IDR (A)
COMMON SOURCE
Tc=25 ℃
VGS=0, -1V
3
5
100
50
30
10
5
3
1
0
-0.4
-0.8
-1.2
-1.6
-2.0
DRAIN-SOURCE VOLTAGE VDS (V)


CAPACITANCE -VDS
CAPACITANCE C (pF)
Ciss
Coss
Crss
COMMON SOURCE
VGS=0V
f=1MHz
Tc=25℃
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 (℃)


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


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
2
1
0.5
0.3
0.1
0.05
0.03
0.01
0.005
0.003
10μ
100μ
1m
10m
100m
1
10
PULSE WIDTH tw (s)


SAFE OPERATING AREA
ID MAX. (PULSED) ※
100μs※
ID MAX. (DC)
1ms※
10ms※
DC OPERATION Tc=25°C
※ SINGLE NONREPETITIVE PULSE Tc= 25°C
CURVES MUST BE DERATED LINEARY WITH INCREASE IN TEMPERATURE.
VDSS MAX
DRAIN CURRENT ID(A)
100
30
10
3
1
0.3
0.1
3
10
30
100
300
1000
DRAIN-SOURCE VOLTAGE VDS(V)