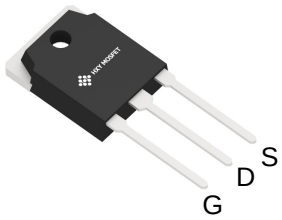
Description

The 2SK1971-E uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications.

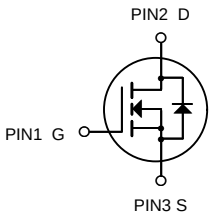


TO-3P
(TO-3PN)

General Features

V_{DS} =500V,I_D =28A

$R_{DS(ON)}$ < 180mΩ @ V_{GS}=10V



N-Channel MOSFET

Application

High efficiency switch mode power supplies

Power factor correction

Electronic lamp ballast

Ordering Information

Product ID	Pack	Brand	Units Tube
2SK1971-E	TO-3P(TO-3PN)	HXY MOSFET	30

Absolute Maximum Ratings@T_j=25°C(unless otherwise specified)

Symbol	Parameter	Rating	Units
VDS	Drain-Source Voltage	500	V
VGS	Gate-Source Voltage	±20	V
I_D@T_C=25°C	Drain Current	28	A
IDM	Pulsed Drain Current[1]	112	A
P_D@T_C=25°C	Total Power Dissipation	312.5	W
TSTG	Storage Temperature Range	-55 to 150	°C
T_J	Operating Junction Temperature Range	-55 to 150	°C

Electrical Characteristics (T_C=25°C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage (Note 1)	BV_{DSS}	V_{GS}=0V I_D=250μA	500	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=500V,V_{GS}=0V	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±20V,V_{DS}=0V	-	-	±100	nA
On Characteristics						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=250μA	2.0	-	4.0	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=14A	-	150	180	mΩ
Forward Transconductance	g_{FS}	V_{DS}=40V,I_D=14A	-	25	-	S
Dynamic Characteristics						
Input Capacitance	C_{lss}	V_{DS}=25V,V_{GS}=0V, F=1.0MHz	-	4500	-	PF
Output Capacitance	C_{oss}		-	320	-	PF
Reverse Transfer Capacitance	C_{rss}		-	20	-	PF
Switching Characteristics						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=400V,I_D=28A R_G=10 Ω (Note 2)	-	40	-	nS
Turn-on Rise Time	t_r		-	70	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	170	-	nS
Turn-Off Fall Time	t_f		-	55	-	nS
Total Gate Charge	Q_g	V_{DS}=400V,I_D=28A, V_{GS}=10V (Note 2)	-	110	-	nC
Gate-Source Charge	Q_{gs}		-	15	-	nC
Gate-Drain Charge	Q_{gd}		-	40	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage	V_{SD}	V_{GS}=0V,I_S=14A	-		1.4	V
Diode Forward Current (Note 2)	I_S		-	-	28	A

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.

Typical Characteristics

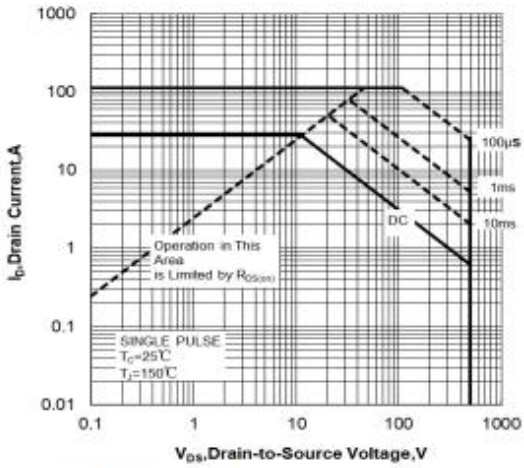


Figure 1 Maximum Forward Bias Safe Operating Area

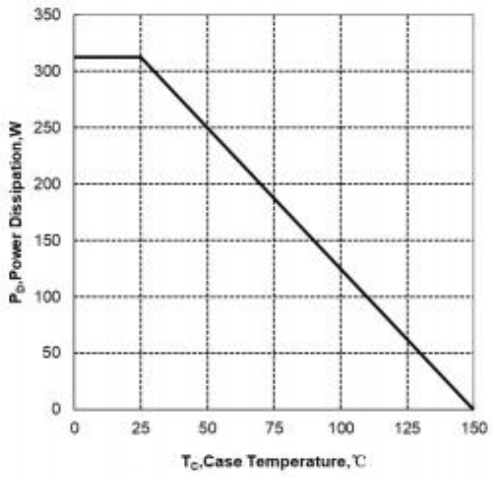


Figure 2 Maximum Power dissipation vs Case Temperature

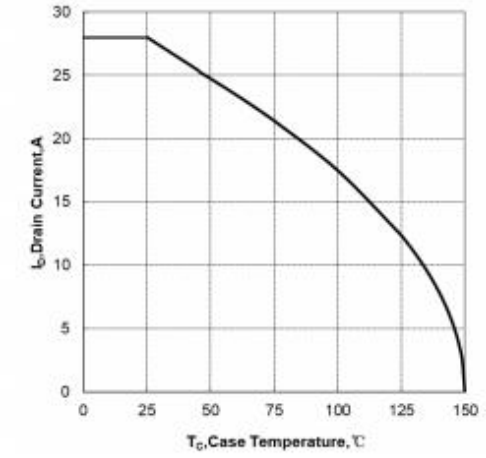


Figure 3 Maximum Continuous Drain Current vs Case Temperature

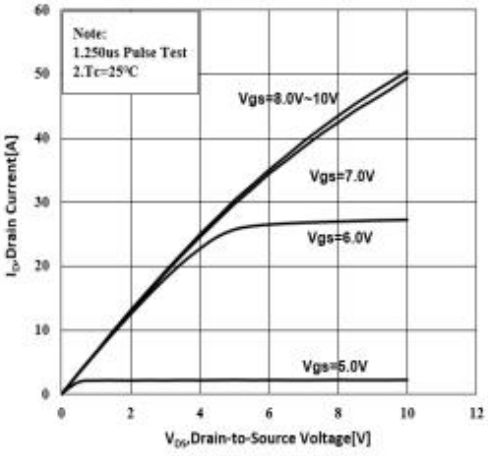


Figure 4 Typical Output Characteristics

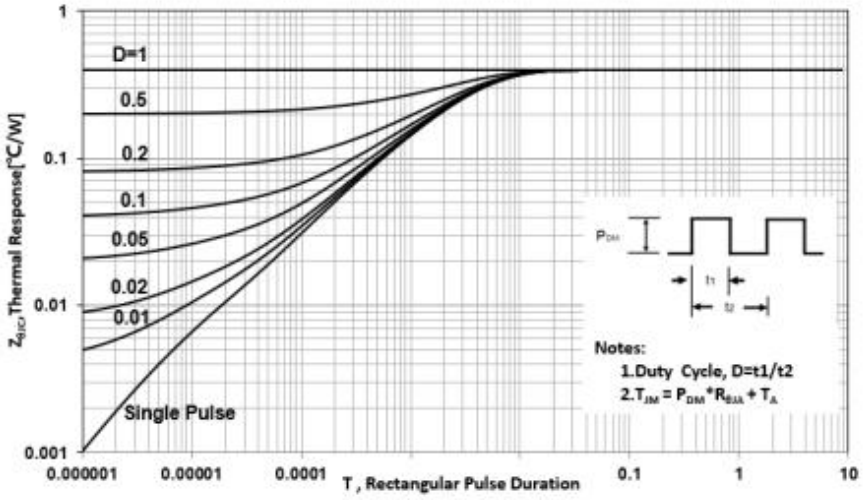


Figure 5 Maximum Effective Thermal Impedance , Junction to Case

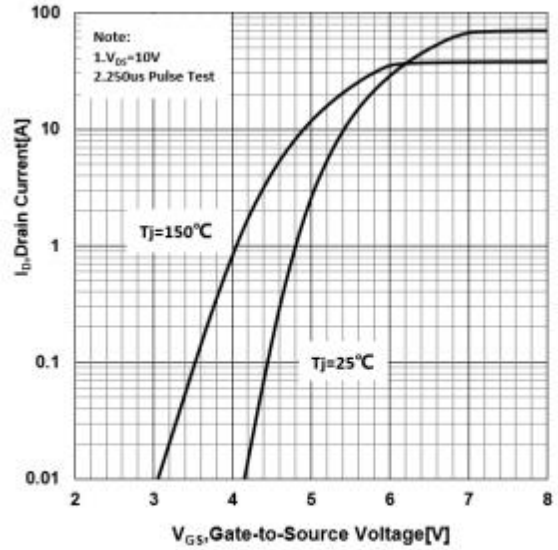


Figure 6 Typical Transfer Characteristics

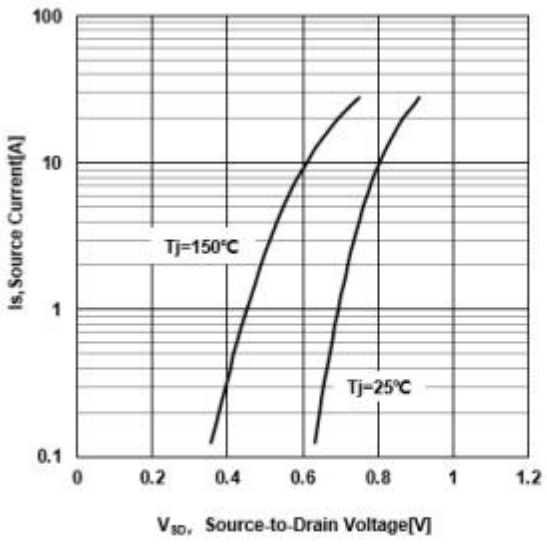


Figure 7 Typical Body Diode Transfer Characteristics

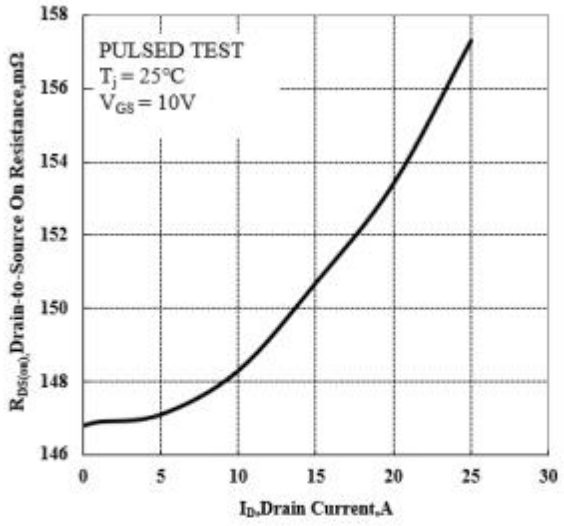


Figure 8 Typical Drain to Source ON Resistance vs Drain Current

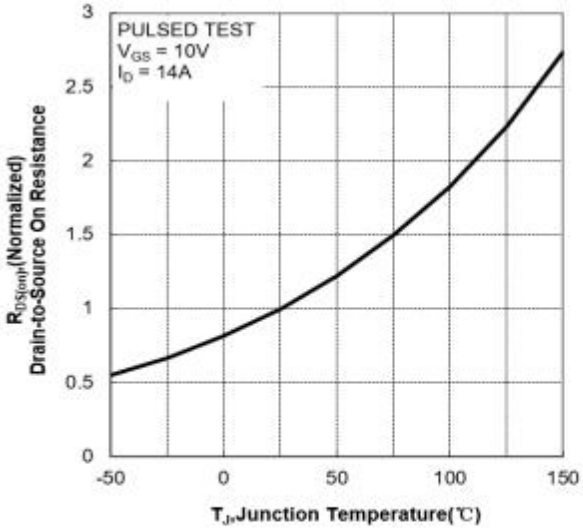


Figure 9 Typical Drian to Source on Resistance vs Junction Temperature

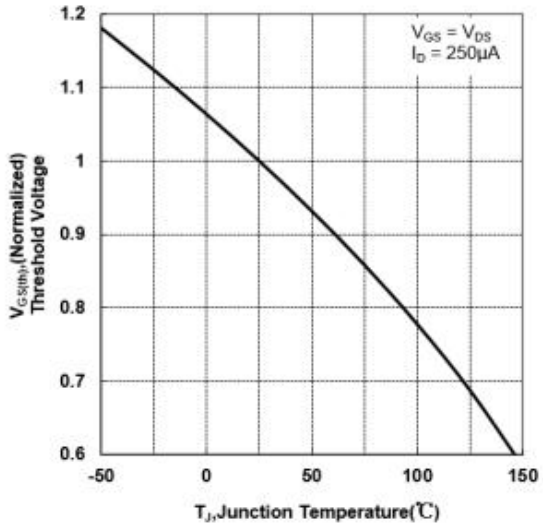


Figure 10 Typical Theshold Voltage vs Junction Temperature

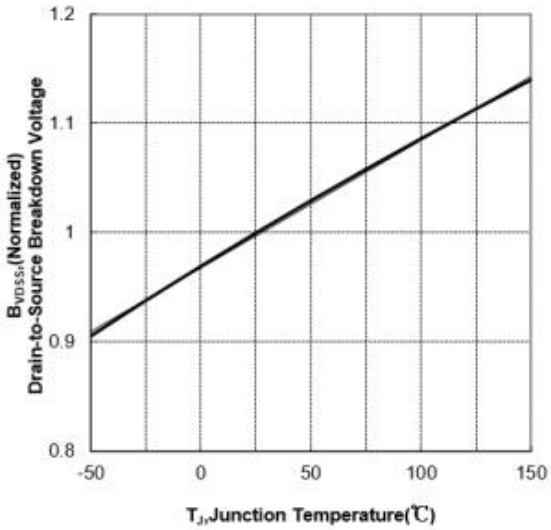


Figure 11 Typical Breakdown Voltage vs Junction Temperature

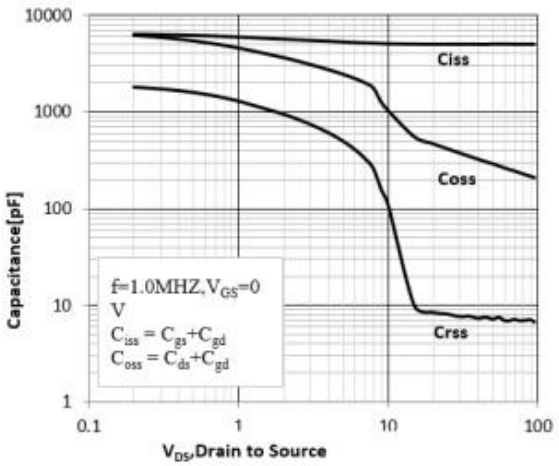


Figure 12 Typical Capacitance vs Drain to Source Voltage

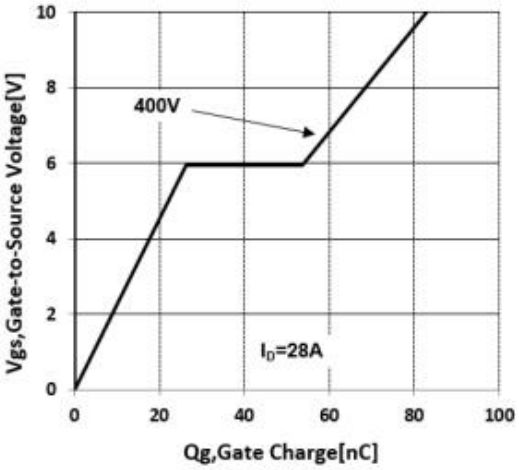
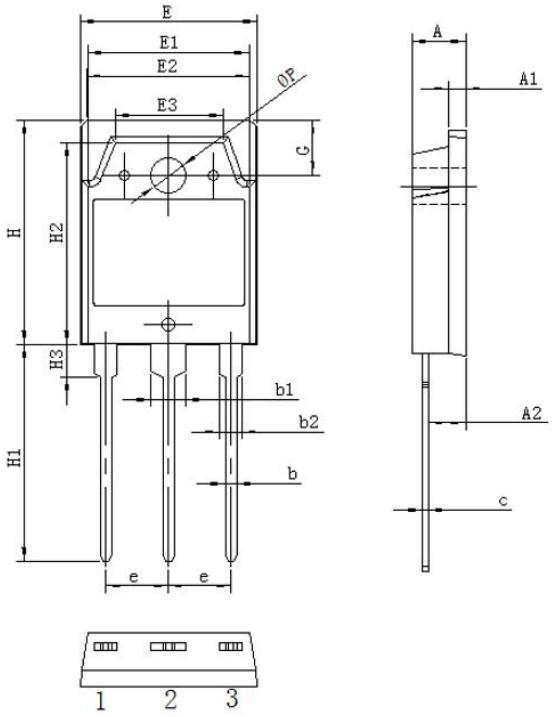


Figure 13 Typical Gate Charge vs Gate to Source Voltage

Package Information

TO-3P(TO-3PN)



Symbol	单位 mm		
	Min	Nom	Max
A	4.60	4.80	5.00
A1	1.3	1.5	1.7
A2	1.20	1.40	1.60
b	0.80	1.0	1.20
b1	2.90	3.10	3.30
b2	1.90	2.10	2.30
c	0.50	0.60	0.70
e	5.25	5.45	5.65
E	15.2	15.6	16.0
E1	13.2	13.4	13.6
E2	13.1	13.3	13.5
E3	9.1	9.3	9.5
H	19.8	20.0	20.2
H1	20.1	20.3	20.5
H2	18.5	18.7	18.9
H3	3.2	3.5	3.8
G	4.8	5.0	5.2
ΦP	3.00	3.20	3.40

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