Ordering number : ENN7766

SANYO Semiconductors
DATA SHEET

2SK3706 — N-Channel Silicon MOSFET General-Purpose Switching Device Applications

Features

- Low ON-resistance.
- 4V drive.
- Motor driver, DC / DC converter.
- Avalanche resistance guarantee.

Specifications

Absolute Maximum Ratings at Ta=25°C

Parameter	Symbol	Conditions	Ratings	Unit
Drain-to-Source Voltage	V_{DSS}		100	V
Gate-to-Source Voltage	V_{GSS}		±20	V
Drain Current (DC)	I_D		12	A
Drain Current (Pulse)	I_{DP}	PW≤10μs, duty cycle≤1%	48	A
Allowable Power Dissipation	P_D		2.0	W
		Tc=25°C	20	W
Channel Temperature	Tch		150	°C
Storage Temperature	Tstg		−55 to +150	°C
Avalanche Energy (Single Pulse) *1	E_{AS}		18	mJ
Avalanche Current *2	I_{AV}		12	A

*1 V_{DD}=20V, L=200μH, I_{AV}=12A

*2 L≤200μH, single pulse

Electrical Characteristics at Ta=25°C

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	I_D=1mA, V_{GS}=0	100			V
Zero-Gate Voltage Drain Current	I_{DSS}	V_{DS}=100V, V_{GS}=0			1	μA
Gate-to-Source Leakage Current	I_{GSS}	V_{GS}= ±16V, V_{DS}=0			±10	μA
Cutoff Voltage	$V_{GS}(off)$	V_{DS}=10V, I_D=1mA	1.2		2.6	V
Forward Transfer Admittance	$\|yfs\|$	V_{DS}=10V, I_D=6A	7	10		S
Static Drain-to-Source On-State Resistance	$R_{DS}(on)1$	I_D=6A, V_{GS}=10V		100	130	mΩ
	$R_{DS}(on)2$	I_D=6A, V_{GS}=4V		120	160	mΩ

Marking : K3706

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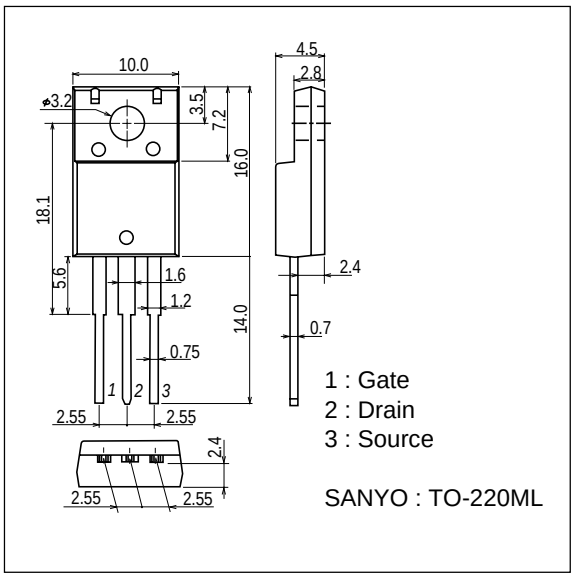
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Input Capacitance	Ciss	V_{DS}=20V, f=1MHz		880		pF
Output Capacitance	Coss	V_{DS}=20V, f=1MHz		80		pF
Reverse Transfer Capacitance	Crss	V_{DS}=20V, f=1MHz		55		pF
Turn-ON Delay Time	t_{d}(on)	See specified Test Circuit.		11.5		ns
Rise Time	t_{r}	See specified Test Circuit.		16		ns
Turn-OFF Delay Time	t_{d}(off)	See specified Test Circuit.		97		ns
Fall Time	t_{f}	See specified Test Circuit.		45		ns
Total Gate Charge	Qg	V_{DS}=50V, V_{GS}=10V, I_{D}=12A		24		nC
Gate-to-Source Charge	Qgs	V_{DS}=50V, V_{GS}=10V, I_{D}=12A		3.2		nC
Gate-to-Drain “Miller” Charge	Qgd	V_{DS}=50V, V_{GS}=10V, I_{D}=12A		5.5		nC
Diode Forward Voltage	V_{SD}	I_{S}=12A, V_{GS}=0		0.92	1.2	V

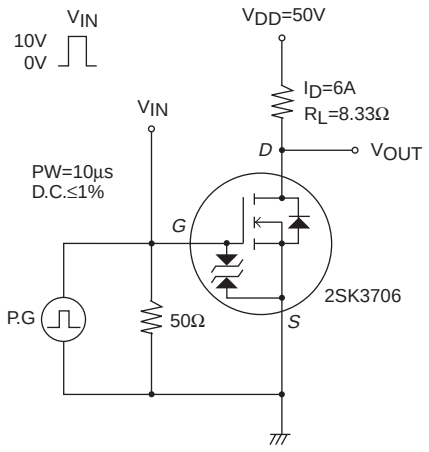
Package Dimensions

unit : mm

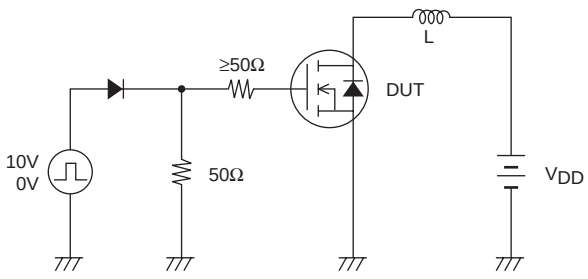
2063A

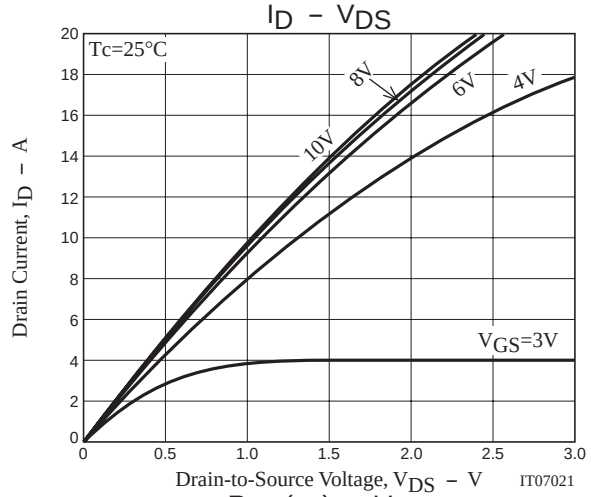


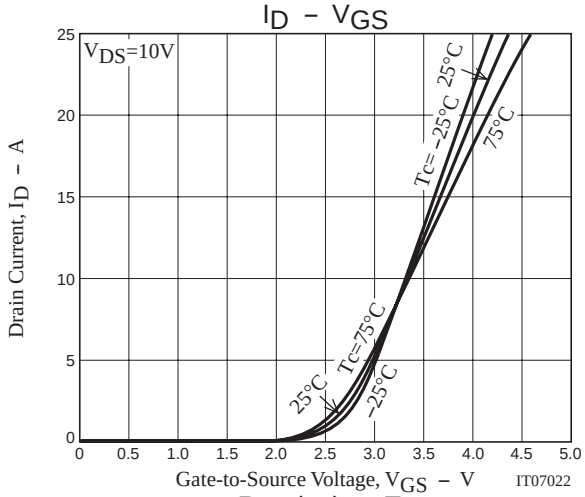
Switching Time Test Circuit

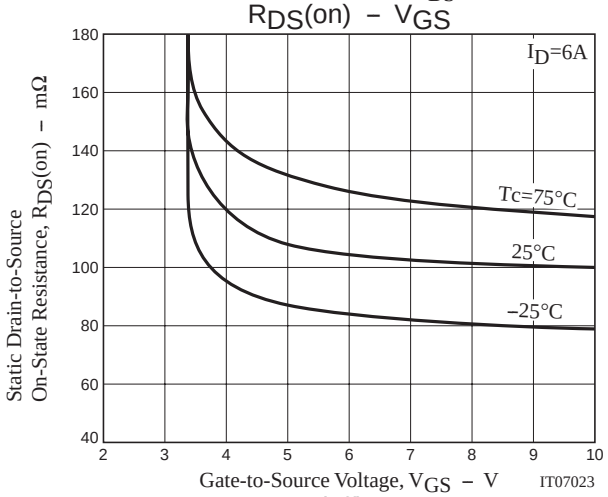


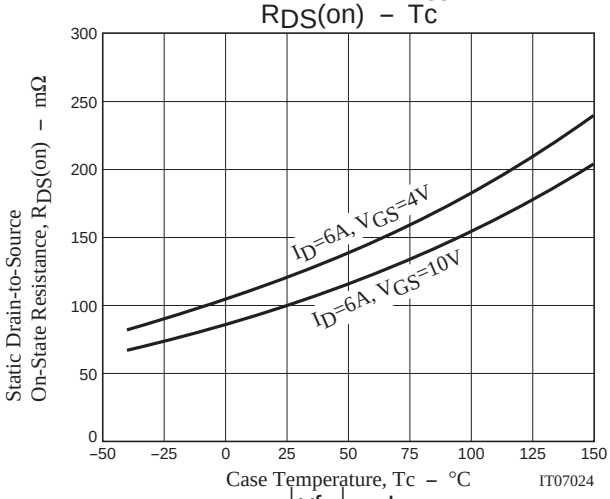
Unclamped Inductive Test Circuit

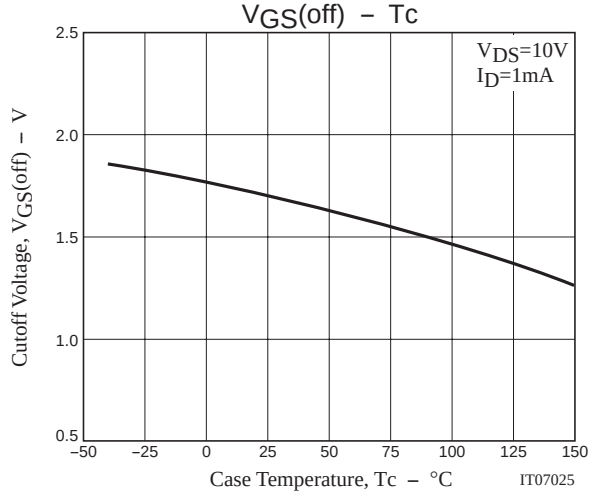


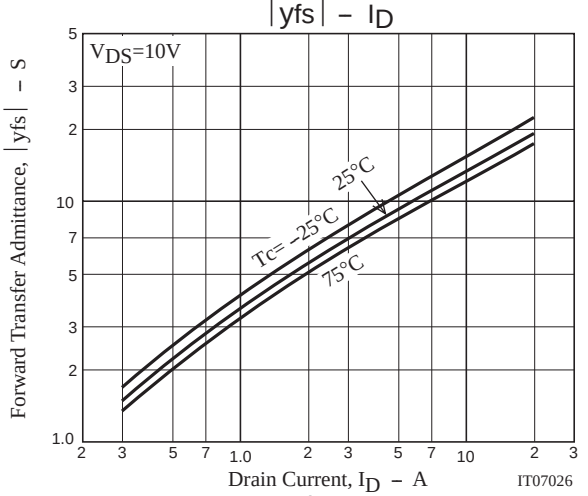

ID – VDS
Tc=25°C
8V
6V
4V
10V
VGS=3V
Drain Current, ID – A
Drain-to-Source Voltage, VDS – V
IT07021

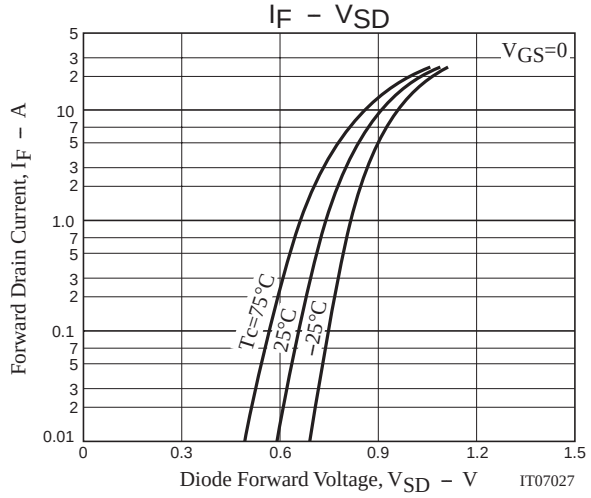

ID – VGS
VDS=10V
Tc=–25°C
25°C
75°C
Drain Current, ID – A
Gate-to-Source Voltage, VGS – V
IT07022

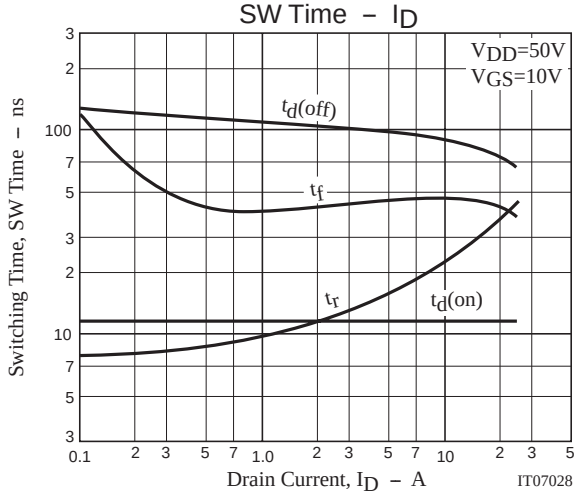

RDS(on) – VGS
ID=6A
Tc=75°C
25°C
–25°C
Static Drain-to-Source On-State Resistance, RDS(on) – mΩ
Gate-to-Source Voltage, VGS – V
IT07023

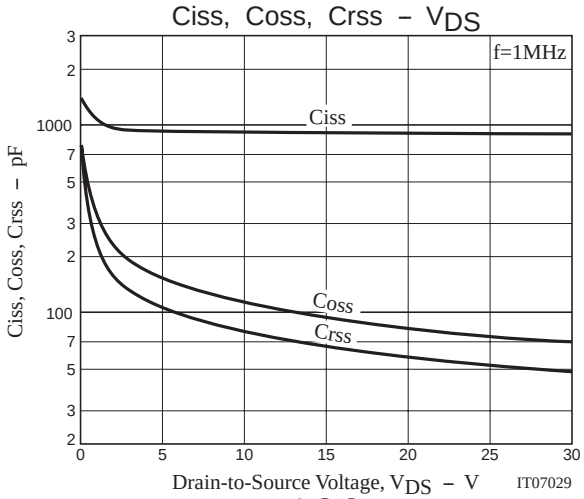

RDS(on) – Tc
ID=6A, VGS=4V
ID=6A, VGS=10V
Static Drain-to-Source On-State Resistance, RDS(on) – mΩ
Case Temperature, Tc – °C
IT07024

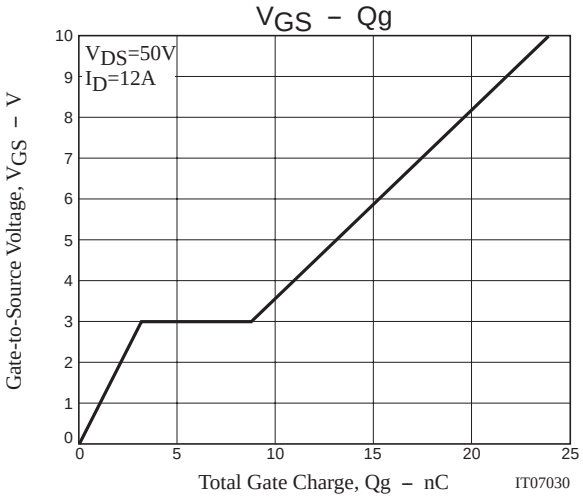

VGS(off) – Tc
VDS=10V
ID=1mA
Cutoff Voltage, VGS(off) – V
Case Temperature, Tc – °C
IT07025

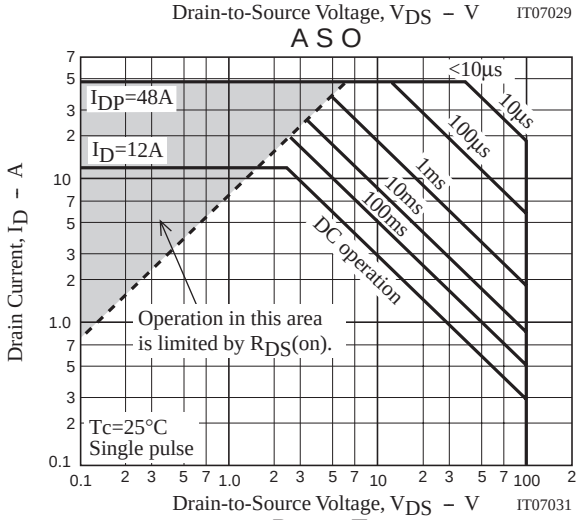

|yfs| – ID
VDS=10V
25°C
Tc=–25°C
75°C
Forward Transfer Admittance, |yfs| – S
Drain Current, ID – A
IT07026

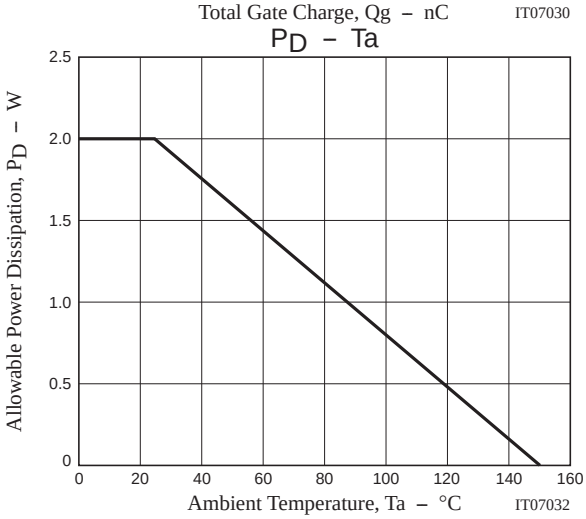

IF – VSD
VGS=0
Tc=75°C
25°C
–25°C
Forward Drain Current, IF – A
Diode Forward Voltage, VSD – V
IT07027

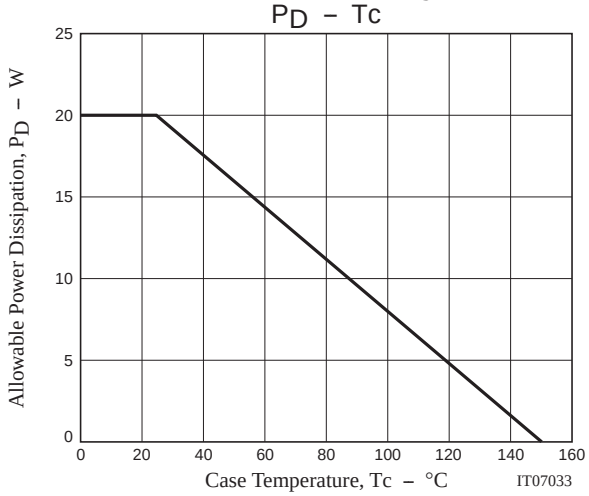

SW Time – ID
VDD=50V
VGS=10V
td(off)
tf
tr
td(on)
Switching Time, SW Time – ns
Drain Current, ID – A
IT07028


Ciss, Coss, Crss – VDS
f=1MHz
Ciss
Coss
Crss
Ciss, Coss, Crss – pF
Drain-to-Source Voltage, VDS – V
IT07029


VGS – Qg
VDS=50V
ID=12A
Gate-to-Source Voltage, VGS – V
Total Gate Charge, Qg – nC
IT07030


A S O
IDP=48A
ID=12A
<10µs
10µs
100µs
1ms
10ms
100ms
DC operation
Operation in this area
is limited by RDS(on).
Tc=25°C
Single pulse
Drain Current, ID – A
Drain-to-Source Voltage, VDS – V
IT07031


PD – Ta
Allowable Power Dissipation, PD – W
Ambient Temperature, Ta – °C
IT07032


PD – Tc
Allowable Power Dissipation, PD – W
Case Temperature, Tc – °C
IT07033

Note on usage : Since the 2SK3706 is a MOSFET product, please avoid using this device in the vicinity of highly charged objects.