Ordering number : ENN7705

SANYO Semiconductors
DATA SHEET

N-Channl Silicon MOSFET

2SK3705 — General-Purpose Switching Device Applications

Features

- Low ON-resistance.
- Ultrahigh-speed switching.
- 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}		60	V
Gate-to-Source Voltage	V_{GSS}		±20	V
Drain Current (DC)	I_D*		60	A
Drain Current (Pulse)	I_{DP}	PW≤10μs, duty cycle≤1%	208	A
Allowable Power Dissipation	P_D		2.0	W
		Tc=25°C	35	W
Channel Temperature	Tch		150	°C
Storage Temperature	Tstg		−55 to +150	°C
Avalanche Enargy (Single Pulse) *1	E_{AS}		540	mJ
Avalanche Current *2	I_{AV}		60	A

*Shows Chip Capability

*1 V_{DD}=20V, I_{AV}=60A, L=200μH

*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	60			V
Zero-Gate Voltage Drain Current	I_{DSS}	V_{DS}=60V, 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=26A	28	40		S
Static Drain-to-Source On-State Resistance	$R_{DS(on)1}$	I_D=26A, V_{GS}=10V		9.0	12.5	mΩ
	$R_{DS(on)2}$	I_D=26A, V_{GS}=4V		12	17	mΩ

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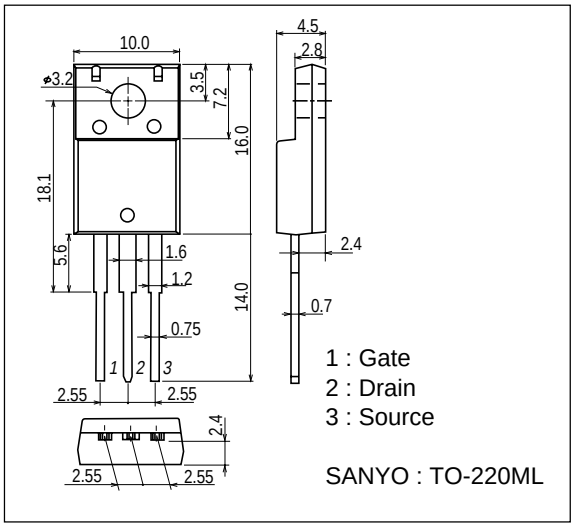
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Input Capacitance	Ciss	V_{DS}=20V, f=1MHz		5500		pF
Output Capacitance	Coss	V_{DS}=20V, f=1MHz		750		pF
Reverse Transfer Capacitance	Crss	V_{DS}=20V, f=1MHz		550		pF
Turn-ON Delay Time	t_{d}(on)	See specified Test Circuit.		38		ns
Rise Time	t_{r}	See specified Test Circuit.		215		ns
Turn-OFF Delay Time	t_{d}(off)	See specified Test Circuit.		380		ns
Fall Time	t_{f}	See specified Test Circuit.		280		ns
Total Gate Charge	Qg	V_{DS}=30V, V_{GS}=10V, I_{D}=52A		100		nC
Gate-to-Source Charge	Qgs	V_{DS}=30V, V_{GS}=10V, I_{D}=52A		18		nC
Gate-to-Drain “Miller” Charge	Qgd	V_{DS}=30V, V_{GS}=10V, I_{D}=52A		16		nC
Diode Forward Voltage	V_{SD}	I_{S}=52A, V_{GS}=0		1.0	1.2	V

Marking : K3705

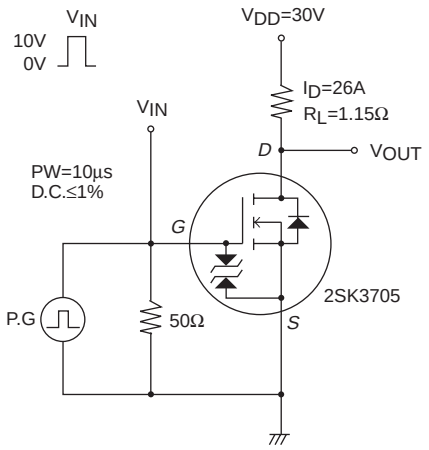
Package Dimensions

unit : mm

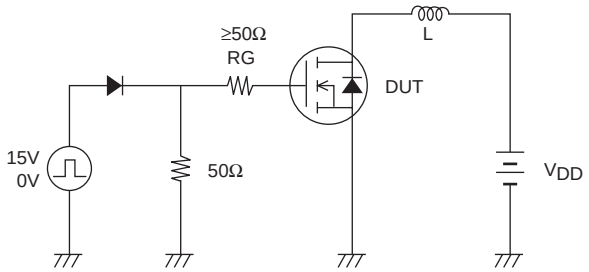
2063A

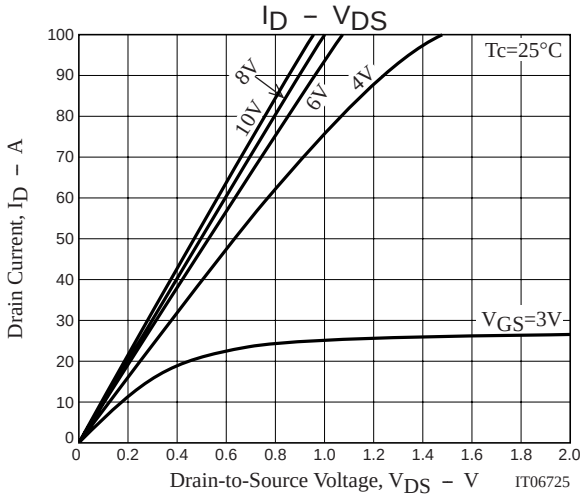


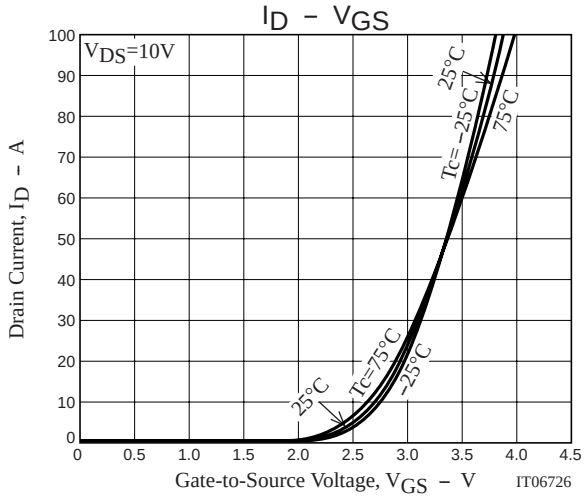
Switching Time Test Circuit

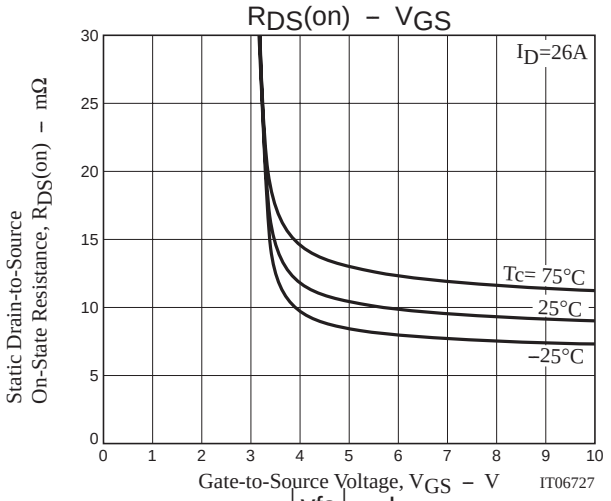


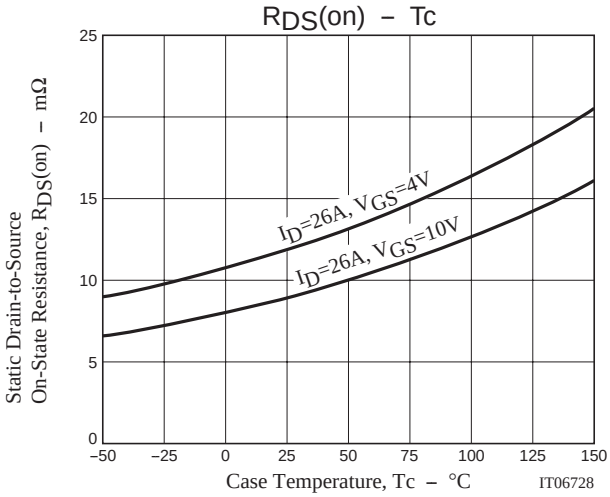
Unclamped Inductive Test Circuit

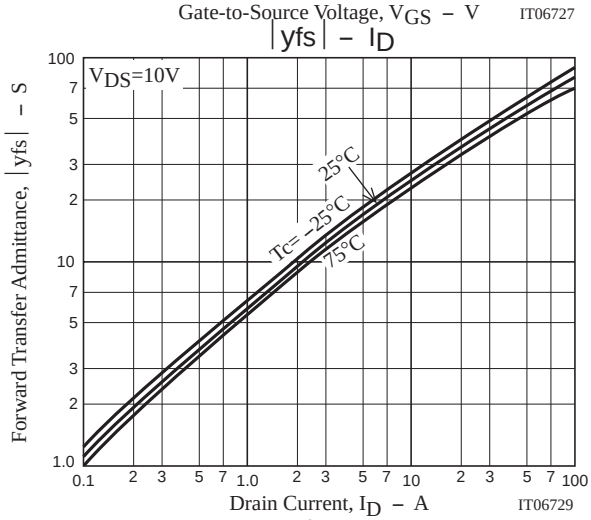


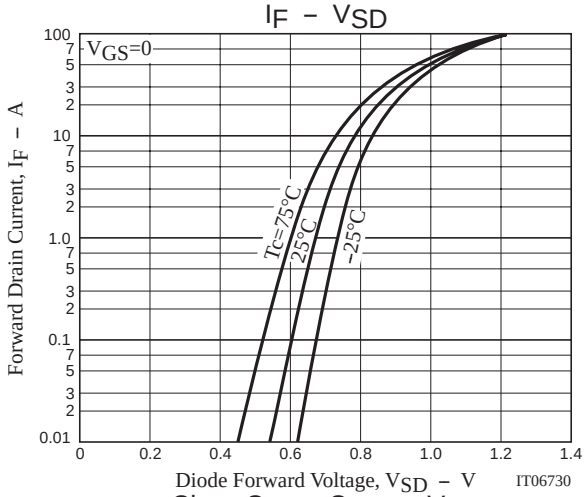


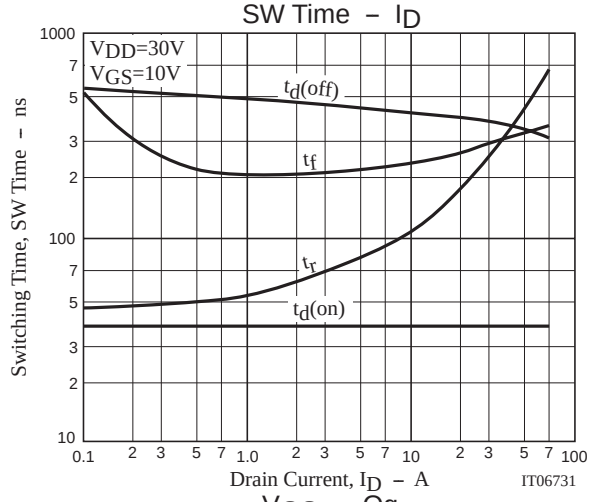


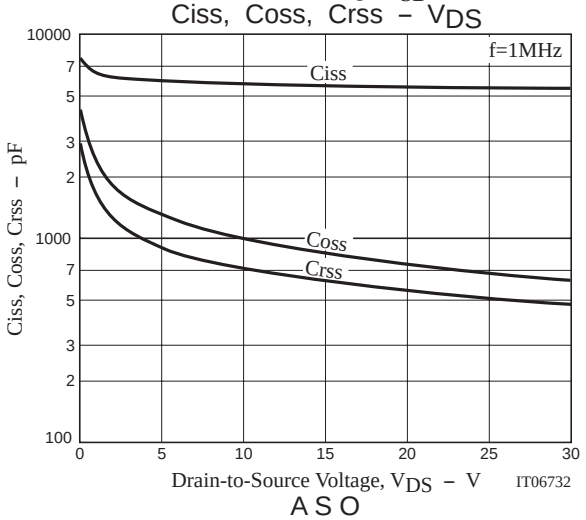

RDS(on) – VGS
ID=26A
Tc= 75°C
25°C
–25°C
Static Drain-to-Source On-State Resistance, RDS(on) – mΩ
Gate-to-Source Voltage, VGS – V
IT06727

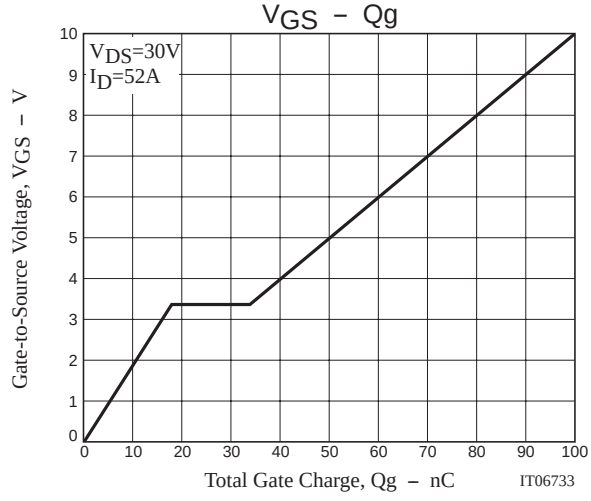

RDS(on) – Tc
ID=26A, VGS=4V
ID=26A, VGS=10V
Static Drain-to-Source On-State Resistance, RDS(on) – mΩ
Case Temperature, Tc – °C
IT06728

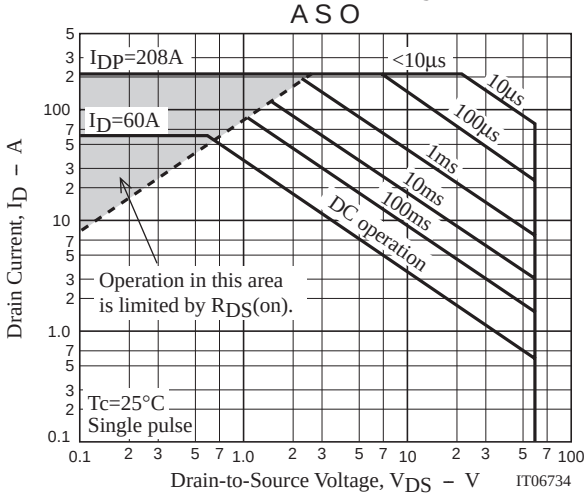

|yfs| – ID
VDS=10V
25°C
Tc= –25°C
75°C
Forward Transfer Admittance, |yfs| – S
Drain Current, ID – A
IT06729

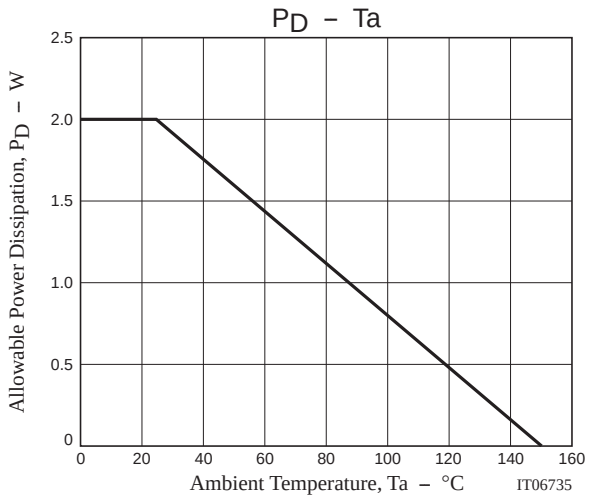

IF – VSD
VGS=0
Tc=75°C
25°C
–25°C
Forward Drain Current, IF – A
Diode Forward Voltage, VSD – V
IT06730

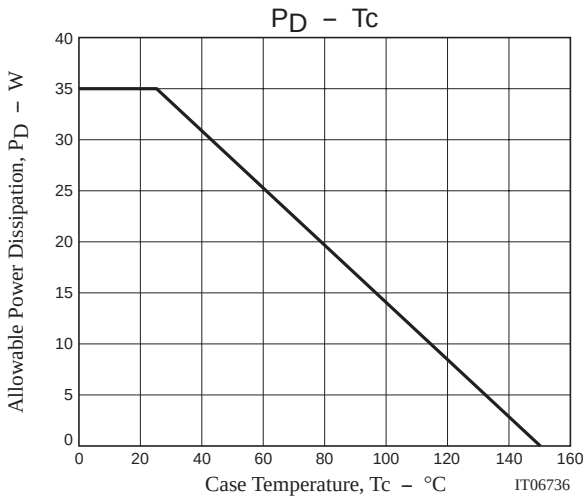

SW Time – ID
VDD=30V
VGS=10V
td(off)
tf
tr
td(on)
Switching Time, SW Time – ns
Drain Current, ID – A
IT06731


Ciss, Coss, Crss – VDS
f=1MHz
Ciss
Coss
Crss
Ciss, Coss, Crss – pF
Drain-to-Source Voltage, VDS – V
IT06732


VGS – Qg
VDS=30V
ID=52A
Gate-to-Source Voltage, VGS – V
Total Gate Charge, Qg – nC
IT06733


ASO
IDP=208A
ID=60A
<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
IT06734





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