Ordering number : ENN8054

SANYO Semiconductors
DATA SHEET

N-Channel Silicon MOSFET

2SK3816 — General-Purpose Switching Device Applications

Features

- Low ON-resistance.
- Ultrahigh-speed switching.
- 4V drive.
- Motor drive, 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		40	A
Drain Current (Pulse)	I_{DP}	PW≤10μs, duty cycle≤1%	160	A
Allowable Power Dissipation	P_D		1.65	W
		Tc=25°C	50	W
Channel Temperature	Tch		150	°C
Storage Temperature	Tstg		-55 to +150	°C
Avalanche Energy (Single Pulse) *1	E_{AS}		60	mJ
Avalanche Current *2	I_{AV}		40	A

Note : *1 V_{DD}=20V, L=50μH, I_{AV}=40A
*2 L≤50μH, 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=20A	16	27		S
Static Drain-to-Source On-State Resistance	$R_{DS}(on)1$	I_D=20A, V_{GS}=10V		20	26	mΩ
	$R_{DS}(on)2$	I_D=20A, V_{GS}=4V		28	40	mΩ

Marking : K3816

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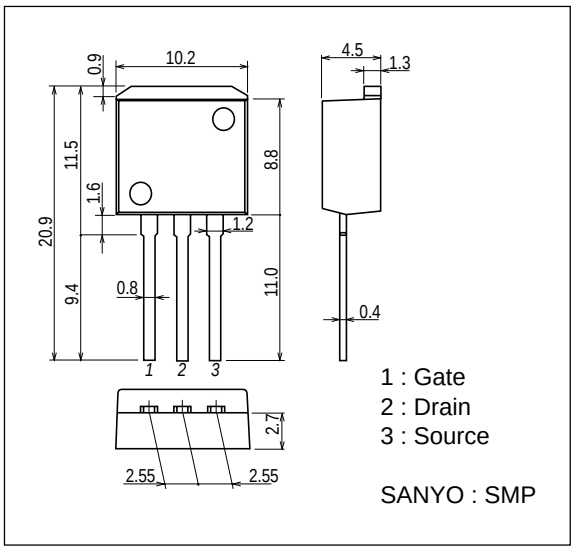
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Input Capacitance	Ciss	V_{DS}=20V, f=1MHz		1780		pF
Output Capacitance	Coss	V_{DS}=20V, f=1MHz		266		pF
Reverse Transfer Capacitance	Crss	V_{DS}=20V, f=1MHz		197		pF
Turn-ON Delay Time	t_{d}(on)	See specified Test Circuit.		16.5		ns
Rise Time	t_{r}	See specified Test Circuit.		160		ns
Turn-OFF Delay Time	t_{d}(off)	See specified Test Circuit.		160		ns
Fall Time	t_{f}	See specified Test Circuit.		160		ns
Total Gate Charge	Qg	V_{DS}=30V, V_{GS}=10V, I_{D}=40A		40		nC
Gate-to-Source Charge	Qgs	V_{DS}=30V, V_{GS}=10V, I_{D}=40A		6.5		nC
Gate-to-Drain “Miller” Charge	Qgd	V_{DS}=30V, V_{GS}=10V, I_{D}=40A		11.5		nC
Diode Forward Voltage	V_{SD}	I_{S}=40A, V_{GS}=0		1.05	1.5	V

Package Dimensions

unit : mm

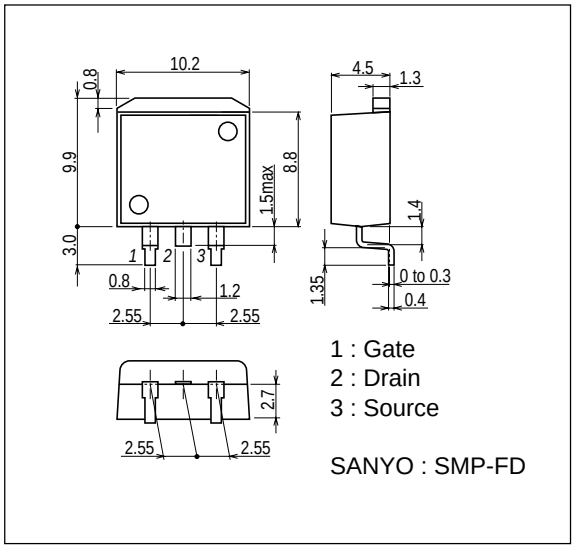
2093A



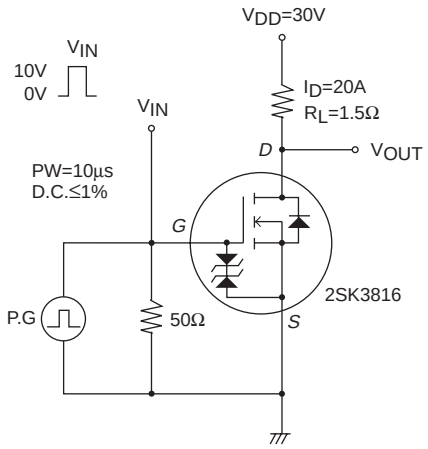
Package Dimensions

unit : mm

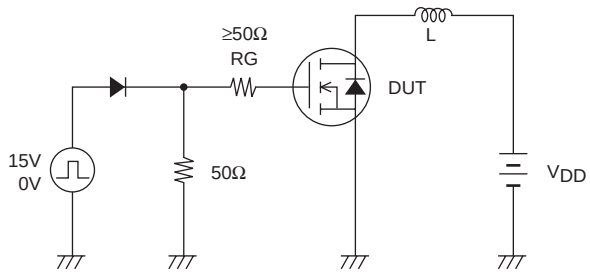
2090A

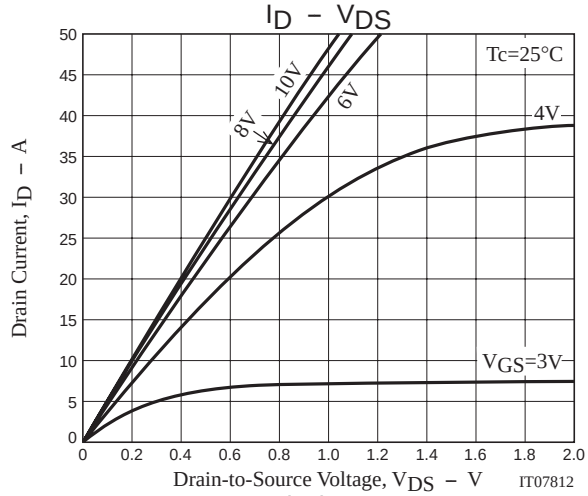


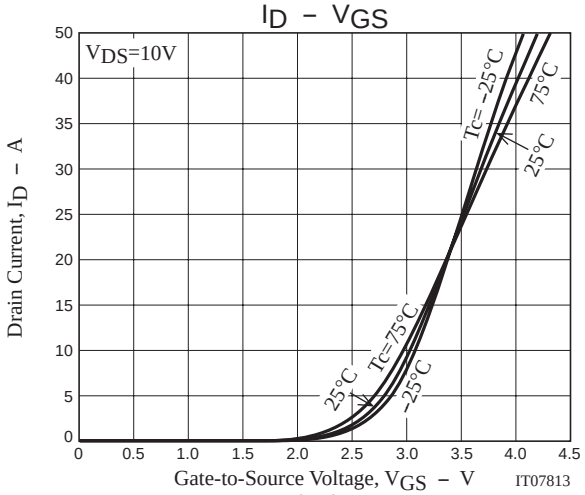
Switching Time Test Circuit

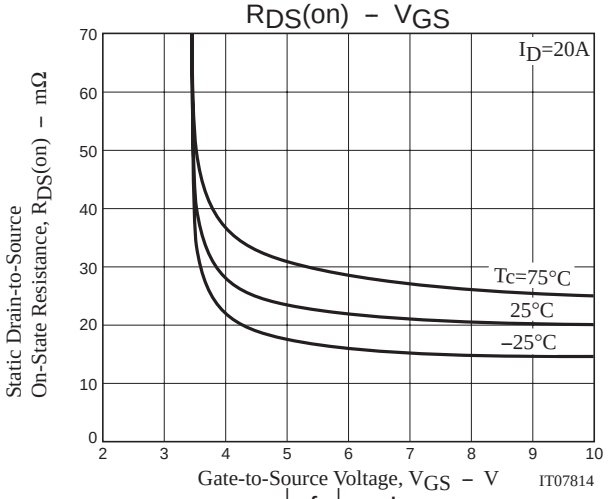


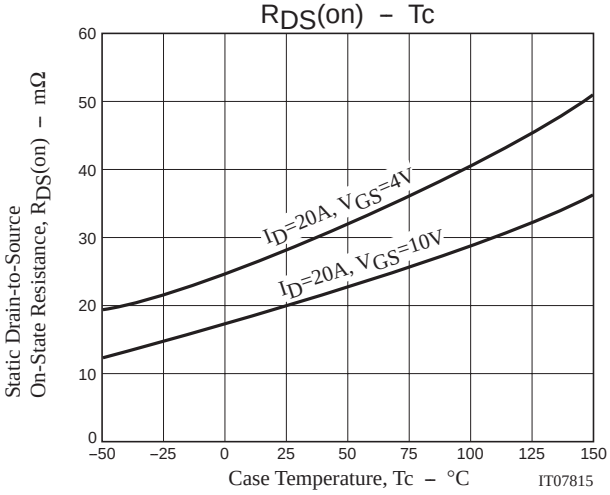
Unclamped Inductive Test Circuit

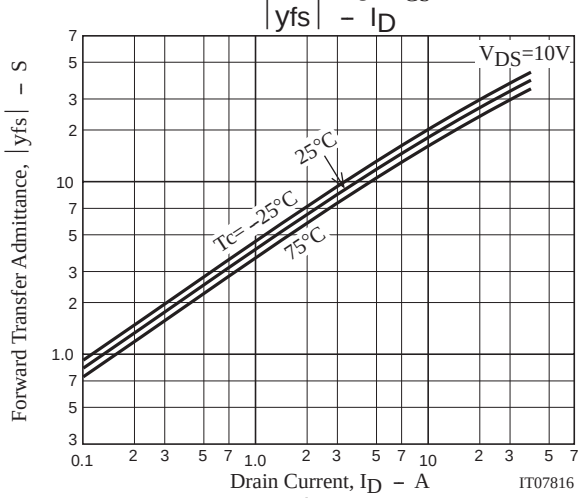


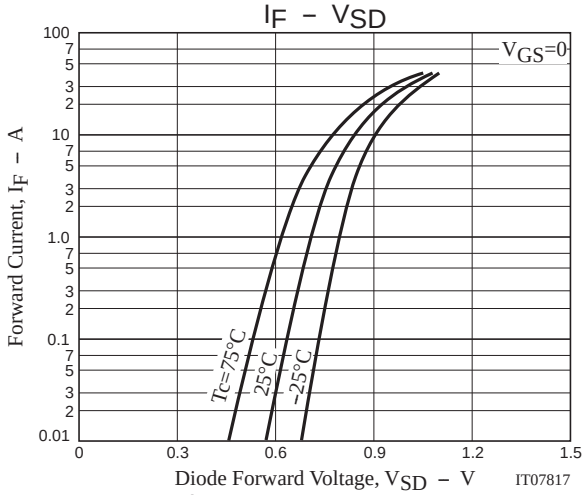

ID – VDS
Tc=25°C
8V
10V
6V
4V
VGS=3V
Drain Current, ID – A
Drain-to-Source Voltage, VDS – V
IT07812

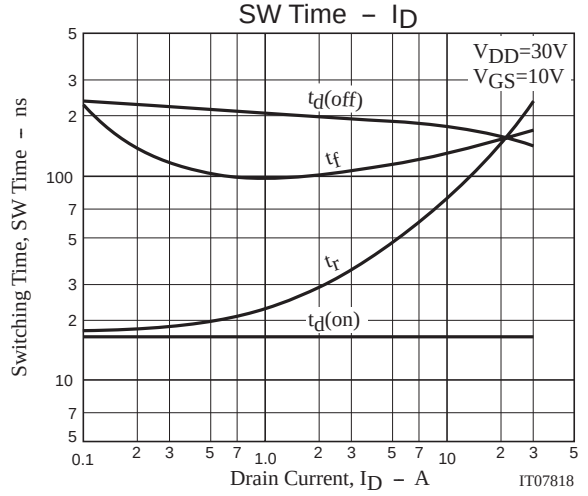

ID – VGS
VDS=10V
Tc=–25°C
75°C
25°C
25°C
Tc=75°C
–25°C
Drain Current, ID – A
Gate-to-Source Voltage, VGS – V
IT07813

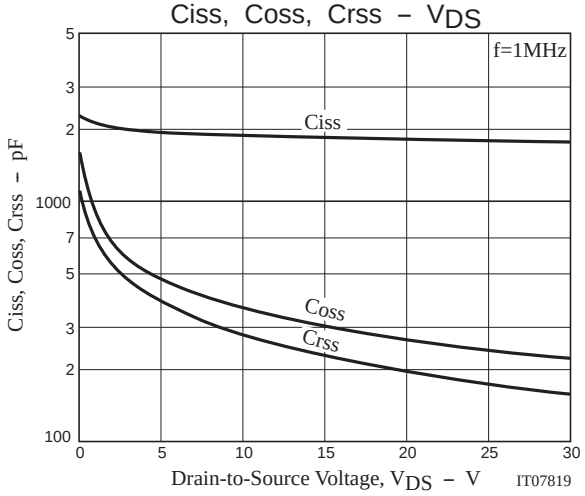

RDS(on) – VGS
ID=20A
Tc=75°C
25°C
–25°C
Static Drain-to-Source On-State Resistance, RDS(on) – mΩ
Gate-to-Source Voltage, VGS – V
IT07814

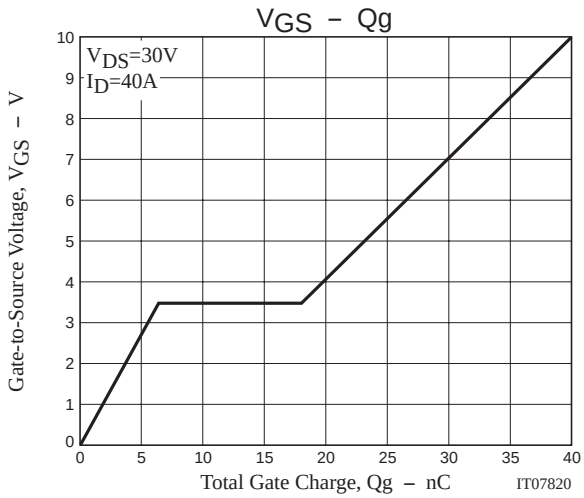

RDS(on) – Tc
ID=20A, VGS=4V
ID=20A, VGS=10V
Static Drain-to-Source On-State Resistance, RDS(on) – mΩ
Case Temperature, Tc – °C
IT07815

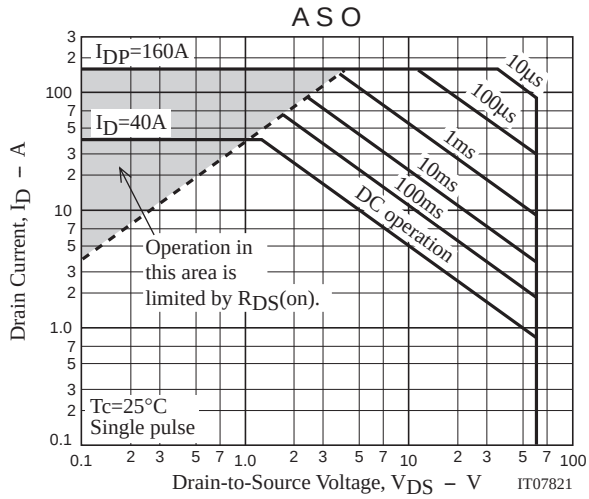

|yfs| – ID
VDS=10V
25°C
Tc=–25°C
75°C
Forward Transfer Admittance, |yfs| – S
Drain Current, ID – A
IT07816

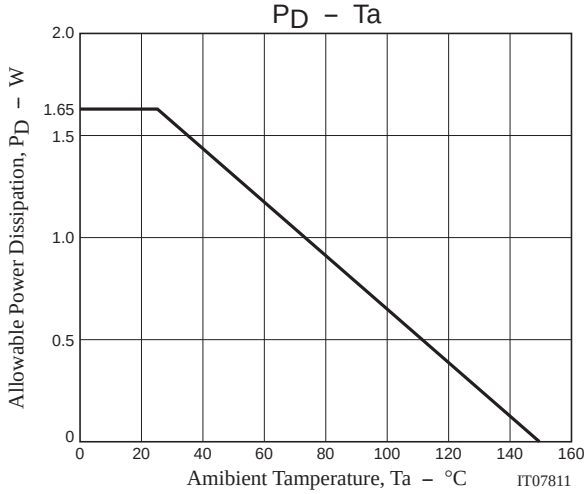

IF – VSD
VGS=0
Tc=75°C
25°C
–25°C
Forward Current, IF – A
Diode Forward Voltage, VSD – V
IT07817

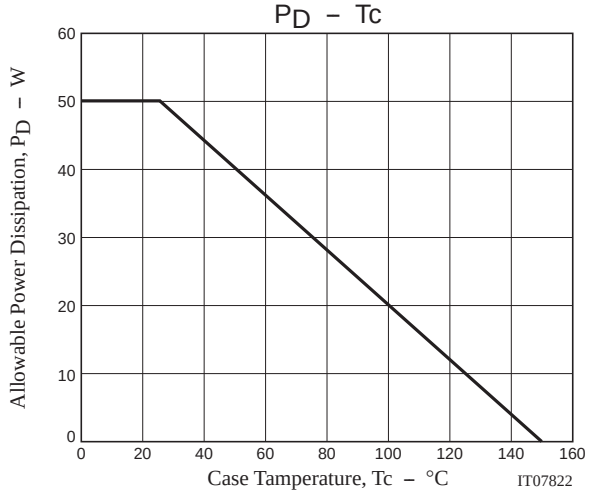

SW Time – ID
VDD=30V
VGS=10V
td(off)
tf
tr
td(on)
Switching Time, SW Time – ns
Drain Current, ID – A
IT07818


Ciss, Coss, Crss – VDS
f=1MHz
Ciss
Coss
Crss
Ciss, Coss, Crss – pF
Drain-to-Source Voltage, VDS – V
IT07819









Note on usage : Since the 2SK3816 is a MOSFET product, please avoid using this device in the vicinity of highly charged objects.