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SANYO Semiconductors

DATA SHEET

N-Channel Silicon MOSFET

BMS4003 — General-Purpose Switching Device Applications

Features

- ON-resistance $R_{DS}(on)$=50mΩ (typ.)
- Input capacitance Ciss=680pF (typ.)
- 10V drive

Specifications

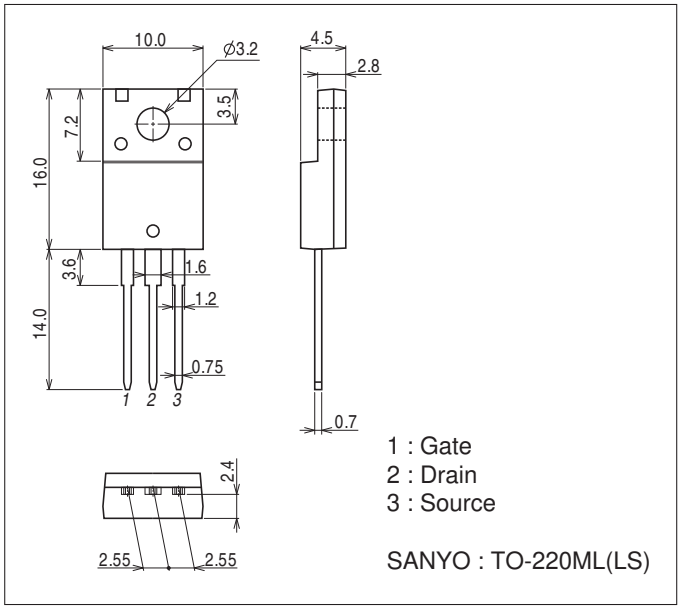
Absolute Maximum Ratings at Ta=25°C

Parameter	Symbol	Conditions	Ratings	Unit
Drain-to-Source Voltage	V_{DSS}		100	V
Gate-to-Source Voltage	V_{GSS}		±30	V
Drain Current (DC)	I_D		18	A
Drain Current (Pulse)	I_{DP}	PW≤10μs, duty cycle≤1%	72	A
Allowable Power Dissipation	P_D		2.0	W
		Tc=25°C	25	W
Channel Temperature	Tch		150	°C
Storage Temperature	Tstg		−55 to +150	°C
Avalanche Energy (Single Pulse) *1	E_{AS}		53	mJ
Avalanche Current *2	I_{AV}		15	A

Note :*1 V_{DD}=60V, L=200μH, I_{AV}=15A (Fig.1)
*2 L≤200μH, Single pulse

Package Dimensions

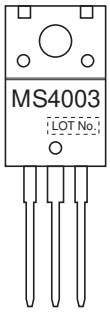
unit : mm (typ)
7525-002



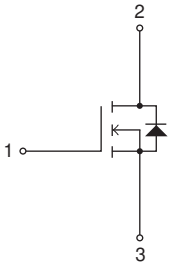
Product & Package Information

- Package : TO-220ML(LS)
- JEITA, JEDEC : SC-67, SOT-186A
- Minimum Packing Quantity : 100 pcs./bag or 50pcs./magazine

Marking



Electrical Connection



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}=0V	100			V
Zero-Gate Voltage Drain Current	I_{DSS}	V_{DS}=100V, V_{GS}=0V			1	μA
Gate-to-Source Leakage Current	I_{GSS}	V_{GS}=±30V, V_{DS}=0V			±100	nA
Cutoff Voltage	V_{GS}(off)	V_{DS}=10V, I_D=1mA	3		5	V
Forward Transfer Admittance	| yfs |	V_{DS}=10V, I_D=9A		7.8		S
Static Drain-to-Source On-State Resistance	R_{DS}(on)	I_D=9A, V_{GS}=10V		50	65	mΩ
Input Capacitance	Ciss	V_{DS}=20V, f=1MHz		680		pF
Output Capacitance	Coss			130		pF
Reverse Transfer Capacitance	Crss			33		pF
Turn-ON Delay Time	t_d(on)	See Fig.2		16		ns
Rise Time	t_r			33		ns
Turn-OFF Delay Time	t_d(off)			27		ns
Fall Time	t_f			15		ns
Total Gate Charge	Qg	V_{DS}=60V, V_{GS}=10V, I_D=18A		11.4		nC
Gate-to-Source Charge	Qgs			4.1		nC
Gate-to-Drain “Miller” Charge	Qgd			3.8		nC
Diode Forward Voltage	V_{SD}	I_S=18A, V_{GS}=0V		0.9	1.2	V
Reverse Recovery Time	t_{rr}	See Fig.3		60		ns
Reverse Recovery Charge	Q_{rr}	I_S=18A, V_{GS}=0V, di/dt=100A/μs		114		nC

Fig.1 Avalanche Resistance Test Circuit

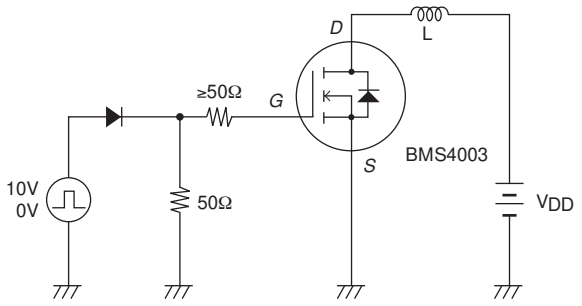


Fig.2 Switching Time Test Circuit

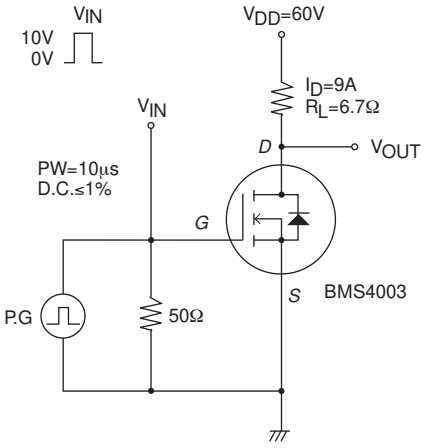
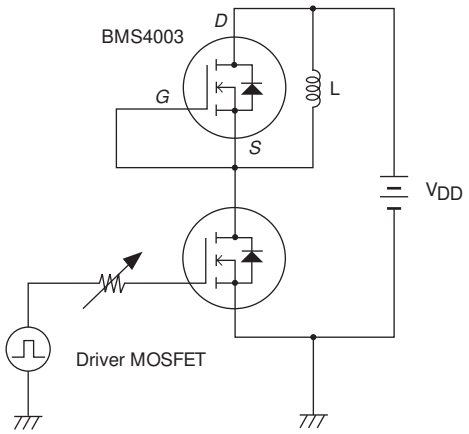
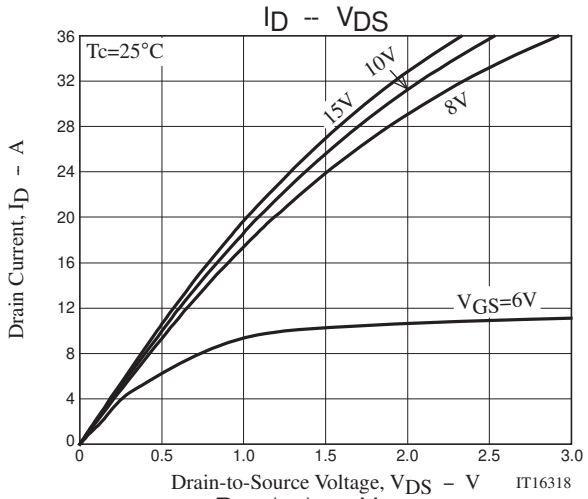
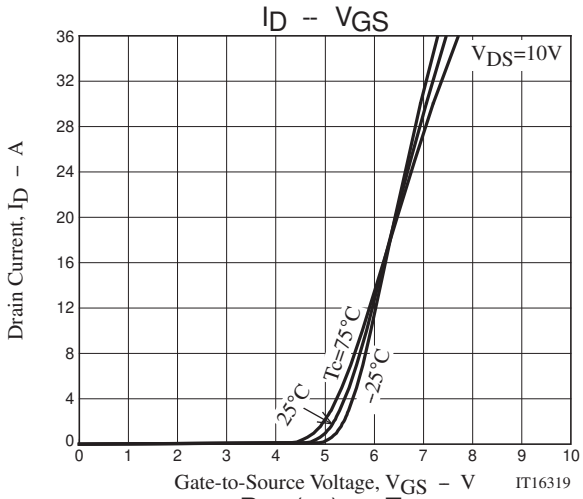
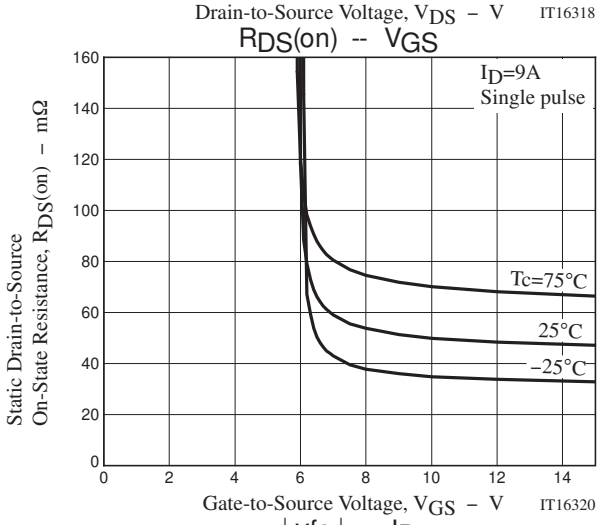


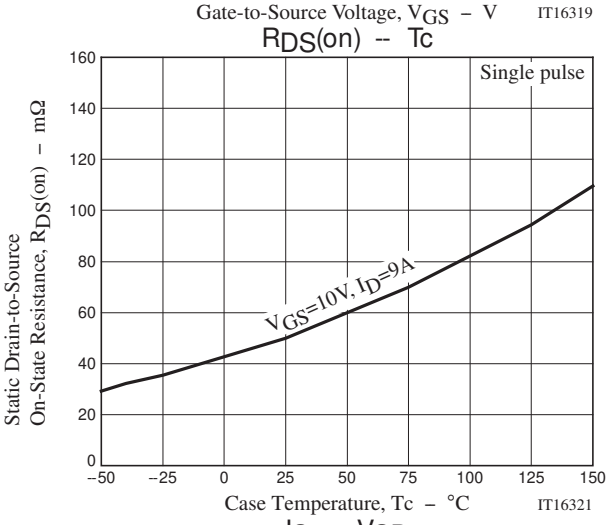
Fig.3 Reverse Recovery Time Test Circuit

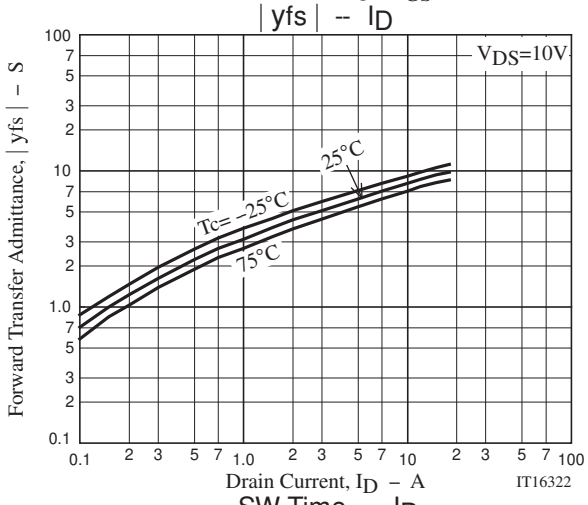


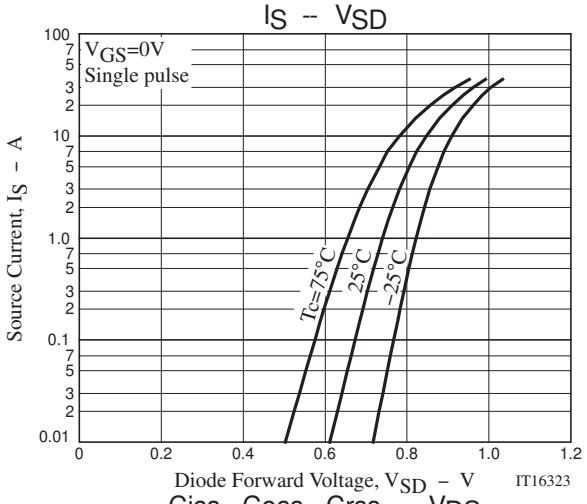

ID -- VDS
Tc=25°C
10V
15V
8V
VGS=6V
Drain Current, ID – A
Drain-to-Source Voltage, VDS – V
IT16318

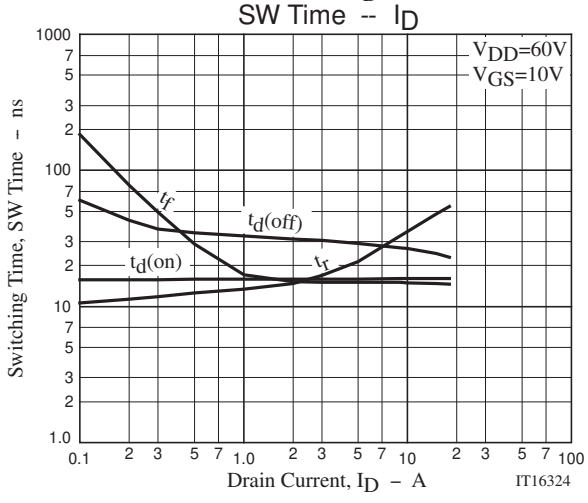

ID -- VGS
VDS=10V
25°C
Tc=75°C
–25°C
Drain Current, ID – A
Gate-to-Source Voltage, VGS – V
IT16319

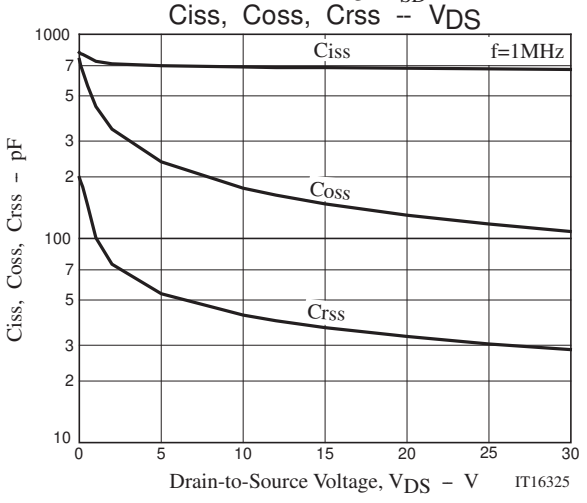

RDS(on) -- VGS
ID=9A
Single pulse
Tc=75°C
25°C
–25°C
Static Drain-to-Source On-State Resistance, RDS(on) – mΩ
Gate-to-Source Voltage, VGS – V
IT16320

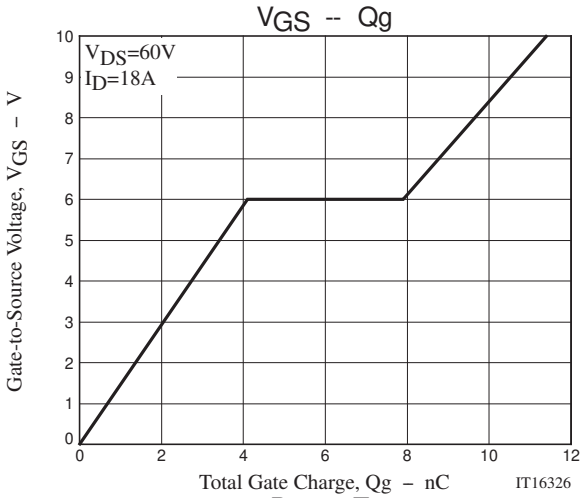

RDS(on) -- Tc
Single pulse
VGS=10V, ID=9A
Static Drain-to-Source On-State Resistance, RDS(on) – mΩ
Case Temperature, Tc – °C
IT16321

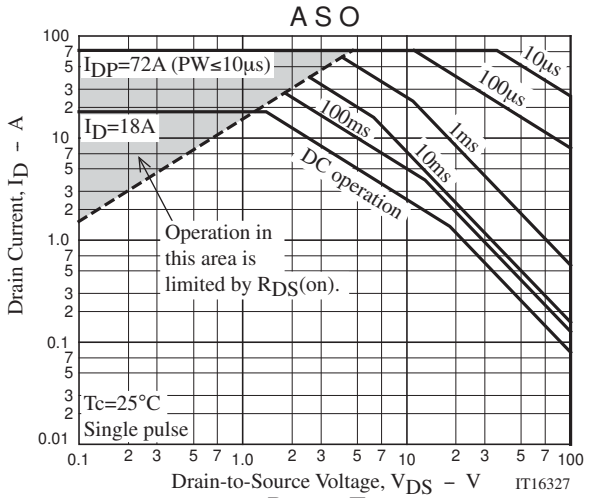

| yfs | -- ID
VDS=10V
25°C
Tc= –25°C
75°C
Forward Transfer Admittance, | yfs | – S
Drain Current, ID – A
IT16322

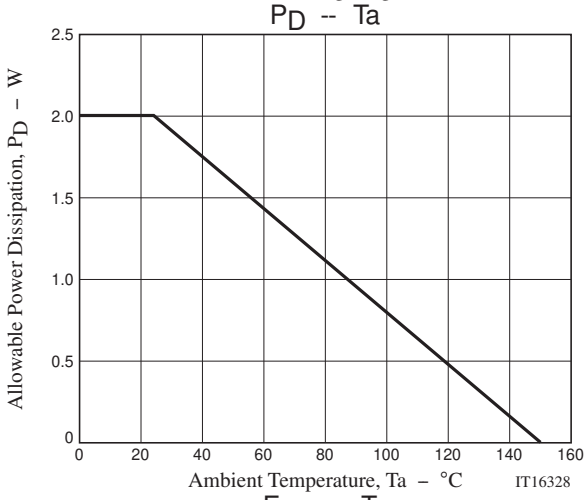

IS -- VSD
VGS=0V
Single pulse
Tc=75°C
25°C
–25°C
Source Current, IS – A
Diode Forward Voltage, VSD – V
IT16323

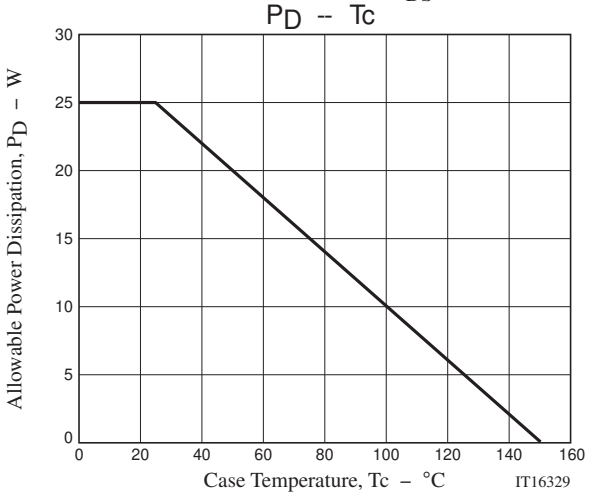

SW Time -- ID
VDD=60V
VGS=10V
tf
td(off)
td(on)
tr
Switching Time, SW Time – ns
Drain Current, ID – A
IT16324

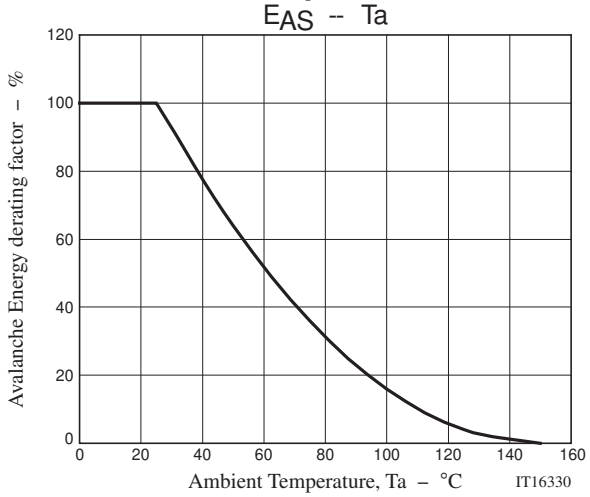

Ciss, Coss, Crss -- VDS
Ciss
f=1MHz
Coss
Crss
Ciss, Coss, Crss – pF
Drain-to-Source Voltage, VDS – V
IT16325


VGS -- Qg
VDS=60V
ID=18A
Gate-to-Source Voltage, VGS – V
Total Gate Charge, Qg – nC
IT16326


A S O
IDP=72A (PW≤10μs)
ID=18A
10μs
100μs
100ms
1ms
10ms
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
IT16327


PD -- Ta
Allowable Power Dissipation, PD – W
Ambient Temperature, Ta – °C
IT16328


PD -- Tc
Allowable Power Dissipation, PD – W
Case Temperature, Tc – °C
IT16329


EAS -- Ta
Avalanche Energy derating factor – %
Ambient Temperature, Ta – °C
IT16330

Note on usage : Since the BMS4003 is a MOSFET product, please avoid using this device in the vicinity of highly charged objects.

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