Rochester Electronics

Datasheet

Rochester Electronics Manufactured Components

Rochester branded components are manufactured using either die/wafers purchased from the original suppliers or Rochester wafers recreated from the original IP. All recreations are done with the approval of the OCM.

Parts are tested using original factory test programs or Rochester developed test solutions to guarantee product meets or exceed the OCM data sheet.

Quality Overview

- ISO-9001
- AS9120 certification
- Qualified Manufacturers List (QML) MIL-PRF-35835
    - Class Q Military
    - Class V Space Level
- Qualified Suppliers List of Distributors (QSLD)

    - Rochester is a critical supplier to DLA and meets all industry and DLA standards.

Rochester Electronics, LLC is committed to supplying products that satisfy customer expectations for quality and are equal to those originally supplied by industry manufacturers.

The original manufacturer's datasheet accompanying this document reflects the performance and specifications of the Rochester manufactured version of this device. Rochester Electronics guarantees the performance of its semiconductor products to the original OEM specifications. 'Typical' values are for reference purposes only. Certain minimum or maximum ratings may be based on product characterization, design, simulation, or sample testing.

Advanced Power MOSFET

SFM9110

FEATURES

- Avalanche Rugged Technology
- Rugged Gate Oxide Technology
- Lower Input Capacitance
- Improved Gate Charge
- Extended Safe Operating Area
- Lower Leakage Current : 10 μA (Max.) @ V_{DS} = -100V
- Lower $R_{DS(ON)}$: 0.912 Ω (Typ.)

BV_{DSS} = -100 V

$R_{DS(on)}$ = 1.2 Ω

I_D = -1.0 A

SOT-223

1. Gate 2. Drain 3. Source

Absolute Maximum Ratings

Symbol	Characteristic	Value	Units
V_{DSS}	Drain-to-Source Voltage	-100	V
I_D	Continuous Drain Current (T_A=25°C)	-1.0	A
	Continuous Drain Current (T_A=70°C)	-0.7	
I_{DM}	Drain Current-Pulsed ①	-8.0	A
V_{GS}	Gate-to-Source Voltage	± 20	V
E_{AS}	Single Pulsed Avalanche Energy ②	53	mJ
I_{AR}	Avalanche Current ①	-1.0	A
E_{AR}	Repetitive Avalanche Energy ①	0.25	mJ
dv/dt	Peak Diode Recovery dv/dt ③	-6.5	V/ns
P_D	Total Power Dissipation (T_A=25°C) *	2.52	W
	Linear Derating Factor *	0.02	W/°C
T_J , T_{STG}	Operating Junction and Storage Temperature Range	- 55 to +150	°C
T_L	Maximum Lead Temp. for Soldering Purposes, 1/8" from case for 5-seconds	300	

Thermal Resistance

Symbol	Characteristic	Typ.	Max.	Units
$R_{\theta JA}$	Junction-to-Ambient *	--	50	°C/W

* When mounted on the minimum pad size recommended (PCB Mount).

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

Symbol	Characteristic	Min.	Typ.	Max.	Units	Test Condition
BV_{DSS}	Drain-Source Breakdown Voltage	-100	--	--	V	V_{GS}=0V,I_D=-250μA
$\Delta BV/\Delta T_J$	Breakdown Voltage Temp. Coeff.	--	-0.1	--	V/°C	I_D=-250μA ***See Fig 7***
$V_{GS(th)}$	Gate Threshold Voltage	-2.0	--	-4.0	V	V_{DS}=-5V,I_D=-250μA
I_{GSS}	Gate-Source Leakage , Forward	--	--	-100	nA	V_{GS}=-20V
	Gate-Source Leakage , Reverse	--	--	100		V_{GS}=20V
I_{DSS}	Drain-to-Source Leakage Current	--	--	-10	μA	V_{DS}=-100V
		--	--	-100		V_{DS}=-80V,T_C=125°C
$R_{DS(on)}$	Static Drain-Source On-State Resistance	--	--	1.2	Ω	V_{GS}=-10V,I_D=-0.5A ④
g_{fs}	Forward Transconductance	--	1.3	--	S	V_{DS}=-40V,I_D=-0.5A ④
C_{iss}	Input Capacitance	--	260	335	pF	V_{GS}=0V,V_{DS}=-25V,f =1MHz ***See Fig 5***
C_{oss}	Output Capacitance	--	50	80		
C_{rss}	Reverse Transfer Capacitance	--	17	25		
$t_{d(on)}$	Turn-On Delay Time	--	10	30	ns	V_{DD}=-50V,I_D=-3.6A, R_G=24Ω ***See Fig 13*** ④⑤
t_r	Rise Time	--	20	50		
$t_{d(off)}$	Turn-Off Delay Time	--	25	60		
t_f	Fall Time	--	12	35		
Q_g	Total Gate Charge	--	9	10	nC	V_{DS}=-80V,V_{GS}=-10V, I_D=-3.6A ***See Fig 6 & Fig 12*** ④⑤
Q_{gs}	Gate-Source Charge	--	1.5	--		
Q_{gd}	Gate-Drain("Miller") Charge	--	4.3	--		

Source-Drain Diode Ratings and Characteristics

Symbol	Characteristic	Min.	Typ.	Max.	Units	Test Condition
I_S	Continuous Source Current	--	--	-1.0	A	Integral reverse pn-diode in the MOSFET
I_{SM}	Pulsed-Source Current ①	--	--	-8.0		
V_{SD}	Diode Forward Voltage ④	--	--	-3.8	V	T_J=25°C,I_S=-1.0A,V_{GS}=0V
t_{rr}	Reverse Recovery Time	--	100	--	ns	T_J=25°C,I_F=-3.6A
Q_{rr}	Reverse Recovery Charge	--	0.35	--	μC	di_F/dt=100A/μs ④

Notes ;

① Repetitive Rating : Pulse Width Limited by Maximum Junction Temperature

② L=80mH, I_{AS}=-1.0A, V_{DD}=-25V, R_G=27Ω*, Starting T_J=25°C

③ I_{SD}≤-3.6A, di/dt≤ 300A/μs, V_{DD}≤ BV_{DSS}, Starting T_J=25°C

④ Pulse Test : Pulse Width = 250μs, Duty Cycle≤ 2%

⑤ Essentially Independent of Operating Temperature

Fig 1. Output Characteristics

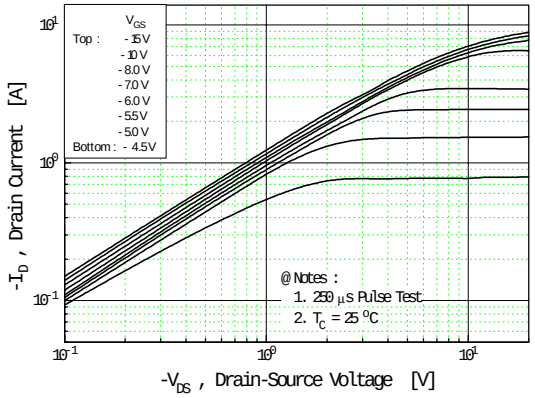


Fig 2. Transfer Characteristics

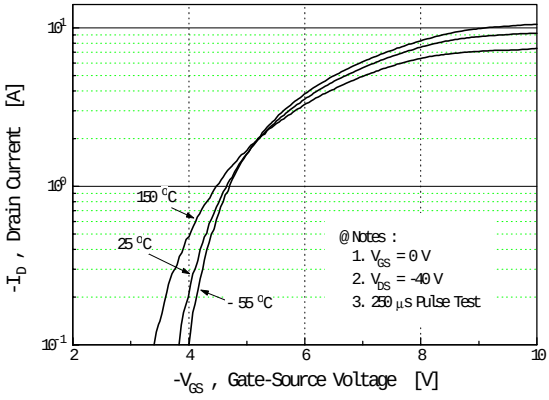


Fig 3. On-Resistance vs. Drain Current

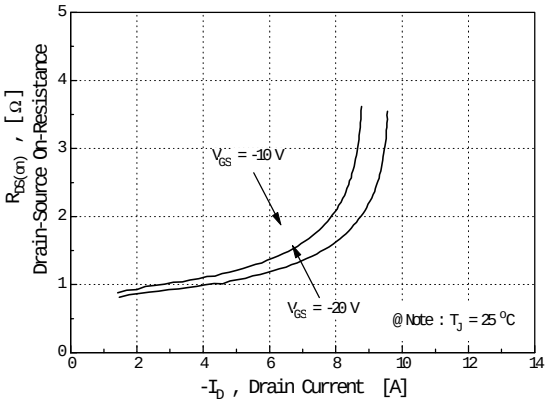


Fig 4. Source-Drain Diode Forward Voltage

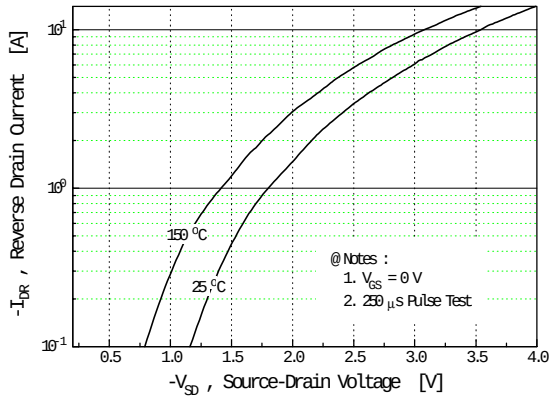


Fig 5. Capacitance vs. Drain-Source Voltage

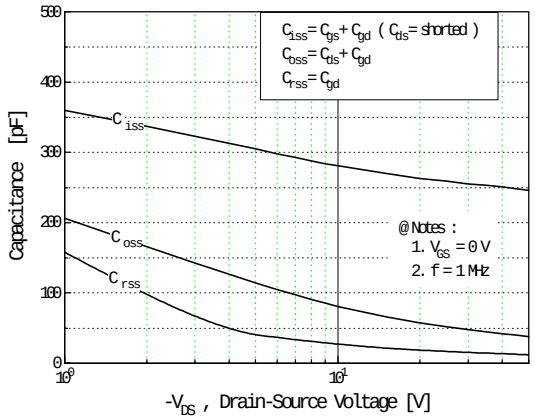


Fig 6. Gate Charge vs. Gate-Source Voltage

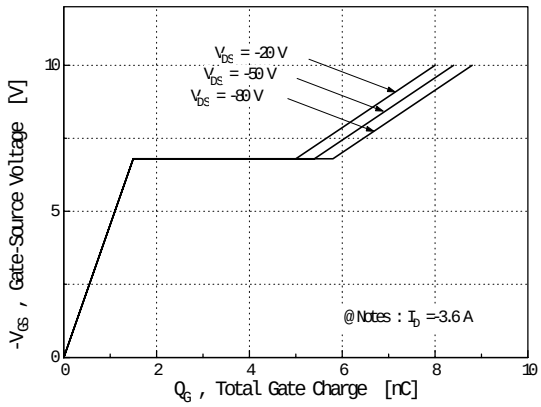


Fig 7. Breakdown Voltage vs. Temperature

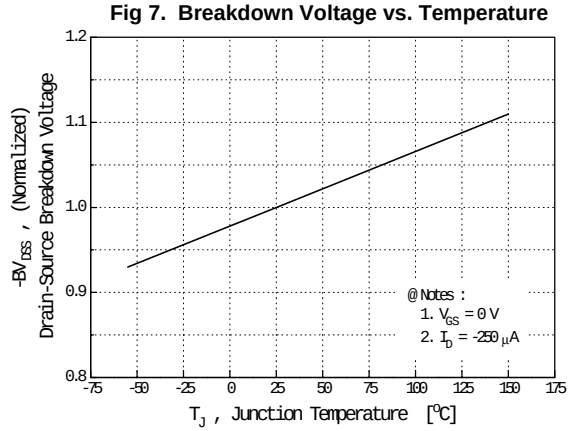


Fig 8. On-Resistance vs. Temperature

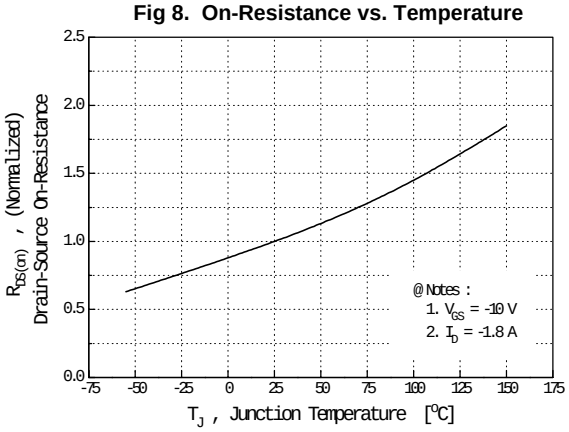


Fig 9. Max. Safe Operating Area

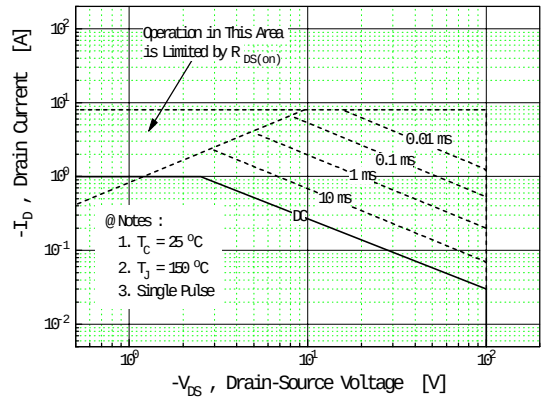


Fig 10. Max. Drain Current vs. Case Temperature

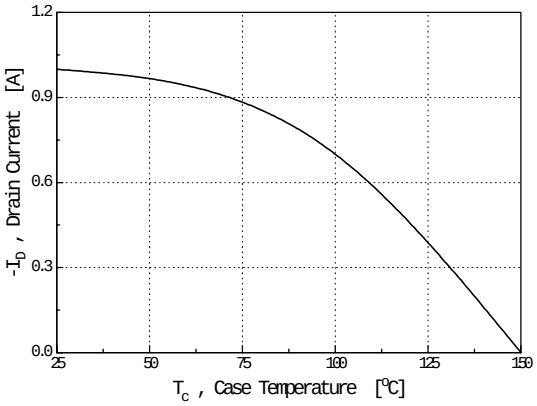


Fig 11. Thermal Response

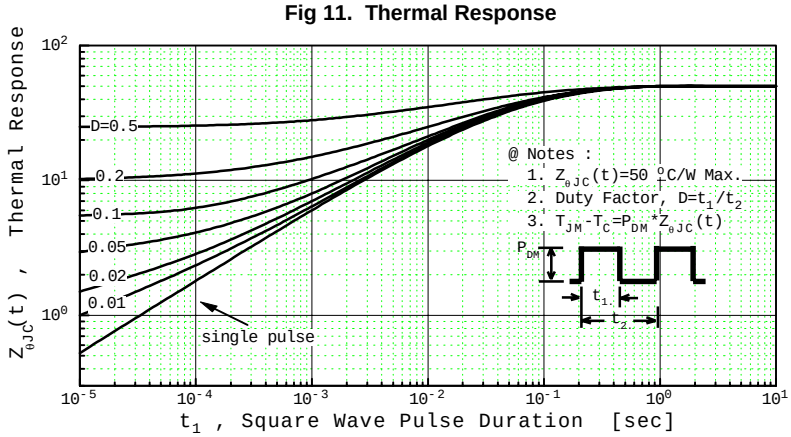


Fig 12. Gate Charge Test Circuit & Waveform

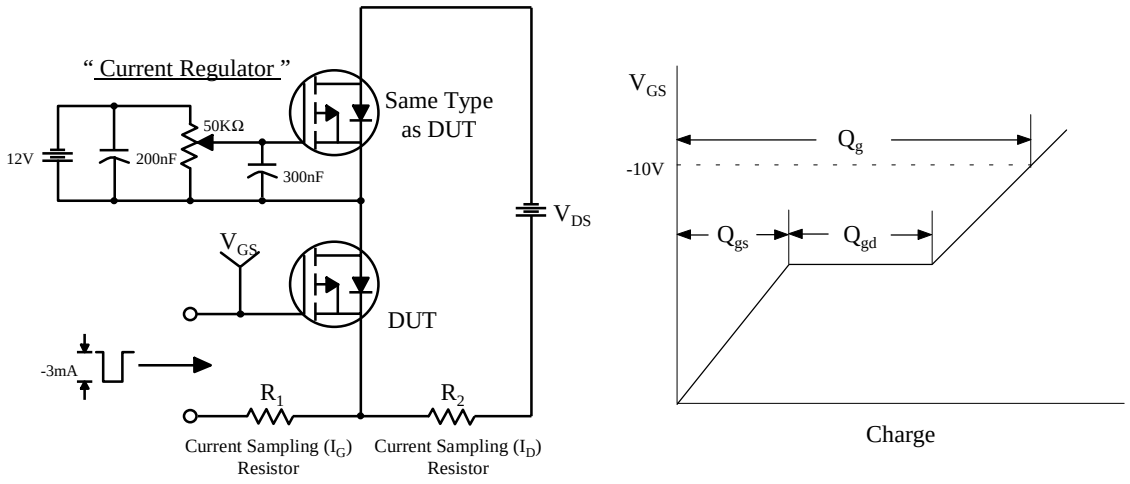


Fig 13. Resistive Switching Test Circuit & Waveforms

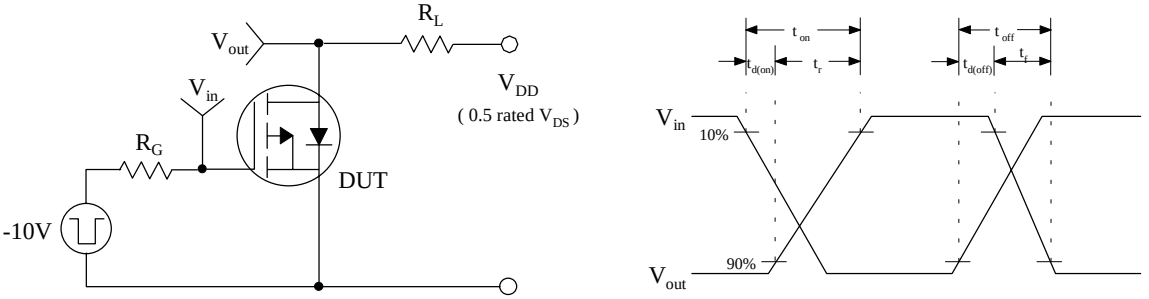


Fig 14. Unclamped Inductive Switching Test Circuit & Waveforms

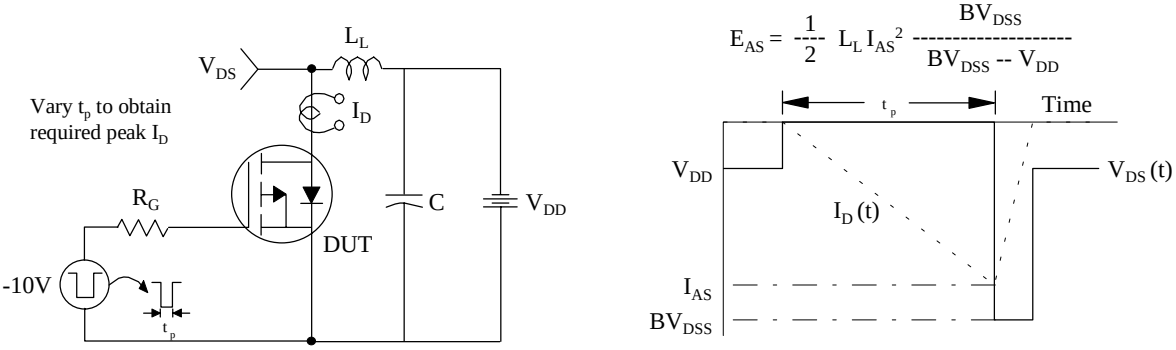
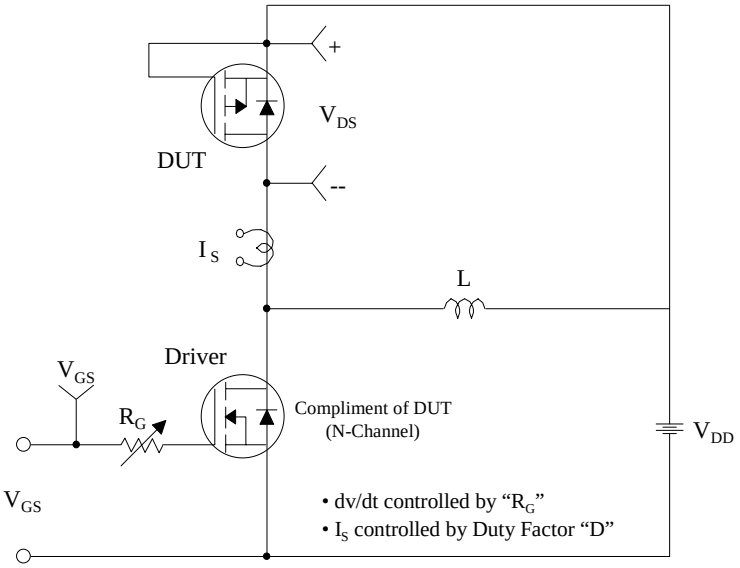
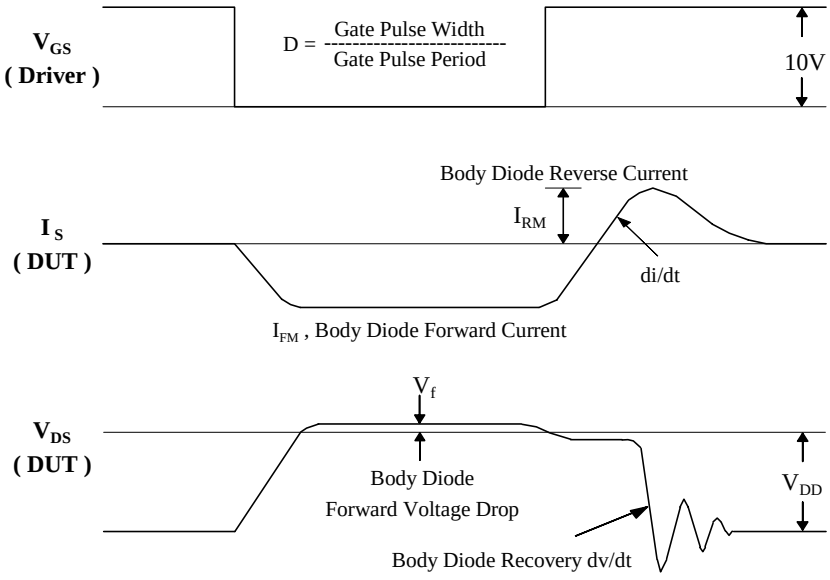


Fig 15. Peak Diode Recovery dv/dt Test Circuit & Waveforms





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PRODUCT STATUS DEFINITIONS

Definition of Terms

Datasheet Identification	Product Status	Definition
Advance Information	Formative or In Design	This datasheet contains the design specifications for product development. Specifications may change in any manner without notice.
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SFM9110
100V P-Channel A-FET

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Features

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- Rugged Gate Oxide Technology
- Lower Input Capacitance
- Improved Gate Charge
- Extended Safe Operating Area
- Lower Leakage Current : 10 µA (Max.) @ V_{DS} = -100V
- Lower R_{DS} 0.912 Ω (Typ.)

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Product status/pricing/packaging

Product	Product status	Pricing*	Package type	Leads	Packing method
SFM9110TF	Full Production	$0.322	SOT-223	3	TAPE REEL

* 1,000 piece Budgetary Pricing

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