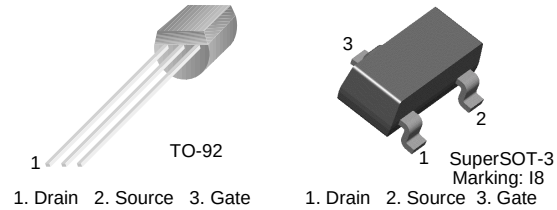


J108/J109/J110/MMBFJ108

N-Channel Switch

- This device is designed for digital switching applications where very low on resistance is mandatory.
- Sourced from Process 58.



Absolute Maximum Ratings * $T_A=25^{\circ}\text{C}$ unless otherwise noted

Symbol	Parameter	Value	Units
V_{DG}	Drain-Gate Voltage	25	V
V_{GS}	Gate-Source Voltage	-25	V
I_{GF}	Forward Gate Current	10	mA
T_J, T_{stg}	Operating and Storage Junction Temperature Range	-55 ~ +150	$^{\circ}\text{C}$

* These ratings are limiting values above which the serviceability of any semiconductor device may be impaired.

NOTES:

- These ratings are based on a maximum junction temperature of 150 degrees C.
- These are steady state limits. The factory should be consulted on applications involving pulsed or low duty cycle operations.

Electrical Characteristics $T_A=25^{\circ}\text{C}$ unless otherwise noted

Symbol	Parameter	Test Condition	Min.	Max.	Units
Off Characteristics					
$V_{(BR)GSS}$	Gate-Source Breakdwn Voltage	$I_G = -10\mu\text{A}, V_{DS} = 0$	-25		V
I_{GSS}	Gate Reverse Current	$V_{GS} = -15\text{V}, V_{DS} = 0$		-3.0	nA
		$V_{GS} = -15\text{V}, V_{DS} = 0, T_A = 100^{\circ}\text{C}$		-200	nA
$V_{GS(off)}$	Gate-Source Cutoff Voltage	$V_{DS} = 15\text{V}, I_D = 10\text{nA}$	-3.0	-10	V
		108	-2.0	-6.0	V
		109	-0.5	-4.0	V
		110			V
On Characteristics					
I_{DSS}	Zero-Gate Voltage Drain Current *	$V_{DS} = 15\text{V}, I_{GS} = 0$	80		mA
		108	40		mA
		109	10		mA
		110			mA
$r_{DS(on)}$	Drain-Source On Resistance	$V_{DS} \leq 0.1\text{V}, V_{GS} = 0$		8.0	Ω
		108		12	Ω
		109		18	Ω
		110			Ω
Small Signal Characteristics					
$C_{dg(on)}$	Drain Gate & Source Gate On Capacitance	$V_{DS} = 0, V_{GS} = 0, f = 1.0\text{MHz}$		85	pF
$C_{sg(off)}$					
$C_{dg(off)}$	Drain-Gate Off Capacitance	$V_{DS} = 0, V_{GS} = -10, f = 1.0\text{MHz}$		15	pF
$C_{sg(off)}$	Source-Gate Off Capacitance	$V_{DS} = 0, V_{GS} = -10, f = 1.0\text{MHz}$		15	pF

* Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2.0\%$

Thermal Characteristics $T_A=25^{\circ}\text{C}$ unless otherwise noted

Symbol	Parameter	Max.		Units
		J108 - 110	*MMBFJ108	
P_D	Total Device Dissipation	625	350	mW
	Derate above 25°C	5.0	2.8	mW/ $^{\circ}\text{C}$
$R_{\theta JC}$	Thermal Resistance, Junction to Case	125		$^{\circ}\text{C/W}$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	357	556	$^{\circ}\text{C/W}$

* Device mounted on FR-4 PCB $1.6'' \times 1.6'' \times 0.06''$

Typical Characteristics

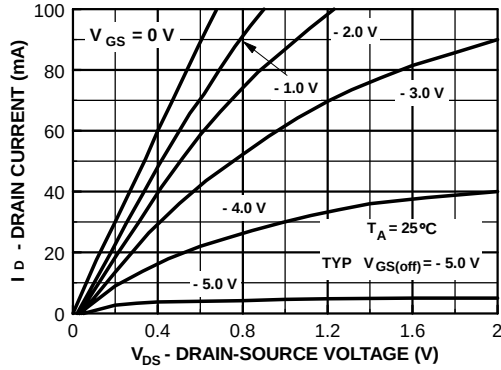


Figure 1. Common Drain-Source

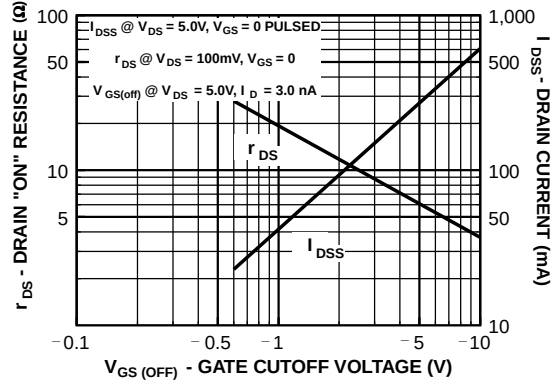


Figure 2. Parameter Interactions

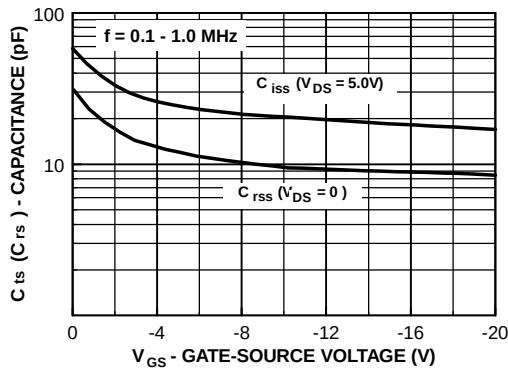


Figure 3. Common Drain-Source

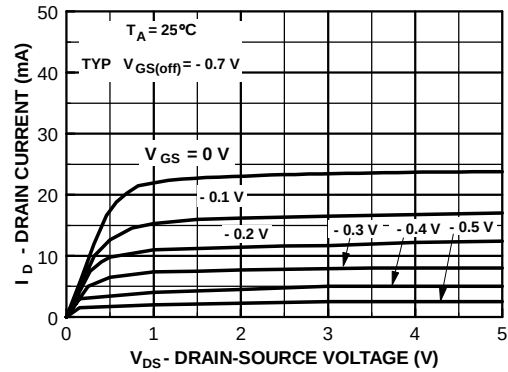


Figure 4. Common Drain-Source

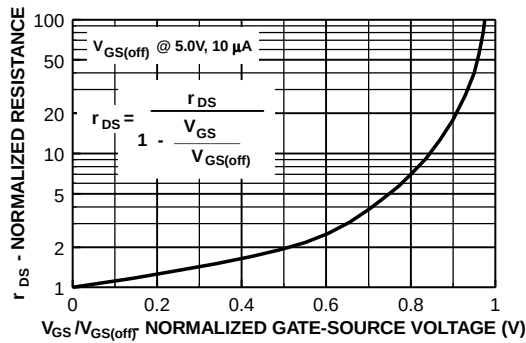


Figure 5. Normalized Drain Resistance vs Bias Voltage

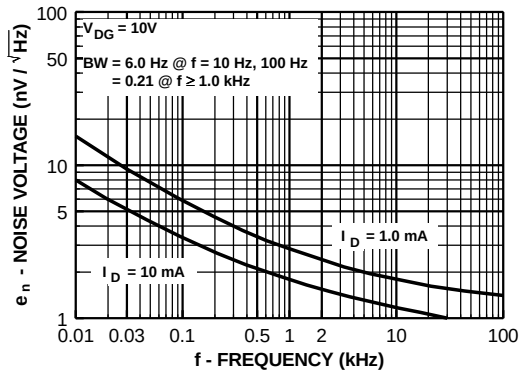


Figure 6. Noise Voltage vs Frequency

Typical Characteristics (Continued)

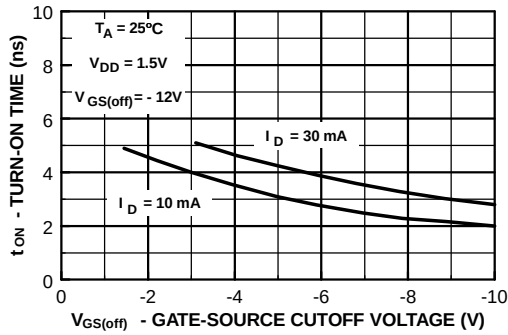


Figure 7. Switching Turn-On Time vs Gate-Source Cutoff Voltage

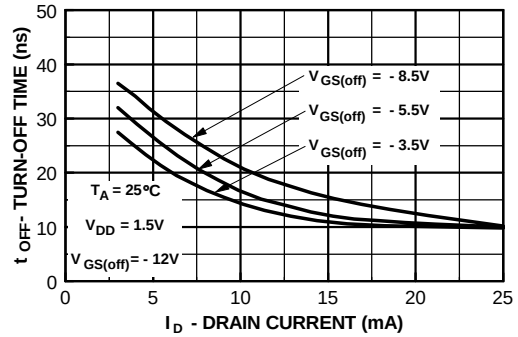


Figure 8. Switching Turn-On Time vs Drain Current

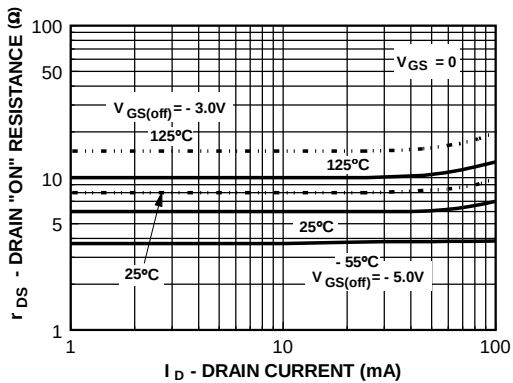


Figure 9. On Resistance vs Drain Current

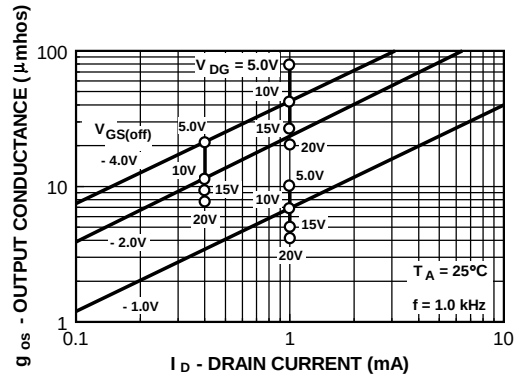


Figure 10. Output Conductance vs Drain Current

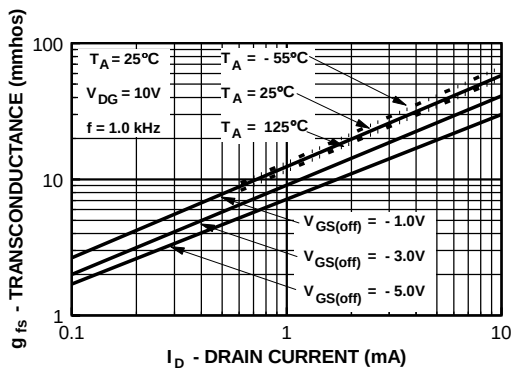


Figure 11. Transconductance vs Drain Current

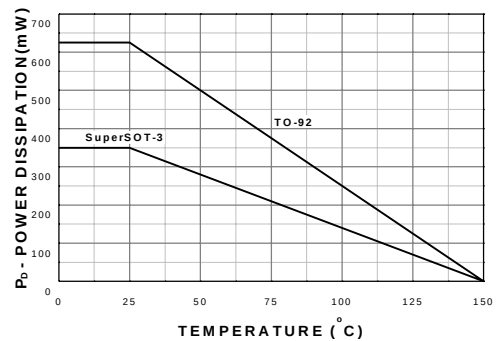
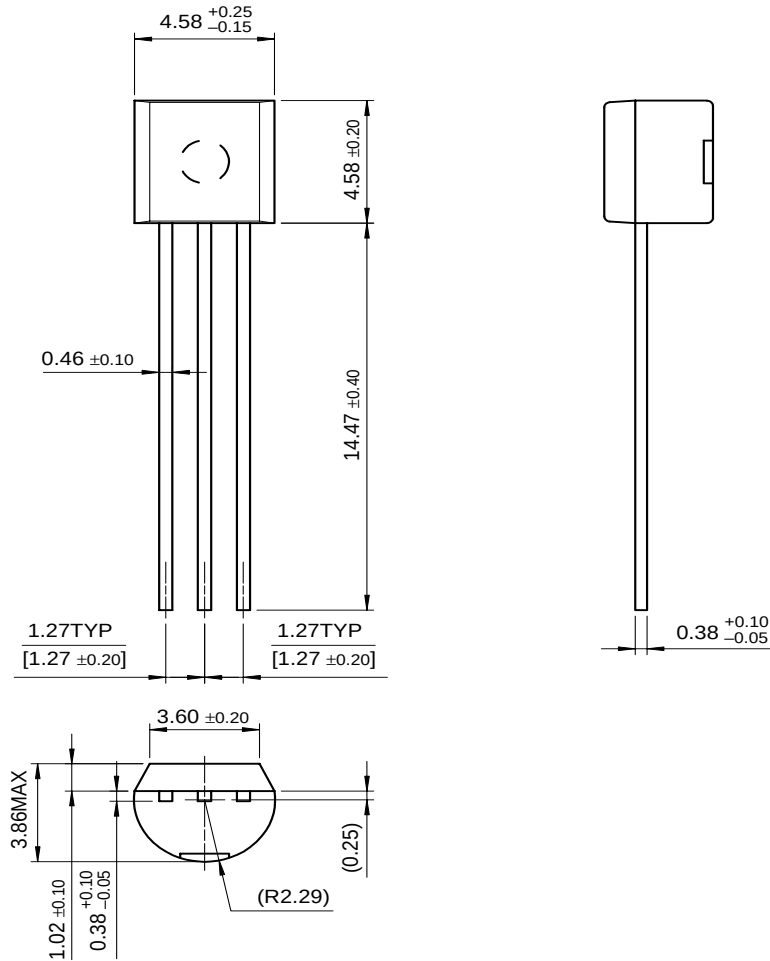


Figure 12. Power Dissipation vs Ambient Temperature

Package Dimensions

TO-92



Dimensions in Millimeters

J108/J109/J110/MMBF-J108

The image shows two technical drawings of a mechanical part. The left drawing is a front view, and the right drawing is a top view.

Front View Dimensions:

- Overall width: 0.0990 ± 0.0050 [2.51 ± 0.13]
- Distance from left edge to center of hole: 0.1150 ± 0.0050 [2.92 ± 0.13]
- Distance from right edge to center of hole: 0.0550 ± 0.0030 [1.40 ± 0.08]
- Distance from left edge to center of hole (alternative): 0.0240 [0.61] and 0.0180 [0.46]
- Distance from center of hole to right edge: 0.0375 ± 0.0025 [0.95 ± 0.06]
- Distance from left edge to center of hole (alternative): 0.0750 ± 0.0050 [1.91 ± 0.13]

Top View Dimensions:

- Overall width: 0.0900 [2.29]
- Distance from left edge to center of hole: 0.0300 [0.76] TYP.
- Distance from center of hole to right edge: 0.0375 [0.95]
- Distance from left edge to center of hole (alternative): 0.0300 [0.76] TYP.

Figure 1 illustrates the dimensioning of a shaft and a hole. The shaft is dimensioned with a diameter of 0.0015 [0.038] C, a length of 0.0040 [0.10] TYP., and a total length of 0.0440 [1.12] 0.0360 [0.91]. The hole is dimensioned with a diameter of 0.0150 ± 0.0020 [0.38 ± 0.05] and a length of 0.0080 [0.20]. The hole is dimensioned from the GAGE PLANE (0.0070 [0.18] 0.0040 [0.10] TYP.) and the SEATING PLANE (0.0220 +0.0020 -0.0040 [0.56 +0.05 -0.10] TYP.). The hole is also dimensioned from the GAGE PLANE (0.0070 [0.18] 0.0040 [0.10] TYP.) and the SEATING PLANE (0.0220 +0.0020 -0.0040 [0.56 +0.05 -0.10] TYP.).

Rev. B1, November 2002

TRADEMARKS

The following are registered and unregistered trademarks Fairchild Semiconductor owns or is authorized to use and is not intended to be an exhaustive list of all such trademarks.

ACE [™]	FACT [™]	ImpliedDisconnect [™]	PACMAN [™]	SPM [™]
ActiveArray [™]	FACT Quiet series [™]	ISOPLANAR [™]	POP [™]	Stealth [™]
Bottomless [™]	FAST [®]	LittleFET [™]	Power247 [™]	SuperSOT [™] -3
CoolFET [™]	FAST [™]	MicroFET [™]	PowerTrench [®]	SuperSOT [™] -6
CROSSVOLT [™]	FRFET [™]	MicroPak [™]	QFET [™]	SuperSOT [™] -8
DOVE [™]	GlobalOptoisolator [™]	MICROWIRE [™]	QS [™]	SyncFET [™]
EcoSPARK [™]	GTO [™]	MSX [™]	QT Optoelectronics [™]	TinyLogic [™]
E ² CMOS [™]	HiSeC [™]	MSXPro [™]	Quiet Series [™]	TruTranslation [™]
EnSigna [™]	I ² C [™]	OCX [™]	RapidConfigure [™]	UHC [™]
Across the board. Around the world. [™]		OCXPro [™]	RapidConnect [™]	UltraFET [®]
The Power Franchise [™]		OPTOLOGIC [®]	SILENT SWITCHER [®]	VCX [™]
Programmable Active Droop [™]		OPTOPLANAR [™]	SMART START [™]	

DISCLAIMER

FAIRCHILD SEMICONDUCTOR RESERVES THE RIGHT TO MAKE CHANGES WITHOUT FURTHER NOTICE TO ANY PRODUCTS HEREIN TO IMPROVE RELIABILITY, FUNCTION OR DESIGN. FAIRCHILD DOES NOT ASSUME ANY LIABILITY ARISING OUT OF THE APPLICATION OR USE OF ANY PRODUCT OR CIRCUIT DESCRIBED HEREIN; NEITHER DOES IT CONVEY ANY LICENSE UNDER ITS PATENT RIGHTS, NOR THE RIGHTS OF OTHERS.

LIFE SUPPORT POLICY

FAIRCHILD'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS WRITTEN APPROVAL OF FAIRCHILD SEMICONDUCTOR CORPORATION.

As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, or (c) whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in significant injury to the user.
2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

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.
Preliminary	First Production	This datasheet contains preliminary data, and supplementary data will be published at a later date. Fairchild Semiconductor reserves the right to make changes at any time without notice in order to improve design.
No Identification Needed	Full Production	This datasheet contains final specifications. Fairchild Semiconductor reserves the right to make changes at any time without notice in order to improve design.
Obsolete	Not In Production	This datasheet contains specifications on a product that has been discontinued by Fairchild semiconductor. The datasheet is printed for reference information only.