

**BSS84 / BSS110**

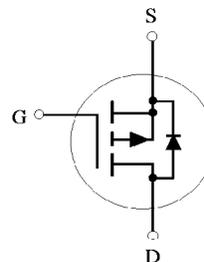
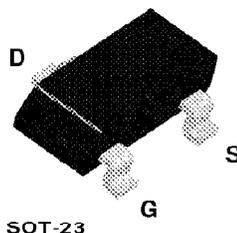
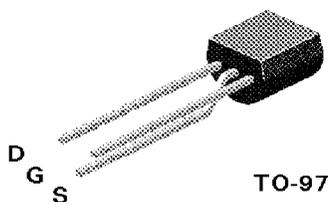
**P-Channel Enhancement Mode Field Effect Transistor**

**General Description**

These P-Channel enhancement mode power field effect transistors are produced using Fairchild's proprietary, high cell density, DMOS technology. This very high density process is designed to minimize on-state resistance, provide rugged and reliable performance and fast switching. They can be used, with a minimum of effort, in most applications requiring up to 0.17A DC and can deliver pulsed currents up to 0.68A. This product is particularly suited to low voltage applications requiring a low current high side switch.

**Features**

- BSS84: -0.13A, -50V.  $R_{DS(ON)} = 10\Omega @ V_{GS} = -5V$ .  
BSS110: -0.17A, -50V.  $R_{DS(ON)} = 10\Omega @ V_{GS} = -10V$
- Voltage controlled p-channel small signal switch.
- High density cell design for low  $R_{DS(ON)}$ .
- High saturation current.



**Absolute Maximum Ratings**

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

Symbol	Parameter	BSS84	BSS110	Units
$V_{DSS}$	Drain-Source Voltage	-50	-50	V
$V_{DGR}$	Drain-Gate Voltage ( $R_{GS} \leq 20\text{ K}\Omega$ )	-50	-50	V
$V_{GSS}$	Gate-Source Voltage - Continuous	$\pm 20$		V
$I_D$	Drain Current - Continuous @ $T_A = 30/35^\circ\text{C}$	-0.13	-0.17	A
	- Pulsed @ $T_A = 25^\circ\text{C}$	-0.52	-0.68	
$P_D$	Maximum Power Dissipation $T_A = 25^\circ\text{C}$	0.36	0.63	W
$T_J, T_{STG}$	Operating and Storage Temperature Range	-55 to 150		$^\circ\text{C}$
$T_L$	Maximum lead temperature for soldering purposes, 1/16" from case for 10 seconds	300		$^\circ\text{C}$

**THERMAL CHARACTERISTICS**

Symbol	Parameter	BSS84	BSS110	Units
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	350	200	$^\circ\text{C/W}$

**ELECTRICAL CHARACTERISTICS** ( $T_A = 25^\circ\text{C}$  unless otherwise noted)

Symbol	Parameter	Conditions	Type	Min	Typ	Max	Units
<b>OFF CHARACTERISTICS</b>							
$BV_{DS}$	Drain-Source Breakdown Voltage	$V_{GS} = 0\text{ V}, I_D = -250\ \mu\text{A}$	All	-50			V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS} = -50\text{ V},$ $V_{GS} = 0\text{ V}$	All			-15	$\mu\text{A}$
						-60	$\mu\text{A}$
		$V_{DS} = -25\text{ V}, V_{GS} = 0\text{ V}$			-0.1	$\mu\text{A}$	
$I_{GSSR}$	Gate - Body Leakage, Reverse	$V_{GS} = -20\text{ V}, V_{DS} = 0\text{ V}$	All			-10	nA
<b>ON CHARACTERISTICS</b> (Note 1)							
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = -1\text{ mA}$	All	-0.8	-1.75	-2	V
$R_{DS(on)}$	Static Drain-Source On-Resistance	$V_{GS} = -5\text{ V}, I_D = -0.10\text{ A}$	BSS84		3.2	10	$\Omega$
		$V_{GS} = -10\text{ V}, I_D = -0.17\text{ A}$	BSS110		2.2	10	
$g_{FS}$	Forward Transconductance	$V_{DS} = -25\text{ V}, I_D = -0.10\text{ A}$	BSS84	0.05	0.27		S
		$V_{DS} = -10\text{ V}, I_D = -0.17\text{ A}$	BSS110	0.05	0.29		
<b>DYNAMIC CHARACTERISTICS</b>							
$C_{iss}$	Input Capacitance	$V_{DS} = -25\text{ V}, V_{GS} = 0\text{ V},$ $f = 1.0\text{ MHz}$	BSS84		37	45	pF
			BSS110		37	40	
$C_{oss}$	Output Capacitance		All		16	25	pF
$C_{rss}$	Reverse Transfer Capacitance		All		5	12	pF
<b>SWITCHING CHARACTERISTICS</b> (Note 1)							
$t_{D(on)}$	Turn - On Delay Time	$V_{DD} = -30\text{ V}, I_D = -0.27\text{ A},$ $V_{GS} = -10\text{ V}, R_{\theta EV} = 50\ \Omega$	All			12	nS
$t_r$	Turn - On Rise Time		All			50	nS
$t_{D(off)}$	Turn - Off Delay Time		All			10	nS
$t_f$	Turn - Off Fall Time		All			25	nS
<b>DRAIN-SOURCE DIODE CHARACTERISTICS</b>							
$I_S$	Continuous Source Diode Current		BSS84			-0.13	A
			BSS110			-0.17	
$I_{SM}$	Maximum Pulsed Source Diode Current (Note 1)		BSS84			-0.52	A
			BSS110			-0.68	
$V_{SD}$	Drain-Source Diode Forward Voltage	$V_{GS} = 0\text{ V}, I_S = -0.26\text{ A}$ (Note 1)	BSS84		-0.95	-1.2	V
		$V_{GS} = 0\text{ V}, I_S = -0.34\text{ A}$ (Note 1)	BSS110		-1	-1.2	

Note:

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

# Typical Electrical Characteristics

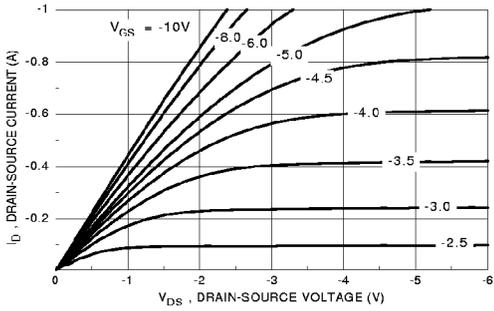


Figure 1. On-Region Characteristics

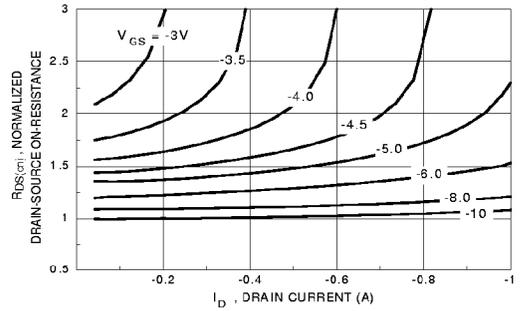


Figure 2. On-Resistance Variation with Drain Current and Gate Voltage

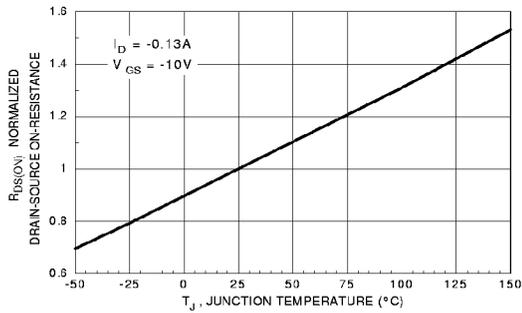


Figure 3. On-Resistance Variation with Temperature

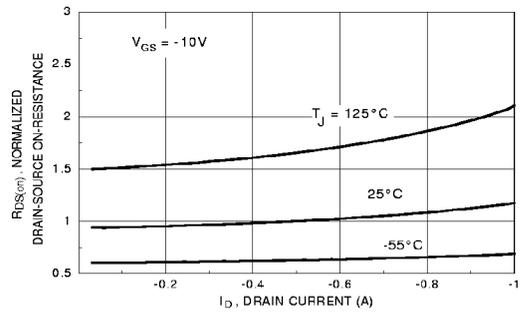


Figure 4. On-Resistance Variation with Drain Current and Temperature

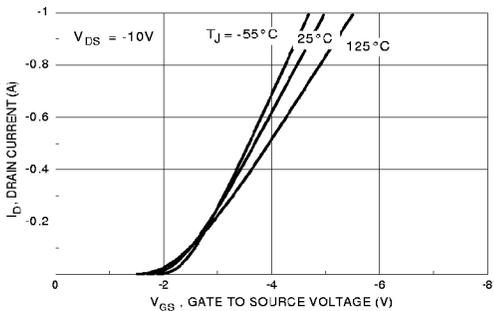


Figure 5. Transfer Characteristics

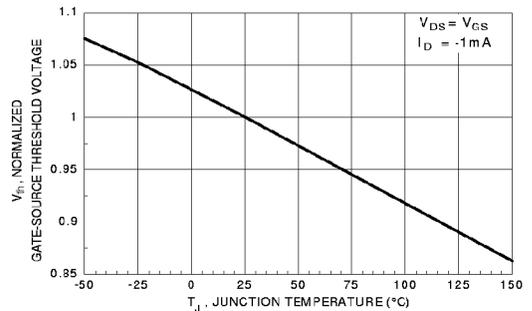


Figure 6. Gate Threshold Variation with Temperature

# Typical Electrical Characteristics (continued)

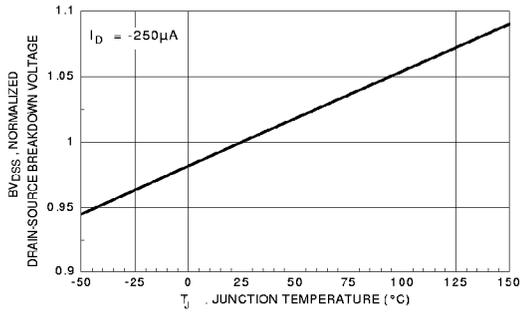


Figure 7. Breakdown Voltage Variation with Temperature

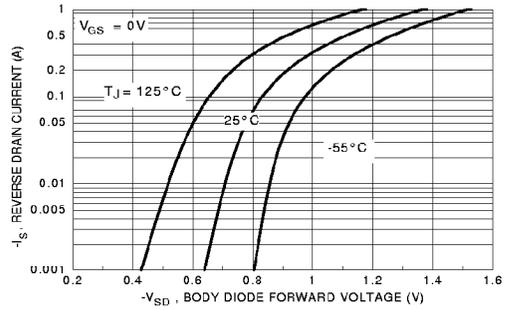


Figure 8. Body Diode Forward Voltage Variation with Source Current and Temperature

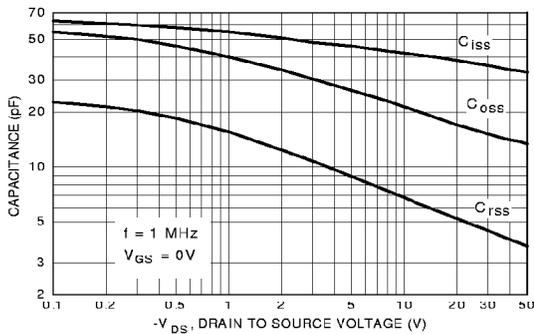


Figure 9. Capacitance Characteristics

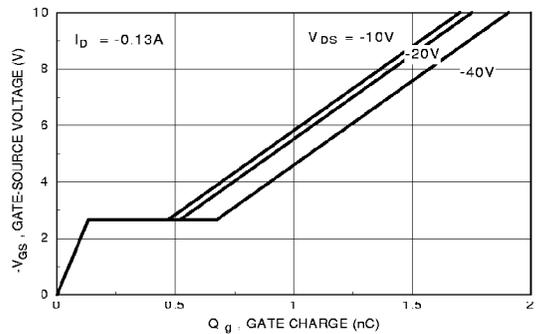


Figure 10. Gate Charge Characteristics

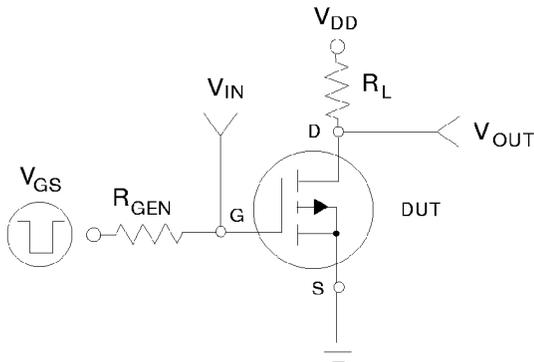


Figure 11. Switching Test Circuit

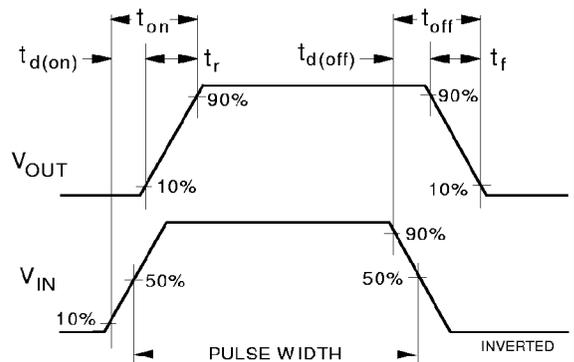


Figure 12. Switching Waveforms

Typical Electrical Characteristics (continued)

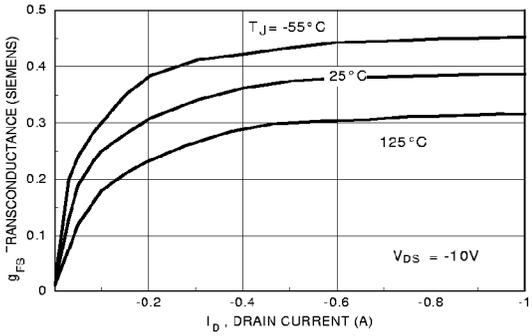


Figure 13. Transconductance Variation with Drain Current and Temperature

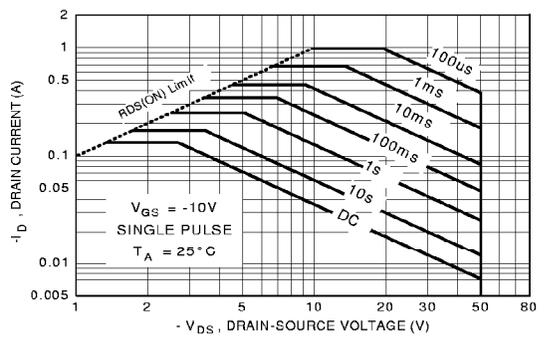


Figure 14. Maximum Safe Operating Area

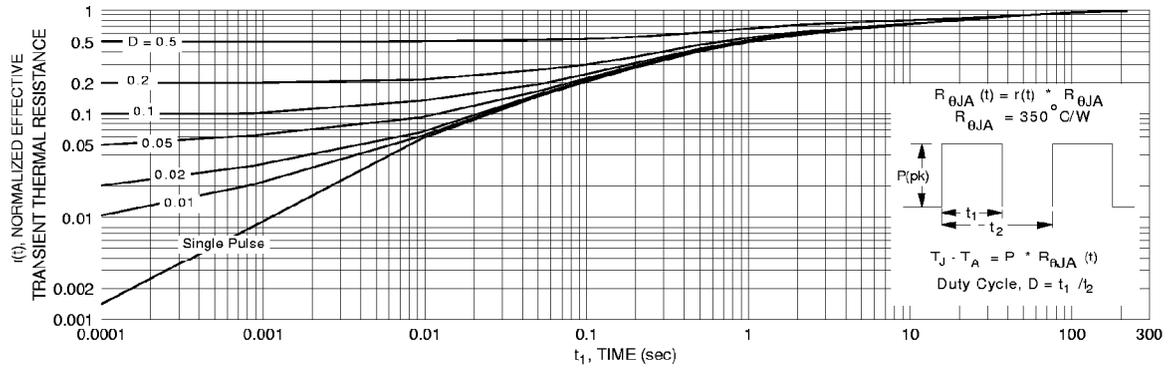


Figure 15. Transient Thermal Response Curve  
 Note : Characterization performed using a circuit board with 175°C/W typical case-to-ambient thermal resistance.