

**POWER MOSFET IN HERMETIC
ISOLATED TO254AA PACKAGE**

SM2F151 SM2F251**
SM2F351** SM2F451****

These devices offer the latest ruggedized MOSFET transistor die mounted in isolated and hermetically sealed metal packages. The standard MOSFET characteristics of very low on-state resistance and high transconductance are maintained. This product range features all of the proven advantages of MOSFET transistors such as excellent switching capability, low drive currents along with voltage control. SEMTECH power MOSFET's are ideally suited for applications such as switching power supplies, motor controls, choppers, audio amplifiers and high energy pulse circuits.

FEATURES

Fast Switching
Low Drive Current
Ease of Paralleling
Excellent Temperature Stability
Available with High Reliability Screening

**QUICK
REFERENCE DATA**

- $V_{DS} = 100V-500V$
- $I_D = 30A$
- $R_{DS(ON)} = 0.070\Omega$

ABSOLUTE MAXIMUM RATINGS (@ 25°C unless otherwise specified)

Parameter	Symbol	SM2F151	SM2F251	SM2F351	SM2F451	Units
Drain-Source Voltage	V_{DS}	100	200	400	500	V
Drain-Gate Voltage	V_{DGR}	100	200	400	500	V
Continuous Drain Current	$I_D @ T_C=25^\circ C$	30	27	14	12	A
Continuous Drain Current	$I_D @ T_C=100^\circ C$	24	17.4	9.0	7.75	A
Pulsed Drain Current (1)	I_{DM}	152	120	56	48	A
Max. Power Dissipation	$P_D @ T_C=25^\circ C$	150	150	150	150	W
Gate-Source Voltage	V_{GS}	20	20	20	20	V
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55 to 150	-55 to 150	-55 to 150	-55 to 150	°C

(1) Pulse Test: Pulsewidth = 300µs; Duty Cycle < 2%

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ELECTRICAL CHARACTERISTICS (@ 25°C unless otherwise specified)

Symbol	Parameter	Device	Min.	Typ.	Max.	Units	Test Conditions
BV _{DSS}	Drain-Source Breakdown Voltage	SM2F451	500	-	-	V	V _{GS} =0V, I _D =1.0mA
		SM2F351	400	-	-		
		SM2F251	200	-	-		
		SM2F151	100	-	-		
V _{GS(th)}	Gate Threshold Voltage	all	2.0	-	4.0	V	V _{DS} =V _{GS} , I _D =250μA
I _{GSS}	Gate-Source Leakage	all	-	-	100	nA	V _{GS} =20V
I _{DSS}	Zero Gate Voltage Drain Current	all	-	-	50	μA	V _{DS} =.8 x Rated V _{DS} , V _{GS} =0V
R _{DS(on)}	Static Drain-Source On-State Resistance (1)	SM2F451	-	0.36	0.415	Ω	V _{GS} =10V, I _D =7.7A V _{GS} =10V, I _D =9.0A V _{GS} =10V, I _D =17A V _{GS} =10V, I _D =24A
		SM2F351	-	0.26	0.315		
		SM2F251	-	0.057	0.100		
		SM2F151	-	0.038	0.070		
g _{fs}	Forward Transconductance (1)	SM2F451	5.0	8.5	-	S	V _{DS} =15V, I _D =7.2A V _{DS} =15V, I _D =8.6A V _{DS} =15V, I _D =16A V _{DS} =15V, I _D =22A
		SM2F351	8.7	8.0	-		
		SM2F251	10	16	-		
		SM2F151	12	18	-		
C _{iss}	Input Capacitance	SM2F451	-	2400	-	pF	V _{GS} =0V, V _{DS} =25V, f=1.0MHz
		SM2F351	-	2400	-		
		SM2F251	-	2400	-		
		SM2F151	-	2400	-		
C _{oss}	Output Capacitance	SM2F451	-	440	-	pF	V _{GS} =0V, V _{DS} =25V, f=1.0MHz
		SM2F351	-	500	-		
		SM2F251	-	800	-		
		SM2F151	-	1000	-		
C _{rss}	Reverse Transfer Capacitance	SM2F451	-	100	-	pF	V _{GS} =0V, V _{DS} =25V, f=1.0MHz
		SM2F351	-	100	-		
		SM2F251	-	210	-		
		SM2F151	-	210	-		
t _{d(on)}	Turn-On Delay Time	SM2F451	-	13	20	ns	V _{DD} =0.5 V _{DS} max., I _D =I _D max @ 25°C
		SM2F351	-	12	18		
		SM2F251	-	20	30		
		SM2F151	-	19	29		
t _r	Rise Time	SM2F451	-	68	100	ns	V _{DD} =0.5 V _{DS} max., I _D =I _D max @ 25°C
		SM2F351	-	51	77		
		SM2F251	-	120	180		
		SM2F151	-	110	170		
t _{d(off)}	Turn-Off Delay Time	SM2F451	-	71	110	ns	V _{DD} =0.5 V _{DS} max., I _D =I _D max @ 25°C
		SM2F351	-	75	110		
		SM2F251	-	70	100		
		SM2F151	-	60	90		
t _f	Fall Time	SM2F451	-	48	72	ns	V _{DD} =0.5 V _{DS} max., I _D =I _D max @ 25°C
		SM2F351	-	47	71		
		SM2F251	-	80	120		
		SM2F151	-	72	110		
Q _{g(on)}	On State Gate Charge	SM2F451	-	83	120	nC	V _{GS} =10V, I _D =I _D max @ 25°C, V _{DS} =.8 max RATING
		SM2F351	-	81	110		
		SM2F251	-	90	115		
		SM2F151	-	79	125		
Q _{gs}	Gate-Source Charge	SM2F451	-	11	19	nC	V _{GS} =10V, I _D =I _D max @ 25°C, V _{DS} =.8 max RATING
		SM2F351	-	11	18		
		SM2F251	-	14	21		
		SM2F151	-	14	25		
Q _{gd}	Gate-Drain Charge	SM2F451	-	42	70	nC	V _{GS} =10V, I _D =I _D max @ 25°C, V _{DS} =.8 max RATING
		SM2F351	-	43	65		
		SM2F251	-	49	60		
		SM2F151	-	39	65		

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SOURCE-DRAIN DIODE RATINGS & CHARACTERISTICS

Symbol	Parameter	Device	Min.	Typ.	Max.	Units	Test Conditions
IS	Continuous Source Current (Body Diode)	SM2F451	-	-	12	A	
		SM2F351	-	-	14		
		SM2F251	-	-	27.4		
		SM2F151	-	-	30		
ISM	Pulsed Source Current (Body Diode)	SM2F451	-	-	44	A	
		SM2F351	-	-	56		
		SM2F251	-	-	96		
		SM2F151	-	-	100		
VSD	Diode Forward Voltage (1)	SM2F451	-	-	1.7	V	T _J =25°C, I _S =I _S max., V _{GS} =0V
		SM2F351	-	-	1.7		
		SM2F251	-	-	1.9		
		SM2F151	-	-	1.9		
t _{rr}	Reverse Recovery Time	SM2F451	320	790	1800	ns	T _J =25°C, I _F =I _S max., di/dt=100 A/s
		SM2F351	270	600	1300		
		SM2F251	190	420	950		
		SM2F151	77	160	370		
Q _{rr}	Reverse Recovery Charge	SM2F451	1.8	4.6	11	μC	T _J =25°C, I _F =I _S max., di/dt=100 A/s
		SM2F351	1.7	3.8	8.1		
		SM2F251	1.0	2.3	5.6		
		SM2F151	0.49	1.20	2.8		

(1) Pulse Test: Pulsewidth = 300μs; Duty Cycle < 2%

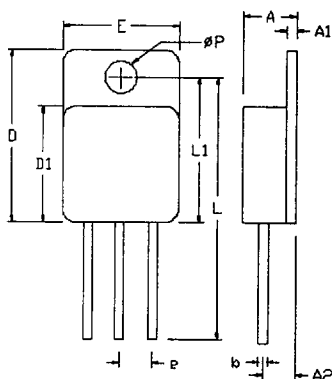
THERMAL RESISTANCE

Symbol	Parameter	Device	Max	Units
R _{θJC}	Junction to Case	All	0.83	°C/W
R _{θJA}	Junction to Ambient			48

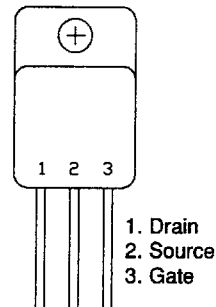
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MECHANICAL OUTLINE AND CONFIGURATION



DIM	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	6.32	6.60	.249	.260
A1	1.02	1.27	.040	.050
A2	3.81	BSC	.150	BSC
b	0.89	1.14	.035	.045
D	20.07	20.32	.790	.800
D1	13.59	13.84	.535	.545
e	3.81	BSC	.150	BSC
E	13.59	13.84	.535	.545
L	30.35	31.40	1.195	1.235
L1	16.89	17.40	.665	.685
P	3.53	3.78	.139	.149



1. Drain
2. Source
3. Gate

ORDERING INFORMATION

The last two characters of the SEMTECH part numbering system identify the lead bend configuration and the level of testing required. All devices are tested for hermeticity and compliance to the appropriate electrical characteristics.

Lead Bend

- S- Straight Leads
- D- 90° Bend Down (see fig 8 at the end of this section)

Screening

- U- Unscreened
- T- Screening per MIL-S-19500 Table II
- F- Screening per MIL-S-19500/543 Table II

e.g. SM2F451DF is a SM2F451 with bent leads and screening to MIL-S-19500/543 Table II

(Unless specified by the customer, devices will have straight leads and be unscreened.)

PACKAGE OUTLINE DRAWINGS

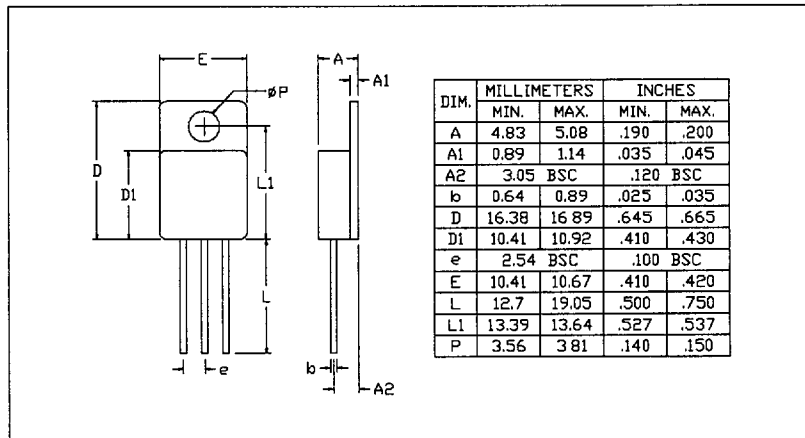


Fig.1 STRAIGHT LEAD TO257AA (S-SUFFIX)

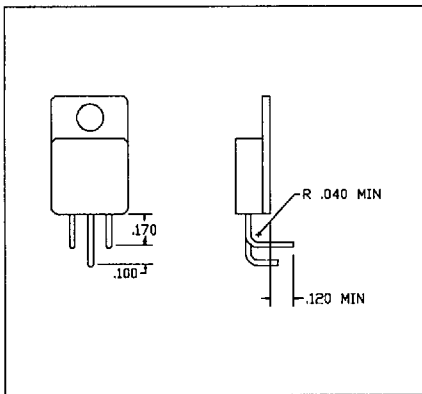


Fig.2 CLAW BEND TO257AA (C-SUFFIX)

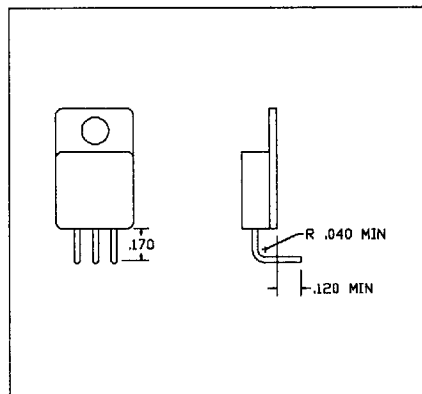


Fig.3 BENT DOWN LEAD TO257AA (D-SUFFIX)

PACKAGE OUTLINE DRAWINGS

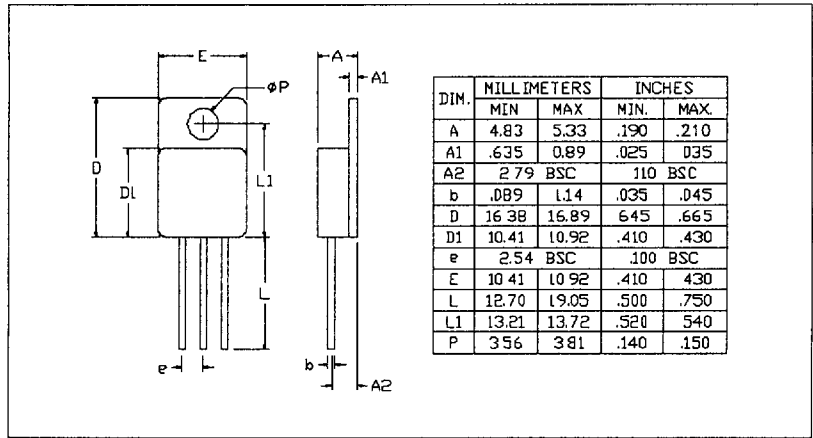


Fig.4 STRAIGHT LEAD TO257AB (S-SUFFIX)

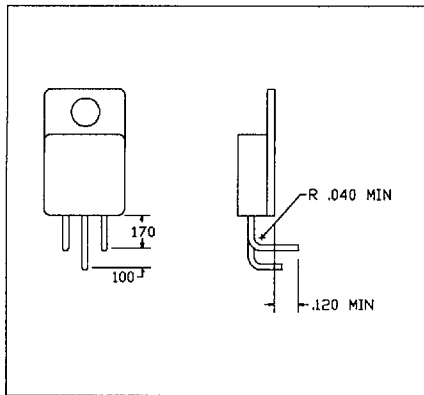


Fig.5 CLAW BEND TO257AB (C-SUFFIX)

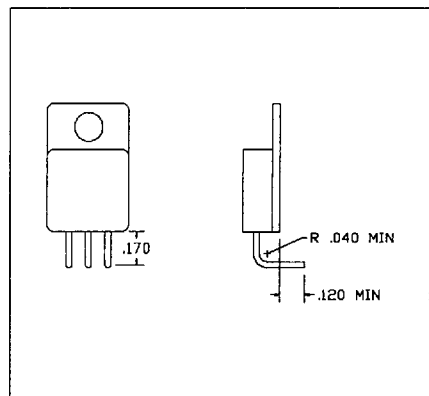


Fig.6 BENT DOWN LEAD TO257AB (D-SUFFIX)

PACKAGE OUTLINE DRAWINGS

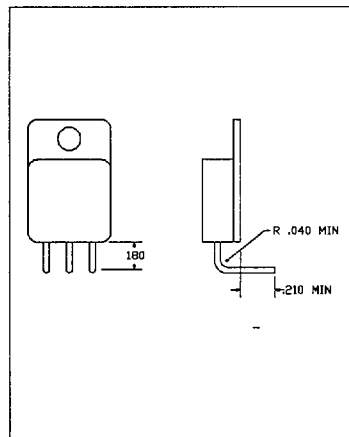
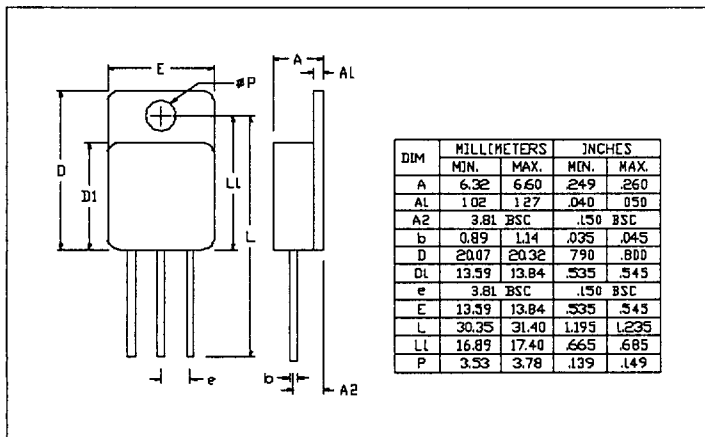


Fig.7 STRAIGHT LEAD TO254AA (S-SUFFIX)

Fig.8 BENT DOWN LEAD TO254AA (D-SUFFIX)

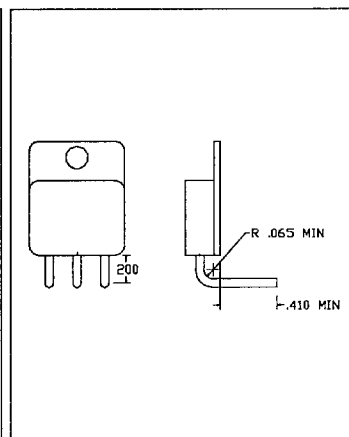
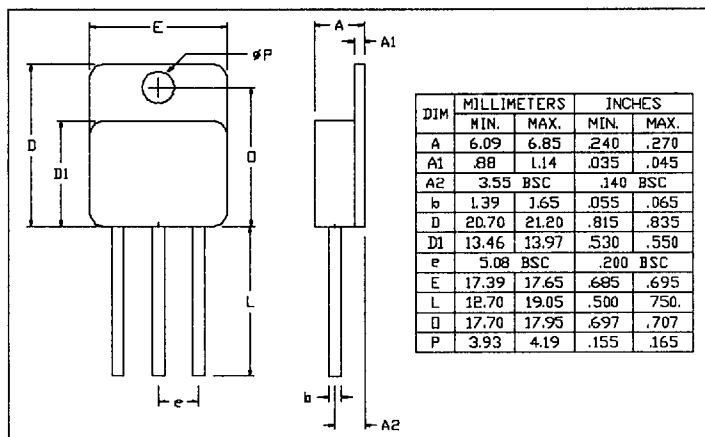


Fig.9 STRAIGHT LEAD TO258AA (S-SUFFIX)

Fig.10 BENT DOWN LEAD TO258AA (D-SUFFIX)

PACKAGE OUTLINE DRAWINGS

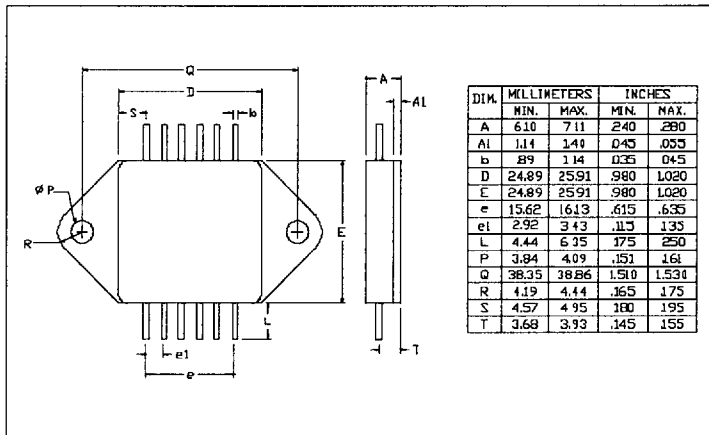
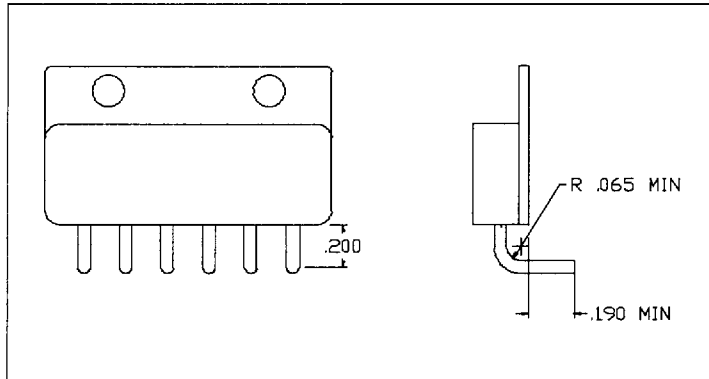
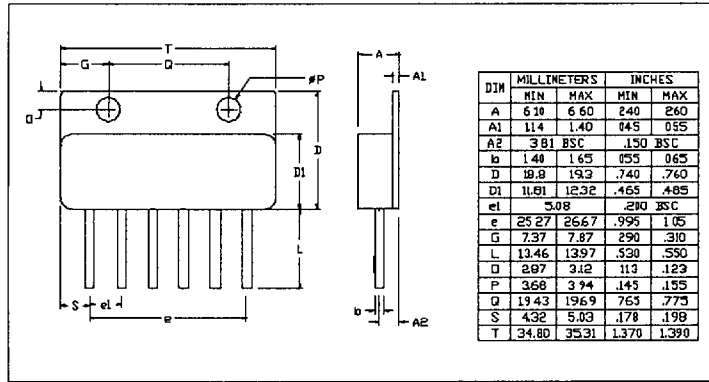


Fig.13 12 PIN "QUADPACK"