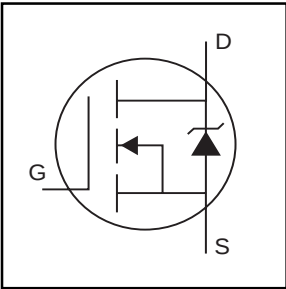


FB180SA10

HEXFET® Power MOSFET

- Fully Isolated Package
- Easy to Use and Parallel
- Very Low On-Resistance
- Dynamic dv/dt Rating
- Fully Avalanche Rated
- Simple Drive Requirements
- Low Drain to Case Capacitance
- Low Internal Inductance

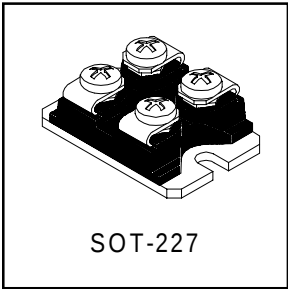


$V_{DS} = 100V$
 $R_{DS(on)} = 0.0065W$
 $I_D = 180A$

Description

Fifth Generation, high current density HEXFETS are paralled into a compact, high power module providing the best combination of switching, ruggedized design, very low ON resistance and cost effectiveness.

The isolated SOT-227 package is preferred for all commercial - industrial applications at power dissipation levels to approximately 500 watts. The low thermal resistance and easy connection to the SOT-227 package contribute to its universal acceptance throughout the industry.



SOT-227

Absolute Maximum Ratings

	Parameter	Max.	Units
$I_D @ T_C = 25^{\circ}C$	Continuous Drain Current, $V_{GS} @ 10V$	180	A
$I_D @ T_C = 100^{\circ}C$	Continuous Drain Current, $V_{GS} @ 10V$	120	
I_{DM}	Pulsed Drain Current ①	720	
$P_D @ T_C = 25^{\circ}C$	Power Dissipation	480	W
	Linear Derating Factor	2.7	W/°C
V_{GS}	Gate-to-Source Voltage	± 20	V
E_{AS}	Single Pulse Avalanche Energy②	700	mJ
I_{AR}	Avalanche Current③	180	A
E_{AR}	Repetitive Avalanche Energy①	48	mJ
dv/dt	Peak Diode Recovery dv/dt ③	5.7	V/ns
T_J	Operating Junction and	-55 to + 150	°C
T_{STG}	Storage Temperature Range		
V_{ISO}	Insulation Withstand Voltage (AC-RMS)	2.5	kV
	Mounting torque, M4 screw	1.3	N•m

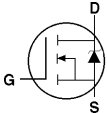
Thermal Resistance

	Parameter	Typ.	Max.	Units
R_{qJC}	Junction-to-Case	—	0.26	°C/W
R_{qCS}	Case-to-Sink, Flat, Greased Surface	0.05	—	

Electrical Characteristics @ $T_J = 25^\circ\text{C}$ (unless otherwise specified)

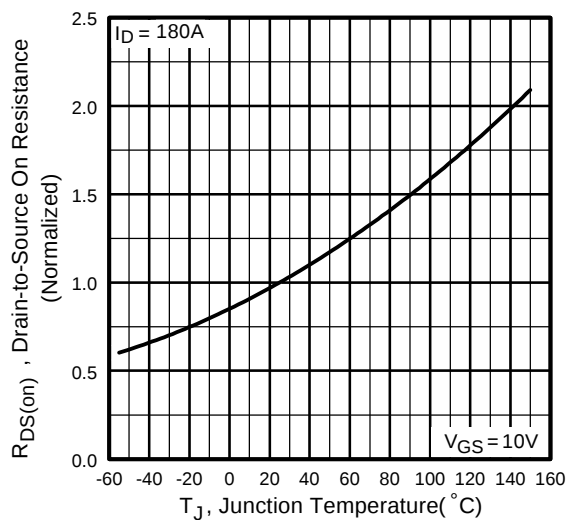
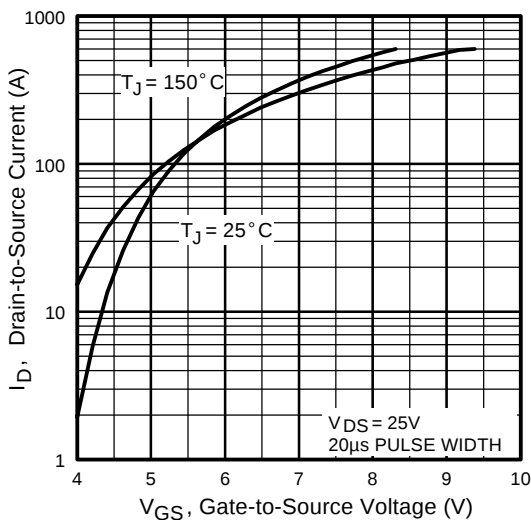
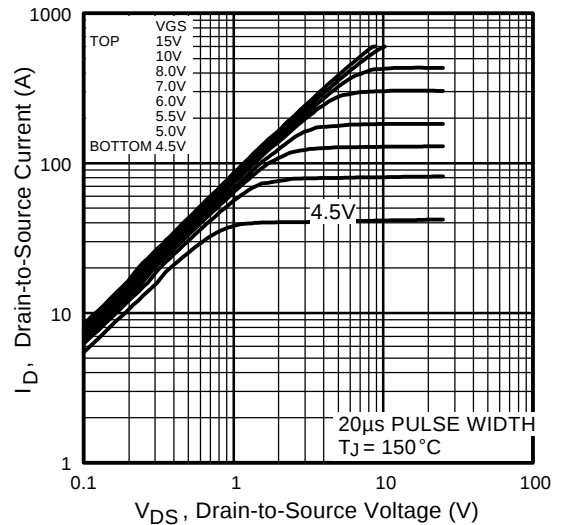
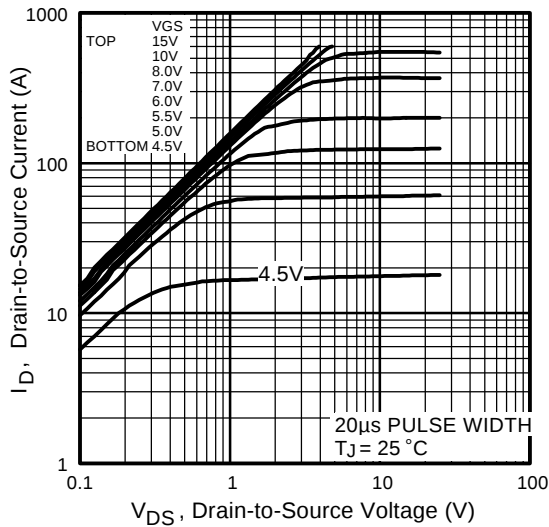
	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	100	—	—	V	$V_{GS} = 0V, I_D = 250\mu A$
$DV_{(BR)DSS}/DT_J$	Breakdown Voltage Temp. Coefficient	—	0.093	—	$V/^\circ\text{C}$	Reference to 25°C , $I_D = 1mA$
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	—	—	0.0065	Ω	$V_{GS} = 10V, I_D = 108A$ ④
$V_{GS(th)}$	Gate Threshold Voltage	2.0	—	4.0	V	$V_{DS} = V_{GS}, I_D = 250\mu A$
g_{fs}	Forward Transconductance	93	—	—	S	$V_{DS} = 25V, I_D = 108A$
I_{DSS}	Drain-to-Source Leakage Current	—	—	50	μA	$V_{DS} = 100V, V_{GS} = 0V$
		—	—	500		$V_{DS} = 80V, V_{GS} = 0V, T_J = 125^\circ\text{C}$
I_{GSS}	Gate-to-Source Forward Leakage	—	—	200	nA	$V_{GS} = 20V$
	Gate-to-Source Reverse Leakage	—	—	-200		$V_{GS} = -20V$
Q_g	Total Gate Charge	—	250	380	nC	$I_D = 180A$
Q_{gs}	Gate-to-Source Charge	—	40	60		$V_{DS} = 80V$
Q_{gd}	Gate-to-Drain ("Miller") Charge	—	110	165		$V_{GS} = 10.0V$, See Fig. 6 and 13 ④
$t_{d(on)}$	Turn-On Delay Time	—	45	—	ns	$V_{DD} = 50V$
t_r	Rise Time	—	351	—		$I_D = 180A$
$t_{d(off)}$	Turn-Off Delay Time	—	181	—		$R_G = 2.0\Omega$ (Internal)
t_f	Fall Time	—	335	—		$R_D = 0.27\Omega$, See Fig. 10 ④
L_s	Internal Source Inductance	—	5.0	—	nH	Between lead, and center of die contact
C_{iss}	Input Capacitance	—	10700	—	pF	$V_{GS} = 0V$
C_{oss}	Output Capacitance	—	2800	—		$V_{DS} = 25V$
C_{rss}	Reverse Transfer Capacitance	—	1300	—		$f = 1.0MHz$, See Fig. 5

Source-Drain Ratings and Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	—	—	180	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I_{SM}	Pulsed Source Current (Body Diode) ①	—	—	720		
V_{SD}	Diode Forward Voltage	—	—	1.3	V	$T_J = 25^\circ\text{C}, I_S = 180A, V_{GS} = 0V$ ④
t_{rr}	Reverse Recovery Time	—	300	450	ns	$T_J = 25^\circ\text{C}, I_F = 180A$
Q_{rr}	Reverse Recovery Charge	—	2.6	3.9	μC	$di/dt = 100A/\mu s$ ④
t_{on}	Forward Turn-On Time	Intrinsic turn-on time is negligible (turn-on is dominated by $L_S + L_D$)				

Notes:

- ① Repetitive rating; pulse width limited by max. junction temperature. (See fig. 11)
- ② Starting $T_J = 25^\circ\text{C}$, $L = 43\mu H$
 $R_G = 25m\Omega$, $I_{AS} = 180A$. (See Figure 12)
- ③ $I_D \leq 180A$, $di/dt \leq 83A/\mu s$, $V_{DD} \leq V_{(BR)DSS}$,
 $T_J \leq 150^\circ\text{C}$
- ④ Pulse width $\leq 300\mu s$; duty cycle $\leq 2\%$.



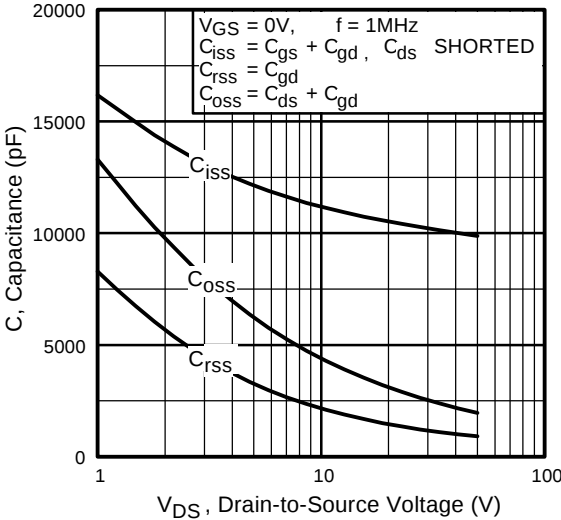


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

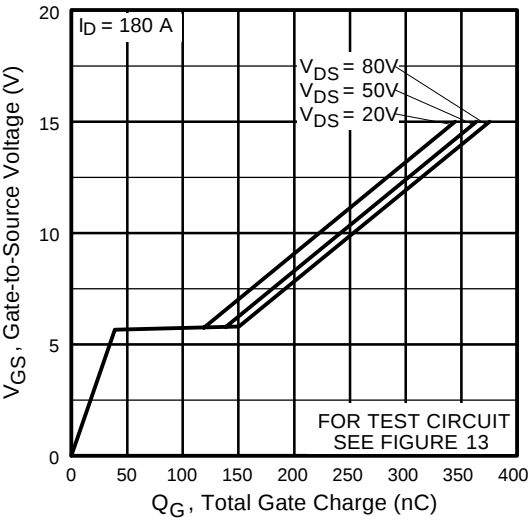


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

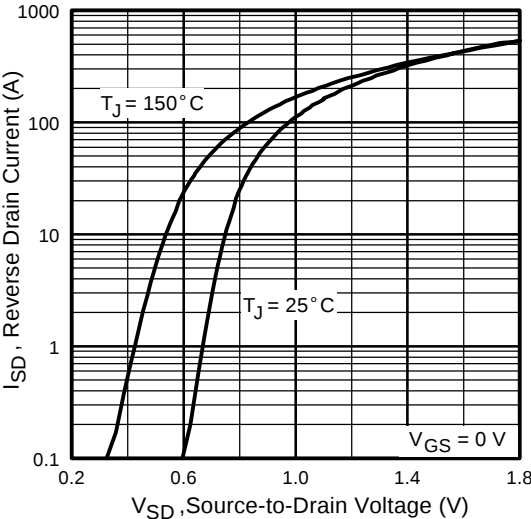


Fig 7. Typical Source-Drain Diode Forward Voltage

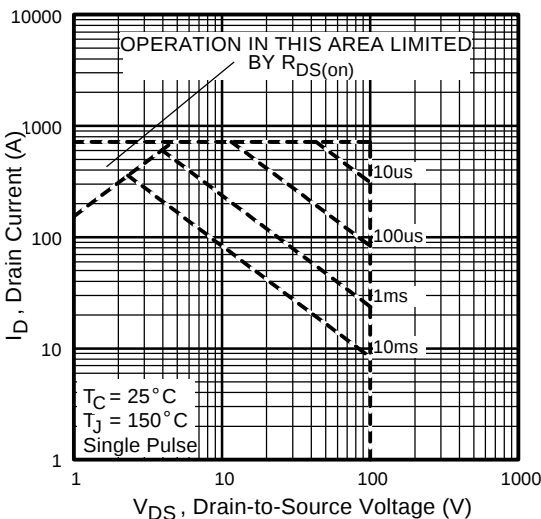


Fig 8. Maximum Safe Operating Area

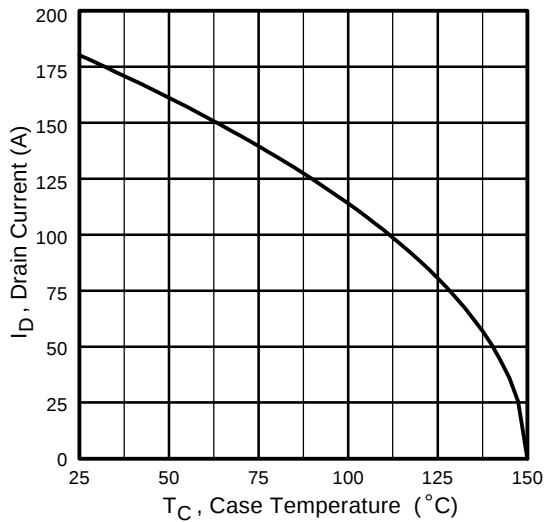


Fig 9. Maximum Drain Current Vs. Case Temperature

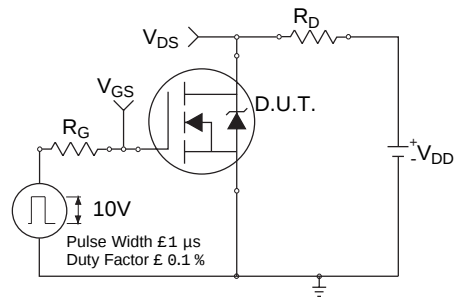


Fig 10a. Switching Time Test Circuit

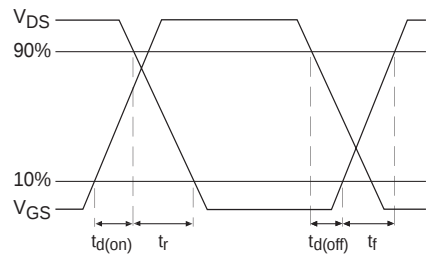


Fig 10b. Switching Time Waveforms

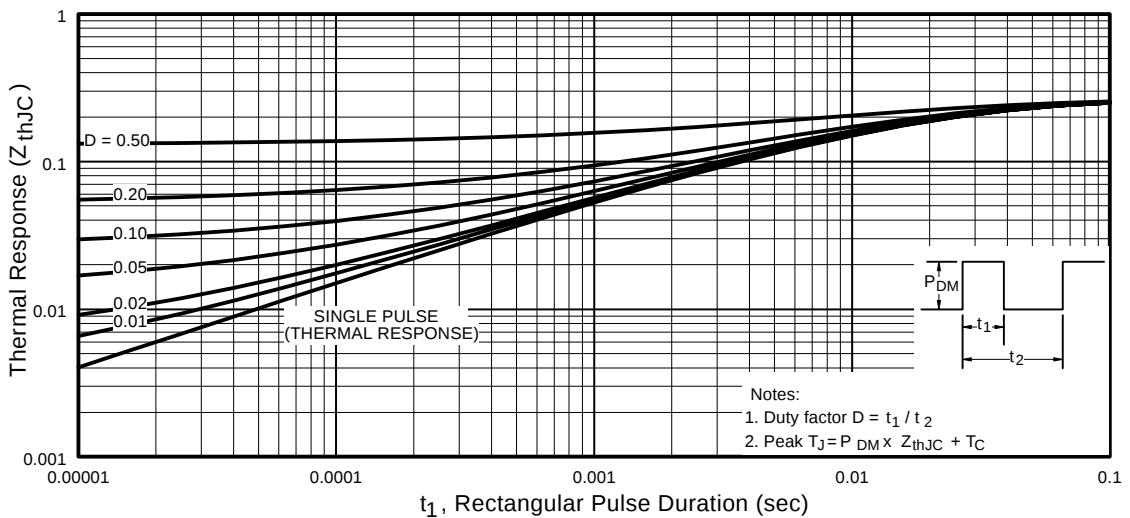


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Case

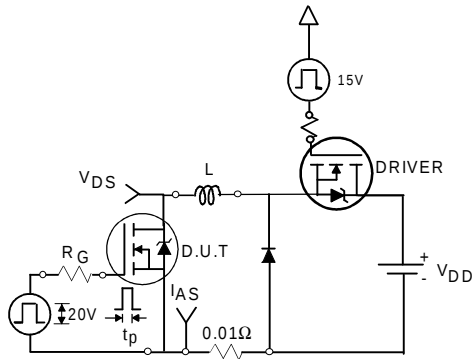


Fig 12a. Unclamped Inductive Test Circuit

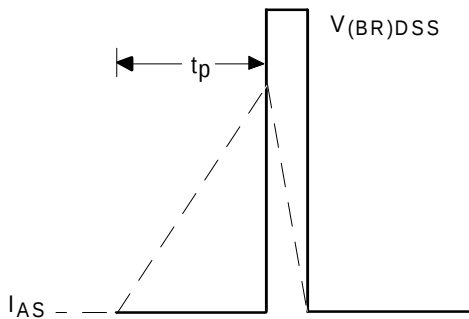


Fig 12b. Unclamped Inductive Waveforms

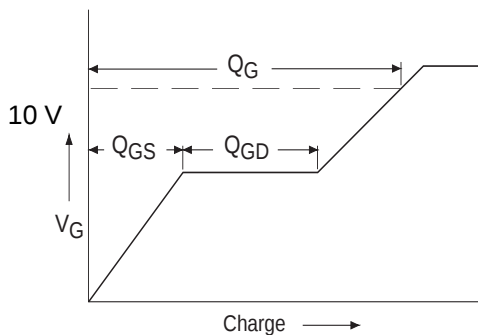


Fig 13a. Basic Gate Charge Waveform

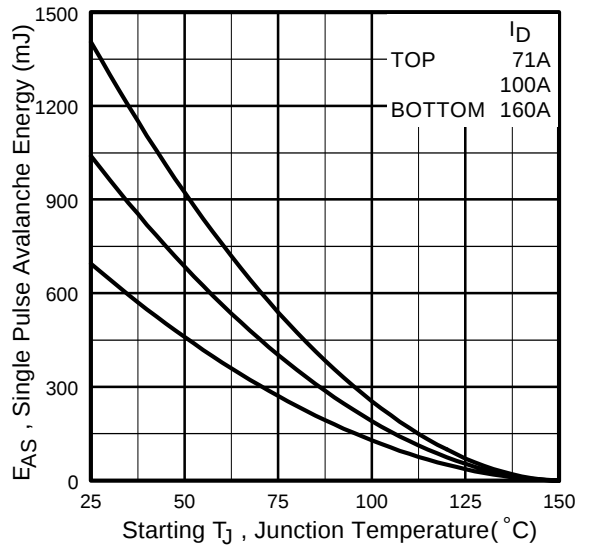


Fig 12c. Maximum Avalanche Energy Vs. Drain Current

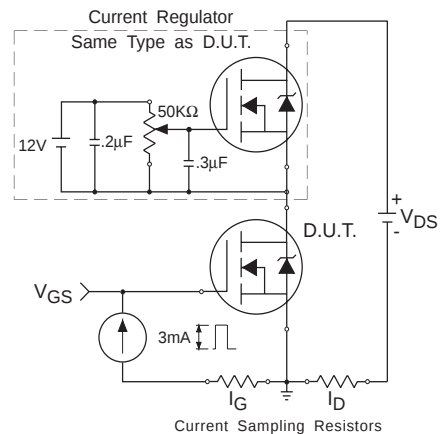
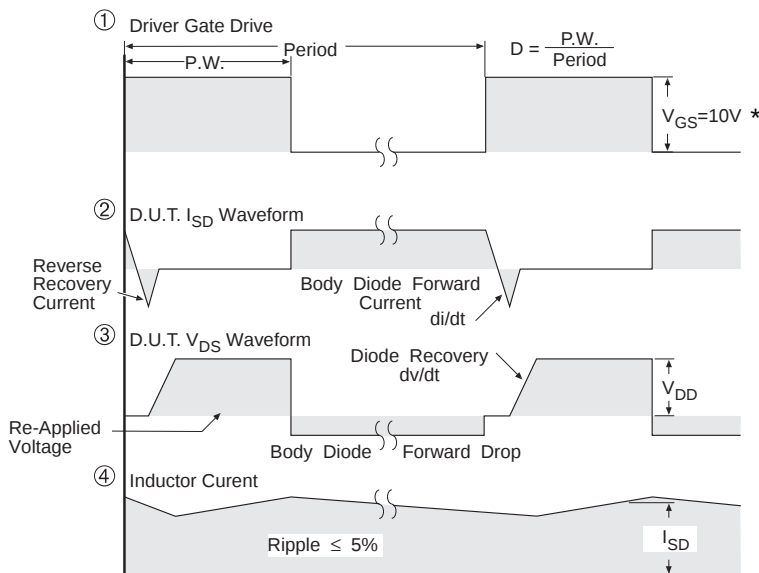
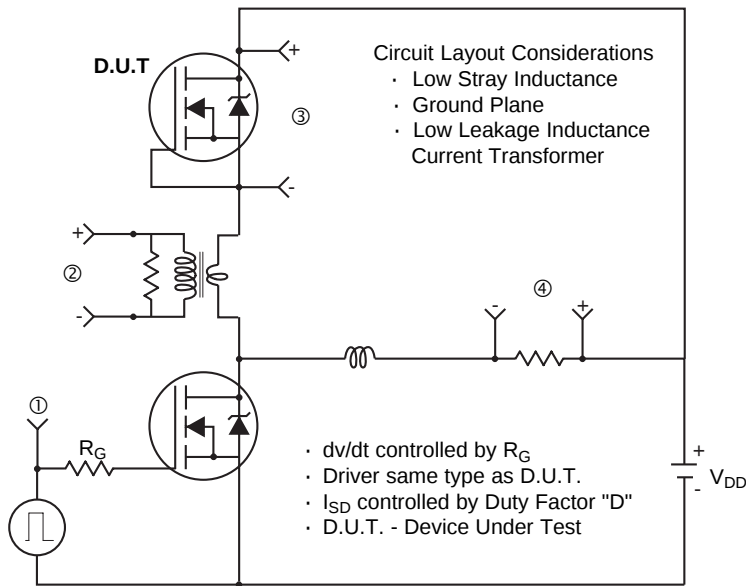


Fig 13b. Gate Charge Test Circuit

Peak Diode Recovery dv/dt Test Circuit



* $V_{GS} = 5V$ for Logic Level Devices

Fig 14. For N-Channel HEXFETS

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Technical drawing of a mechanical part, showing front and side views with dimensions in inches and millimeters.

Front View Dimensions:

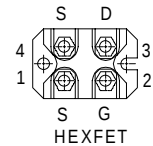
- Top horizontal dimensions: 38.30 (1.508) and 37.80 (1.488).
- Left vertical dimensions: $\varnothing$ 4.40 (.173) and 4.20 (.165).
- Right vertical dimensions: 25.70 (1.012) and 25.20 (.992).
- Internal horizontal dimensions: 12.50 (.492), 6.25 (.246), 7.50 (.295), 15.00 (.590), 30.20 (1.189), and 29.80 (1.173).
- Feature labels: -A-, CHAMFER 2.00 (.079) X 457, R FULL, and 4X.

Side View Dimensions:

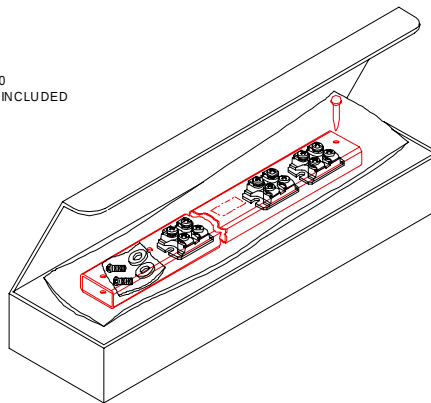
- Left vertical dimensions: 2.10 (.082) and 1.90 (.075).
- Right vertical dimensions: 2.10 (.082) and 1.90 (.075).
- Bottom horizontal dimension: 0.12 (.005).
- Feature label: -C-.

Feature Callouts:

- A-: Section line for the front view.
- B-: Section line for the side view.
- C-: Section line for the bottom view.
- CHAMFER 2.00 (.079) X 457: Chamfer specification on the top right edge.
- R FULL: Full radius specification on the internal fillet.
- 4X: Four identical features (holes or slots) around the central square.



QUANTITY PER TUBE IS 10
M4 SREW AND WASHER INCLUDED



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Data and specifications subject to change without notice. 2/99