

# PolarHV™ HiPerFET IXFB 60N80P

## Power MOSFET

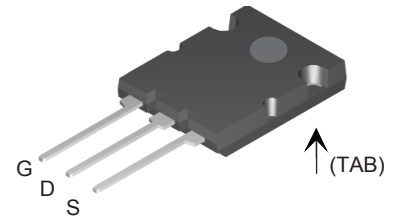
N-Channel Enhancement Mode  
Avalanche Rated  
Fast Intrinsic Diode

$V_{DSS} = 800 \text{ V}$   
 $I_{D25} = 60 \text{ A}$   
 $R_{DS(on)} \leq 140 \text{ m}\Omega$   
 $t_{rr} \leq 250 \text{ ns}$



| Symbol        | Test Conditions   | Maximum Ratings   |                  |
|---------------|---|-------------------|------------------|
| $V_{DSS}$     | $T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$   | 800               | V                |
| $V_{DGR}$     | $T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$ ; $R_{GS} = 1 \text{ M}\Omega$  | 800               | V                |
| $V_{GSS}$     | Continuous  | $\pm 30$          | V                |
| $V_{GSM}$     | Transient   | $\pm 40$          | V                |
| $I_{D25}$     | $T_C = 25^\circ\text{C}$  | 60                | A                |
| $I_{DM}$      | $T_C = 25^\circ\text{C}$ , pulse width limited by $T_{JM}$  | 150               | A                |
| $I_{AR}$      | $T_C = 25^\circ\text{C}$  | 30                | A                |
| $E_{AR}$      | $T_C = 25^\circ\text{C}$  | 100               | mJ               |
| $E_{AS}$      | $T_C = 25^\circ\text{C}$  | 5                 | J                |
| $dv/dt$       | $I_S \leq I_{DM}$ , $di/dt \leq 100 \text{ A}/\mu\text{s}$ , $V_{DD} \leq V_{DSS}$ ,<br>$T_J \leq 150^\circ\text{C}$ , $R_G = 2 \Omega$ | 20                | V/ns             |
| $P_D$         | $T_C = 25^\circ\text{C}$  | 1250              | W                |
| $T_J$         |   | -55 ... +150      | $^\circ\text{C}$ |
| $T_{JM}$      |   | 150               | $^\circ\text{C}$ |
| $T_{stg}$     |   | -55 ... +150      | $^\circ\text{C}$ |
| $T_L$         | 1.6 mm (0.062 in.) from case for 10 s   | 300               | $^\circ\text{C}$ |
| $T_{SOLD}$    | Plastic body for 10 s   | 260               | $^\circ\text{C}$ |
| $F_C$         | Mounting force  | 30..120/7.5...2.7 | N/lb             |
| <b>Weight</b> |   | 10                | g                |

### PLUS264™ (IXFB)



G = Gate      D = Drain  
S = Source      TAB = Drain

### Features

- † International standard packages
- † Fast recovery diode
- † Unclamped Inductive Switching (UIS) rated
- † Low package inductance
- easy to drive and to protect

### Advantages

- † Plus 264™ package for clip or spring
- † Space savings
- † High power density

| Symbol       | Test Conditions<br>( $T_J = 25^\circ\text{C}$ , unless otherwise specified) | Characteristic Values |      |  |
|--------------|---|-----------------------|------|--|
|              |   | Min.                  | Typ. | Max.                                   |
| $BV_{DSS}$   | $V_{GS} = 0 \text{ V}$ , $I_D = 3 \text{ mA}$                               | 800                   |      | V                                      |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$ , $I_D = 8 \text{ mA}$                                    | 3.0                   |      | 5.0 V                                  |
| $I_{GSS}$    | $V_{GS} = \pm 30 \text{ V}_{DC}$ , $V_{DS} = 0$                             |                       |      | $\pm 200 \text{ nA}$                   |
| $I_{DSS}$    | $V_{DS} = V_{DSS}$<br>$V_{GS} = 0 \text{ V}$<br>$T_J = 125^\circ\text{C}$   |                       |      | 25 $\mu\text{A}$<br>3000 $\mu\text{A}$ |
| $R_{DS(on)}$ | $V_{GS} = 10 \text{ V}$ , $I_D = 0.5 I_{D25}$ , Note 1                      |                       |      | 140 $\text{m}\Omega$                   |

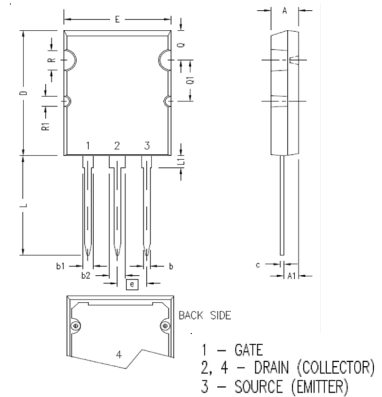
| Symbol       | Test Conditions   | Characteristic Values<br>( $T_J = 25^\circ\text{C}$ , unless otherwise specified) |      |                    |
|--------------|---|---|------|--------------------|
|              |   | Min.  | Typ. | Max.               |
| $g_{fs}$     | $V_{DS} = 20\text{ V}; I_D = 0.5 I_{D25}$ , Note 1  | 35  | 67   | S                  |
| $C_{iss}$    | $V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$                                   |   | 18   | nF                 |
| $C_{oss}$    |   |   | 1200 | pF                 |
| $C_{rss}$    |   |   | 44   | pF                 |
| $t_{d(on)}$  | $V_{GS} = 10\text{ V}, V_{DS} = 0.5 V_{DSS}, I_D = 0.5 I_{D25}$<br>$R_G = 1\ \Omega$ (External) |   | 36   | ns                 |
| $t_r$        |   |   | 29   | ns                 |
| $t_{d(off)}$ |   |   | 110  | ns                 |
| $t_f$        |   |   | 26   | ns                 |
| $Q_{g(on)}$  | $V_{GS} = 10\text{ V}, V_{DS} = 0.5 V_{DSS}, I_D = 0.5 I_{D25}$                                 |   | 250  | nC                 |
| $Q_{gs}$     |   |   | 90   | nC                 |
| $Q_{gd}$     |   |   | 78   | nC                 |
| $R_{thJC}$   |   |   | 0.10 | $^\circ\text{C/W}$ |
| $R_{thCS}$   |   |   | 0.13 | $^\circ\text{C/W}$ |

**Source-Drain Diode**

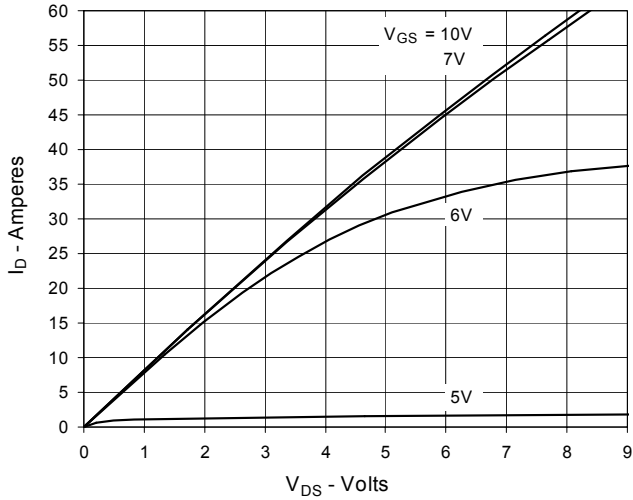
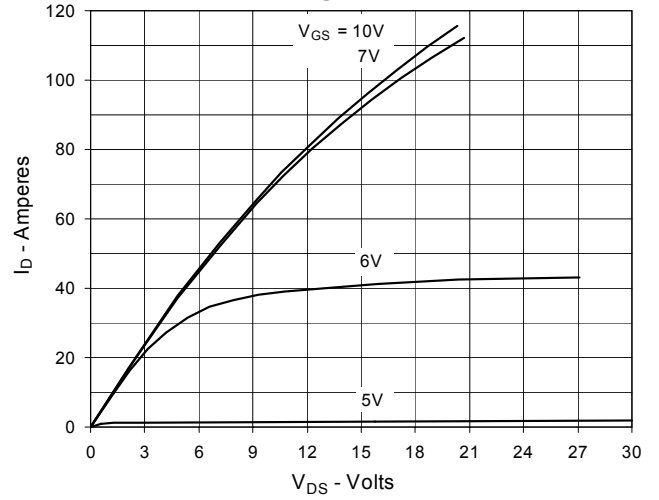
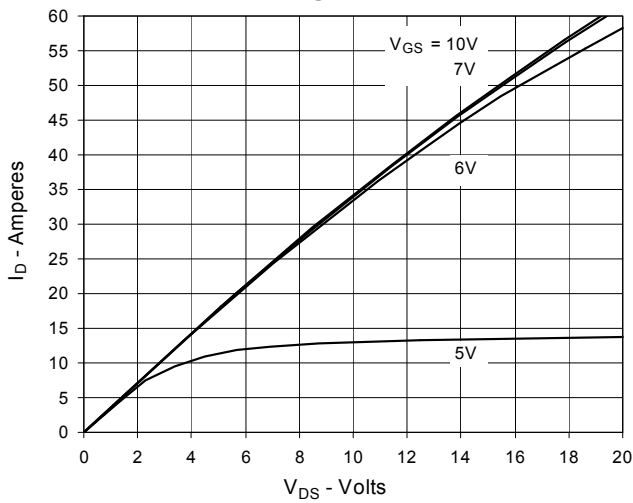
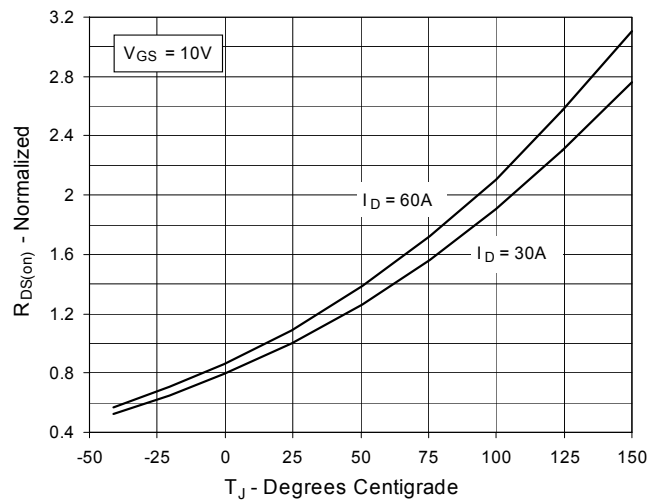
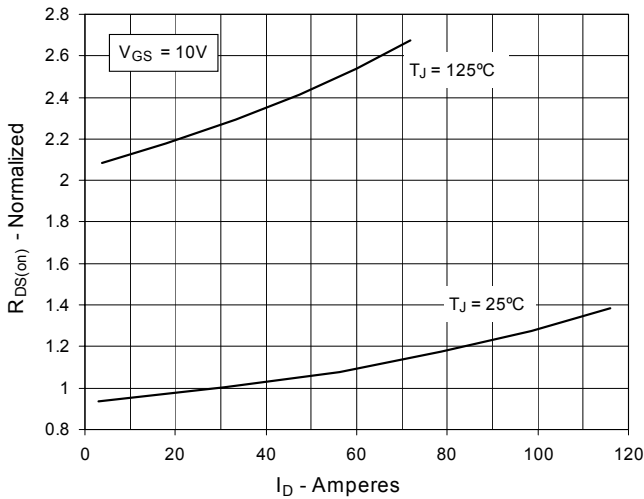
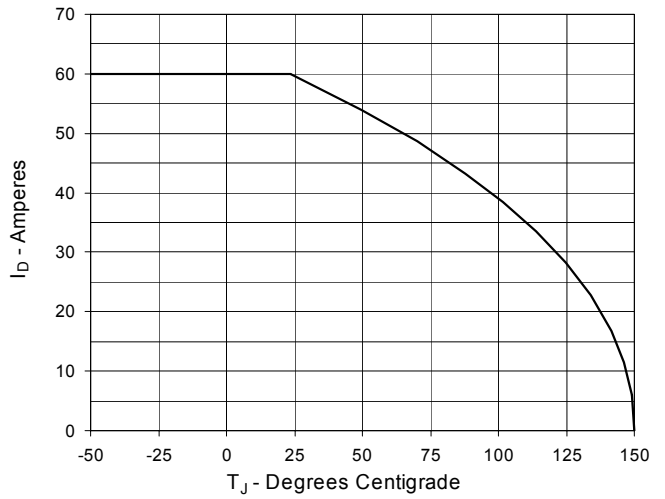
| Symbol   | Test Conditions  | Characteristic Values<br>( $T_J = 25^\circ\text{C}$ , unless otherwise specified) |      |               |
|----------|--|---|------|---------------|
|          |  | Min.  | Typ. | Max.          |
| $I_s$    | $V_{GS} = 0\text{ V}$  |   |      | 60 A          |
| $I_{SM}$ | Repetitive   |   |      | 150 A         |
| $V_{SD}$ | $I_F = I_s, V_{GS} = 0\text{ V}$ , Note 1                                      |   |      | 1.5 V         |
| $t_{rr}$ | $I_F = 25\text{ A}, -di/dt = 100\text{ A}/\mu\text{s}$<br>$V_R = 100\text{ V}$ |   |      | 250 ns        |
| $Q_{RM}$ |  |   | 0.6  | $\mu\text{C}$ |
| $I_{RM}$ |  |   | 6.0  | A             |

**Notes:**

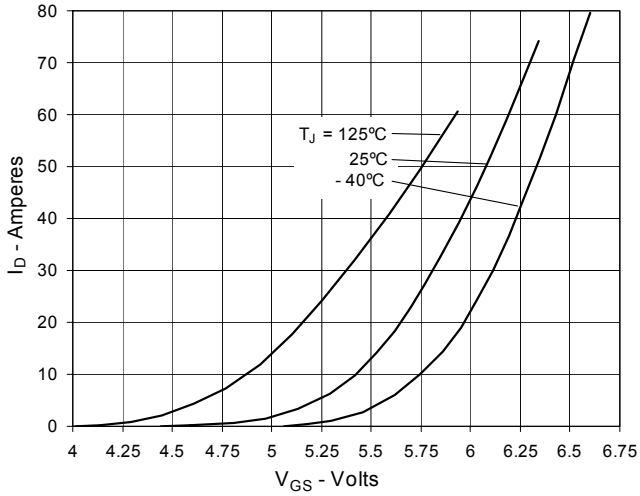
1. Pulse test,  $t \leq 300\ \mu\text{s}$ , duty cycle  $d \leq 2\%$

**PLUS264™ (IXFB) Outline**


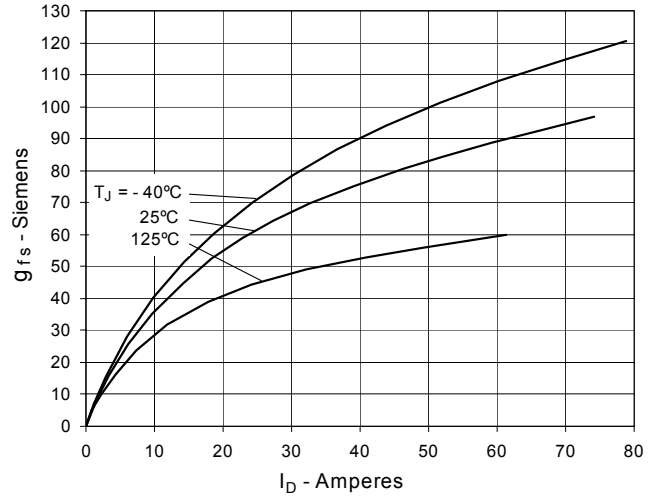
| SYM              | INCHES   |       | MILLIMETERS |       |
|------------------|----------|-------|-------------|-------|
|                  | MIN      | MAX   | MIN         | MAX   |
| A                | .185     | .209  | 4.70        | 5.31  |
| A1               | .102     | .118  | 2.59        | 3.00  |
| b                | .037     | .055  | 0.94        | 1.40  |
| b1               | .087     | .102  | 2.21        | 2.59  |
| b2               | .110     | .126  | 2.79        | 3.20  |
| c                | .017     | .029  | 0.43        | 0.74  |
| D                | 1.007    | 1.047 | 25.58       | 26.59 |
| E                | .760     | .799  | 19.30       | 20.29 |
| e                | .215 BSC |       | 5.46 BSC    |       |
| L                | .779     | .842  | 19.79       | 21.39 |
| L1               | .087     | .102  | 2.21        | 2.59  |
| Q                | .240     | .256  | 6.10        | 6.50  |
| Q1               | .330     | .346  | 8.38        | 8.79  |
| $\varnothing R$  | .155     | .187  | 3.94        | 4.75  |
| $\varnothing R1$ | .085     | .093  | 2.16        | 2.36  |

**Fig. 1. Output Characteristics  
@ 25°C**

**Fig. 2. Extended Output Characteristics  
@ 25°C**

**Fig. 3. Output Characteristics  
@ 125°C**

**Fig. 4.  $R_{DS(on)}$  Normalized to  $I_D = 30A$  Value  
vs. Junction Temperature**

**Fig. 5.  $R_{DS(on)}$  Normalized to  $I_D = 30A$  Value  
vs. Drain Current**

**Fig. 6. Maximum Drain Current vs.  
Case Temperature**


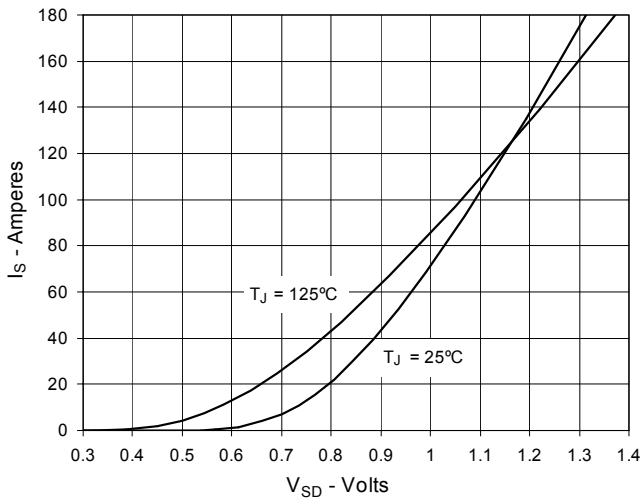
**Fig. 7. Input Admittance**



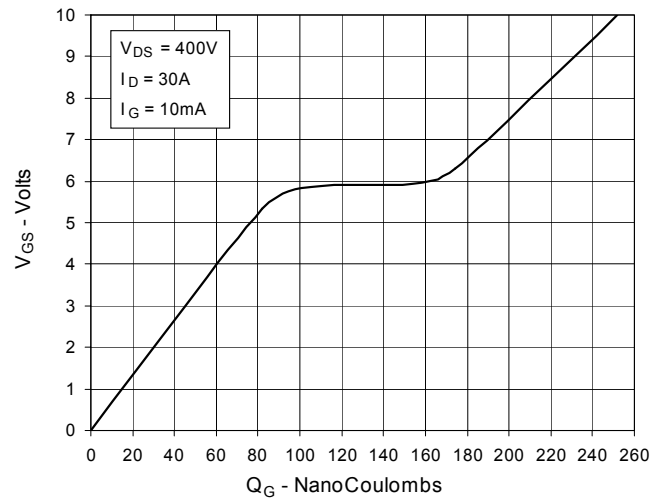
**Fig. 8. Transconductance**



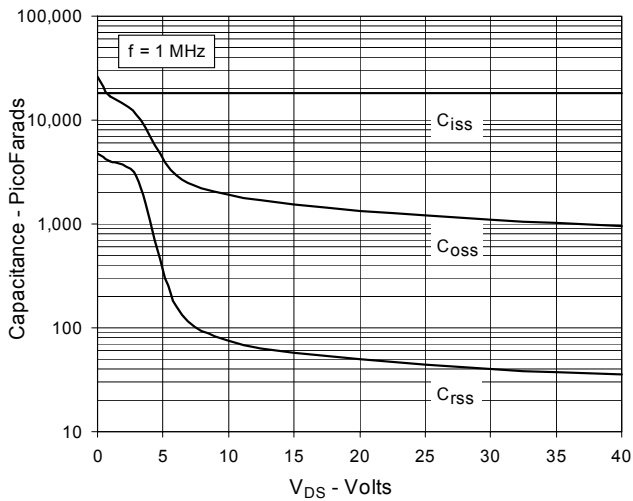
**Fig. 9. Forward Voltage Drop of Intrinsic Diode**



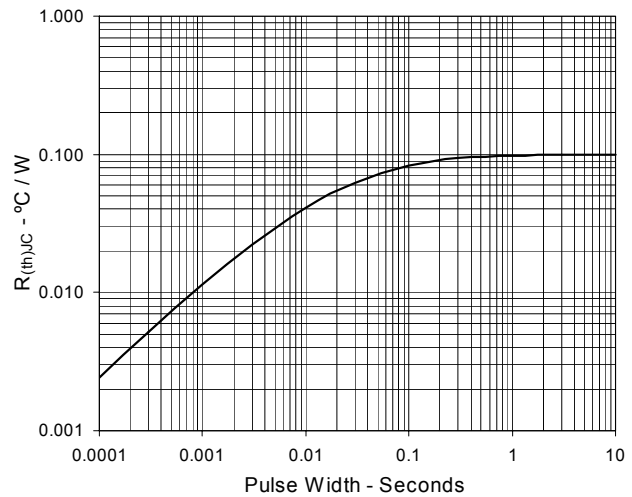
**Fig. 10. Gate Charge**



**Fig. 11. Capacitance**



**Fig. 12. Maximum Transient Thermal Resistance**



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