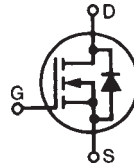


PolarHV™ Power MOSFET

IXTA 5N60P
IXTP 5N60P

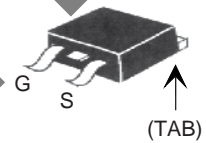
$V_{DSS} = 600 \text{ V}$
 $I_{D25} = 5 \text{ A}$
 $R_{DS(on)} \leq 1.7 \ \Omega$

N-Channel Enhancement Mode
Avalanche Rated

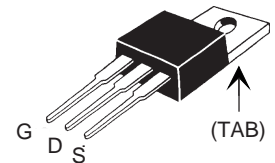


| Symbol | Test Conditions | Maximum Ratings | |
|------------|--|-----------------|------------------|
| V_{DSS} | $T_J = 25^\circ\text{C to } 175^\circ\text{C}$ | 600 | V |
| V_{DGR} | $T_J = 25^\circ\text{C to } 175^\circ\text{C}; R_{GS} = 1 \text{ M}\Omega$ | 600 | V |
| V_{GSS} | Continuous | ± 30 | V |
| V_{GSM} | Transient | ± 40 | V |
| I_{D25} | $T_C = 25^\circ\text{C}$ | 5 | A |
| I_{DM} | $T_C = 25^\circ\text{C}$, pulse width limited by T_{JM} | 10 | A |
| I_{AR} | $T_C = 25^\circ\text{C}$ | 5 | A |
| E_{AR} | $T_C = 25^\circ\text{C}$ | 20 | mJ |
| E_{AS} | $T_C = 25^\circ\text{C}$ | 360 | mJ |
| dv/dt | $I_S \leq I_{DM}$, $di/dt \leq 100 \text{ A}/\mu\text{s}$, $V_{DD} \leq V_{DSS}$, $T_J \leq 150^\circ\text{C}$, $R_G = 18 \ \Omega$ | 10 | V/ns |
| P_D | $T_C = 25^\circ\text{C}$ | 100 | 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 | $^\circ\text{C}$ |
| M_d | Mounting torque (TO-220) | 1.13/10 | Nm/lb.in. |
| Weight | TO-220 | 4 | g |
| | TO-263 | 3 | g |

TO-263 (IXTA)



TO-220 (IXTP)



G = Gate
S = Source

D = Drain
TAB = Drain

Features

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

Advantages

- Easy to mount
- Space savings
- High power density

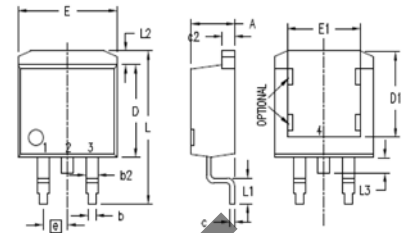
| Symbol | Test Conditions ($T_J = 25^\circ\text{C}$, unless otherwise specified) | Characteristic Values | | |
|--------------|--|-----------------------|------|----------------------|
| | | Min. | Typ. | Max. |
| BV_{DSS} | $V_{GS} = 0 \text{ V}$, $I_D = 250 \ \mu\text{A}$ | 600 | | V |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$, $I_D = 50 \ \mu\text{A}$ | 3.0 | | 5.5 V |
| I_{GSS} | $V_{GS} = \pm 30 \text{ V}$, $V_{DS} = 0 \text{ V}$ | | | $\pm 100 \text{ nA}$ |
| I_{DSS} | $V_{DS} = V_{DSS}$ $V_{GS} = 0 \text{ V}$ $T_J = 125^\circ\text{C}$ | | | 5 μA |
| | | | | 50 μA |
| $R_{DS(on)}$ | $V_{GS} = 10 \text{ V}$, $I_D = 0.5 I_{D25}$ Pulse test, $t \leq 300 \ \mu\text{s}$, duty cycle $d \leq 2 \%$ | | | 1.7 Ω |

| Symbol | Test Conditions | Characteristic Values | | |
|--------------|--|--|------|-------------------------|
| | | $(T_J = 25^\circ\text{C}, \text{ unless otherwise specified})$ | | |
| | | Min. | Typ. | Max. |
| g_{fs} | $V_{DS} = 10\text{ V}; I_D = 0.5 I_{D25}$, pulse test | 3.0 | 5.0 | S |
| C_{iss} | $V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$ | | 750 | pF |
| C_{oss} | | | 78 | pF |
| C_{rss} | | | 6.3 | pF |
| $t_{d(on)}$ | $V_{GS} = 10\text{ V}, V_{DS} = 0.5 V_{DSS}, I_D = 0.5 I_{D25}$ $R_G = 18\ \Omega$ (External) | | 22 | ns |
| t_r | | | 24 | ns |
| $t_{d(off)}$ | | | 55 | ns |
| t_f | | | 17 | ns |
| $Q_{g(on)}$ | $V_{GS} = 10\text{ V}, V_{DS} = 0.5 V_{DSS}, I_D = 0.5 I_{D25}$ | | 14.2 | nC |
| Q_{gs} | | | 4.8 | nC |
| Q_{gd} | | | 4.8 | nC |
| R_{thJC} | (TO-220) | | | 1.25 $^\circ\text{C/W}$ |
| R_{thCS} | | | 0.25 | $^\circ\text{C/W}$ |

Source-Drain Diode

| Symbol | Test Conditions | Characteristic Values | | |
|----------|---|--|------|-------|
| | | $(T_J = 25^\circ\text{C}, \text{ unless otherwise specified})$ | | |
| | | Min. | Typ. | Max. |
| I_S | $V_{GS} = 0\text{ V}$ | | | 5 A |
| I_{SM} | Repetitive | | | 15 A |
| V_{SD} | $I_F = I_S, V_{GS} = 0\text{ V}, I_F = 5\text{ A}, -di/dt = 100\text{ A}/\mu\text{s}$ | | | 1.5 V |
| t_{rr} | Pulse test, $t \leq 300\ \mu\text{s}$, duty cycle $d \leq 2\%$ | | 500 | ns |

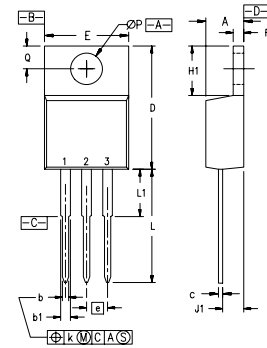
TO-263 (IXTA) Outline



1. GATE
2. DRAIN (COLLECTOR)
3. SOURCE (EMITTER)
4. DRAIN (COLLECTOR) BOTTOM SIDE

| SYM | INCHES | | MILLIMETERS | |
|-----|----------|------|-------------|-------|
| | MIN | MAX | MIN | MAX |
| A | .160 | .190 | 4.06 | 4.83 |
| A1 | .080 | .110 | 2.03 | 2.79 |
| b | .020 | .039 | 0.51 | 0.99 |
| b2 | .045 | .055 | 1.14 | 1.40 |
| c | .016 | .029 | 0.40 | 0.74 |
| c2 | .045 | .055 | 1.14 | 1.40 |
| D | .340 | .380 | 8.64 | 9.65 |
| D1 | .315 | .350 | 8.00 | 8.89 |
| E | .380 | .410 | 9.65 | 10.41 |
| E1 | .245 | .320 | 6.22 | 8.13 |
| e | .100 BSC | | 2.54 BSC | |
| L | .575 | .625 | 14.61 | 15.88 |
| L1 | .090 | .110 | 2.29 | 2.79 |
| L2 | .040 | .055 | 1.02 | 1.40 |
| L3 | .050 | .070 | 1.27 | 1.78 |
| L4 | 0 | .005 | 0 | 0.13 |

TO-220 (IXTP) Outline



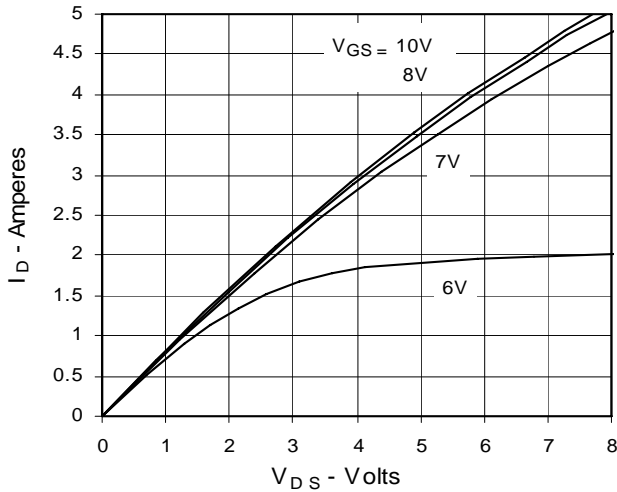
- Pins: 1 - Gate 2 - Drain
3 - Source 4 - Drain

| SYM | INCHES | | MILLIMETERS | |
|-----|----------|------|-------------|-------|
| | MIN | MAX | MIN | MAX |
| A | .170 | .190 | 4.32 | 4.83 |
| b | .025 | .040 | 0.64 | 1.02 |
| b1 | .045 | .065 | 1.15 | 1.65 |
| c | .014 | .022 | 0.35 | 0.56 |
| D | .580 | .630 | 14.73 | 16.00 |
| E | .390 | .420 | 9.91 | 10.66 |
| e | .100 BSC | | 2.54 BSC | |
| F | .045 | .055 | 1.14 | 1.40 |
| H1 | .230 | .270 | 5.85 | 6.85 |
| J1 | .090 | .110 | 2.29 | 2.79 |
| k | 0 | .015 | 0 | 0.38 |
| L | .500 | .550 | 12.70 | 13.97 |
| L1 | .110 | .230 | 2.79 | 5.84 |
| ØP | .139 | .161 | 3.53 | 4.08 |
| Q | .100 | .125 | 2.54 | 3.18 |

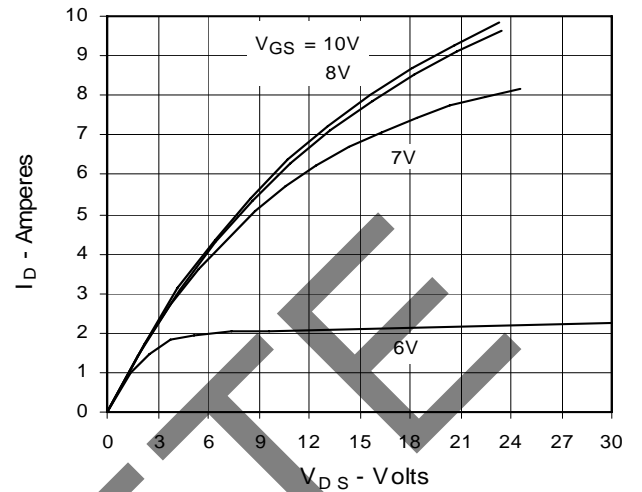
IXYS reserves the right to change limits, test conditions, and dimensions.

IXYS MOSFETs and IGBTs are covered by 4,835,592 4,931,844 5,049,961 5,237,481 6,162,665 6,404,065 B1 6,683,344 6,727,585
one or more of the following U.S. patents: 4,850,072 5,017,508 5,063,307 5,381,025 6,259,123 B1 6,534,343 6,710,405 B2 6,759,692
4,881,106 5,034,796 5,187,117 5,486,715 6,306,728 B1 6,583,505 6,710,463 6,771,478 B2

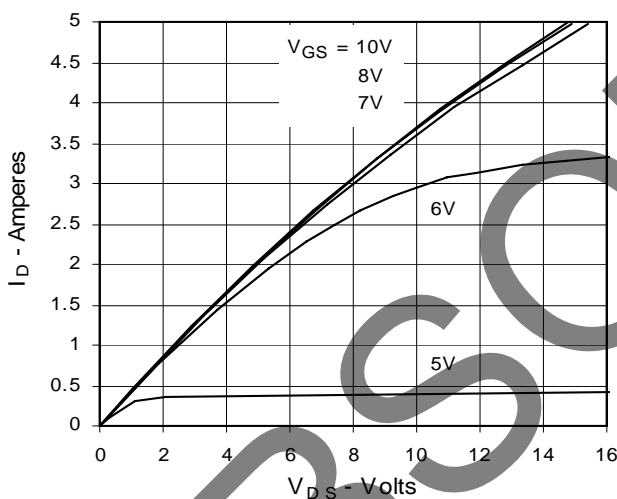
**Fig. 1. Output Characteristics
@ 25°C**



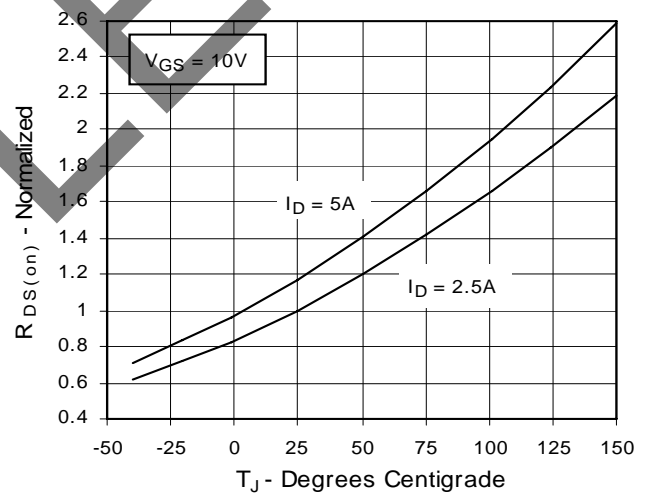
**Fig. 2. Extended Output Characteristics
@ 25°C**



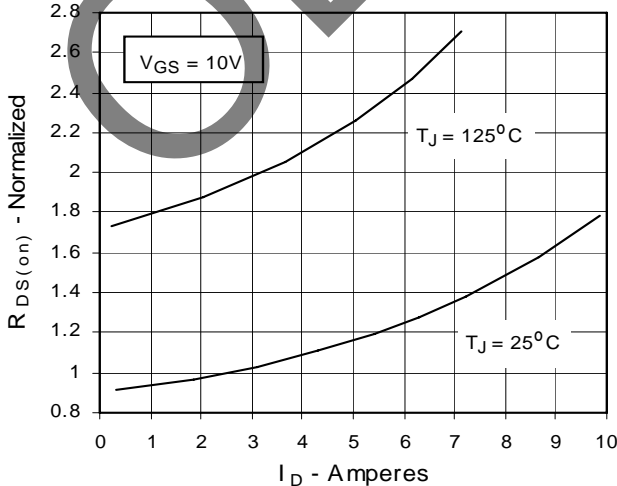
**Fig. 3. Output Characteristics
@ 125°C**



**Fig. 4. $R_{DS(on)}$ Normalized to 0.5 I_{D25}
Value vs. Junction Temperature**



**Fig. 5. $R_{DS(on)}$ Normalized to
0.5 I_{D25} Value vs. I_D**



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

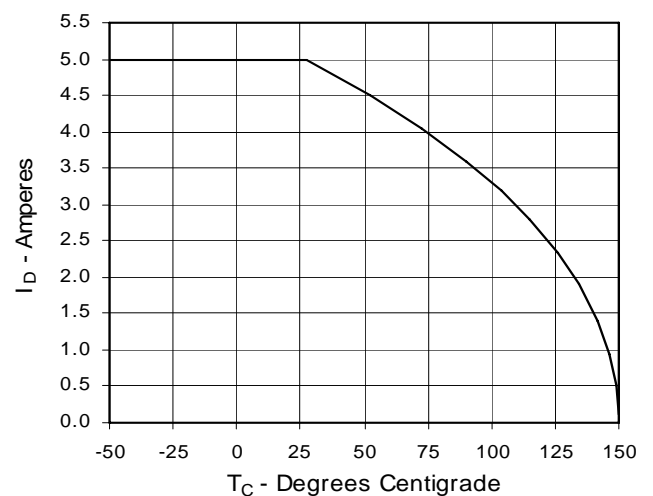


Fig. 7. Input Admittance

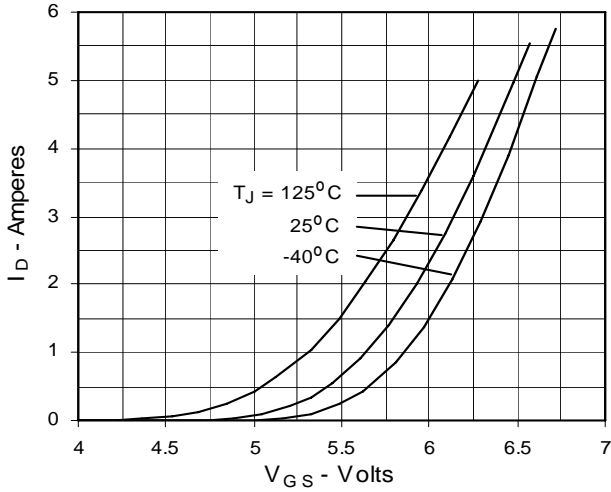


Fig. 8. Transconductance

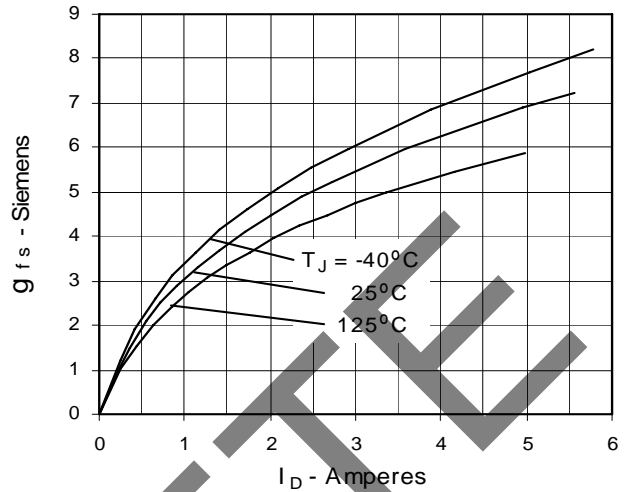


Fig. 9. Source Current vs. Source-To-Drain Voltage

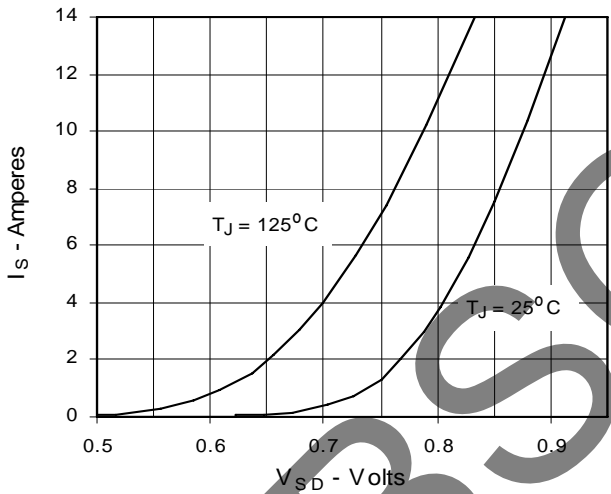


Fig. 10. Gate Charge

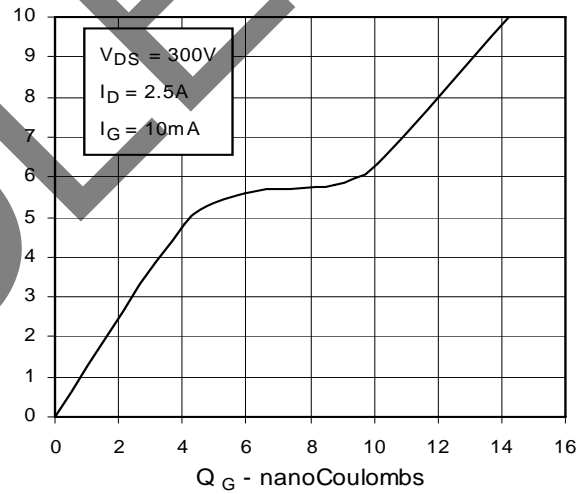


Fig. 11. Capacitance

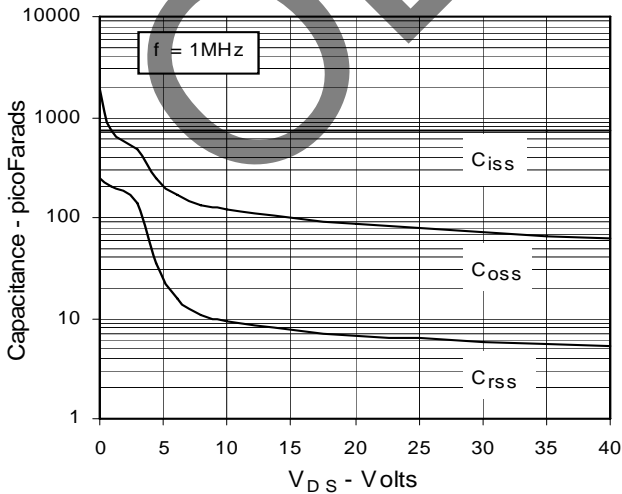
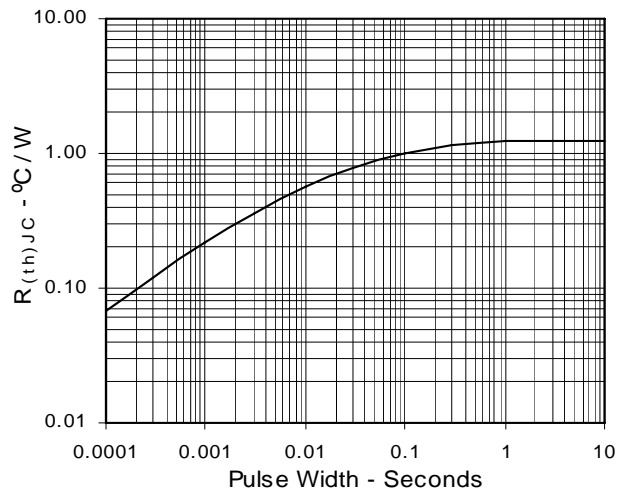


Fig. 12. Maximum Transient Thermal Resistance





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