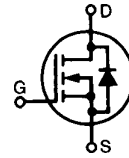


Standard Power MOSFET

IXTH / IXTM 6N90
IXTH / IXTM 6N90A

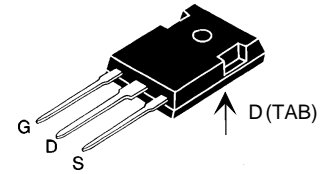
| V_{DSS} | I_{D25} | $R_{DS(on)}$ |
|-----------|-----------|--------------|
| 900 V | 6 A | 1.8 Ω |
| 900 V | 6 A | 1.4 Ω |

N-Channel Enhancement Mode

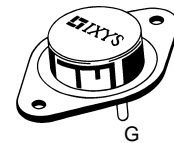


| Symbol | Test Conditions | Maximum Ratings |
|---|---|-------------------------------|
| V_{DSS} | $T_J = 25^\circ\text{C}$ to 150°C | 900 V |
| V_{DGR} | $T_J = 25^\circ\text{C}$ to 150°C ; $R_{GS} = 1\text{ M}\Omega$ | 900 V |
| V_{GS} | Continuous | ± 20 V |
| V_{GSM} | Transient | ± 30 V |
| I_{D25} | $T_C = 25^\circ\text{C}$ | 6 A |
| I_{DM} | $T_C = 25^\circ\text{C}$, pulse width limited by T_{JM} | 24 A |
| P_D | $T_C = 25^\circ\text{C}$ | 180 W |
| T_J | | -55 ... +150 $^\circ\text{C}$ |
| T_{JM} | | 150 $^\circ\text{C}$ |
| T_{stg} | | -55 ... +150 $^\circ\text{C}$ |
| M_d | Mounting torque | 1.13/10 Nm/lb.in. |
| Weight | | TO-204 = 18 g, TO-247 = 6 g |
| Maximum lead temperature for soldering 1.6 mm (0.062 in.) from case for 10 s | | 300 $^\circ\text{C}$ |

TO-247 AD (IXTH)



TO-204 AA (IXTM)



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

Features

- International standard packages
- Low $R_{DS(on)}$ HDMOS™ process
- Rugged polysilicon gate cell structure
- Low package inductance (< 5 nH)
 - easy to drive and to protect
- Fast switching times

Applications

- Switch-mode and resonant-mode power supplies
- Motor controls
- Uninterruptible Power Supplies (UPS)
- DC choppers

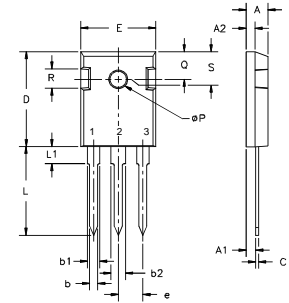
Advantages

- Easy to mount with 1 screw (TO-247) (isolated mounting screw hole)
- Space savings
- High power density

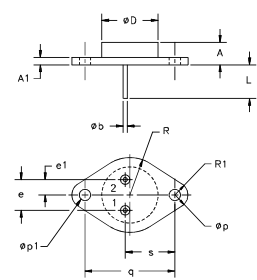
| Symbol | Test Conditions | Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified) | | |
|--------------|---|---|------|------------------------------|
| | | min. | typ. | max. |
| V_{DSS} | $V_{GS} = 0\text{ V}$, $I_D = 3\text{ mA}$ | 900 | | V |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$, $I_D = 250\text{ }\mu\text{A}$ | 2 | | 4.5 V |
| I_{GSS} | $V_{GS} = \pm 20 V_{DC}$, $V_{DS} = 0$ | | | ± 100 nA |
| I_{DSS} | $V_{DS} = 0.8 \cdot V_{DSS}$ $V_{GS} = 0\text{ V}$ | | | 250 μA 1 mA |
| $R_{DS(on)}$ | $V_{GS} = 10\text{ V}$, $I_D = 0.5 I_{D25}$ Pulse test, $t \leq 300\text{ }\mu\text{s}$, duty cycle $d \leq 2\%$ | | | 1.8 Ω 1.4 Ω |

| Symbol | Test Conditions | Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified) | | |
|--------------|---|---|------|--------|
| | | min. | typ. | max. |
| g_{fs} | $V_{DS} = 10\text{ V}; I_D = 0.5 \cdot I_{D25}$, pulse test | 4 | 6 | S |
| C_{iss} | $V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$ | | 2600 | pF |
| C_{oss} | | | 180 | pF |
| C_{rss} | | | 45 | pF |
| $t_{d(on)}$ | $V_{GS} = 10\text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 I_{D25}$ $R_G = 4.7\ \Omega$, (External) | | 35 | 100 ns |
| t_r | | | 40 | 110 ns |
| $t_{d(off)}$ | | | 100 | 200 ns |
| t_f | | | 60 | 100 ns |
| $Q_{g(on)}$ | $V_{GS} = 10\text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 I_{D25}$ | | 88 | 130 nC |
| Q_{gs} | | | 21 | 30 nC |
| Q_{gd} | | | 38 | 70 nC |
| R_{thJC} | | | 0.7 | K/W |
| R_{thCK} | | 0.25 | | K/W |

| Symbol | Test Conditions | Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified) | | |
|----------|---|---|------|-------|
| | | min. | typ. | max. |
| I_S | $V_{GS} = 0\text{ V}$ | | | 6 A |
| I_{SM} | Repetitive; pulse width limited by T_{JM} | | | 24 A |
| V_{SD} | $I_F = I_S, V_{GS} = 0\text{ V}$, Pulse test, $t \leq 300\ \mu\text{s}$, duty cycle $d \leq 2\%$ | | | 1.5 V |
| t_{rr} | $I_F = I_S, -di/dt = 100\text{ A}/\mu\text{s}, V_R = 100\text{ V}$ | 900 | | ns |

TO-247 AD (IXTH) Outline

 Terminals: 1 - Gate
 2 - Drain
 3 - Source
 Tab - Drain

| Dim. | Millimeter | | Inches | |
|----------------|------------|-------|--------|-------|
| | Min. | Max. | Min. | Max. |
| A | 4.7 | 5.3 | .185 | .209 |
| A ₁ | 2.2 | 2.54 | .087 | .102 |
| A ₂ | 2.2 | 2.6 | .059 | .098 |
| b | 1.0 | 1.4 | .040 | .055 |
| b ₁ | 1.65 | 2.13 | .065 | .084 |
| b ₂ | 2.87 | 3.12 | .113 | .123 |
| C | .4 | .8 | .016 | .031 |
| D | 20.80 | 21.46 | .819 | .845 |
| E | 15.75 | 16.26 | .610 | .640 |
| e | 5.20 | 5.72 | 0.205 | 0.225 |
| L | 19.81 | 20.32 | .780 | .800 |
| L1 | | 4.50 | | .177 |
| ∅P | 3.55 | 3.65 | .140 | .144 |
| Q | 5.89 | 6.40 | 0.232 | 0.252 |
| R | 4.32 | 5.49 | .170 | .216 |
| S | 6.15 | BSC | .242 | BSC |

TO-204AA (IXTM) Outline

 Pins 1 - Gate 2 - Source
 Case - Drain

| Dim. | Millimeter | | Inches | |
|-----------------|------------|-------|--------|------|
| | Min. | Max. | Min. | Max. |
| A | 6.4 | 11.4 | .250 | .450 |
| A ₁ | | 3.42 | | .135 |
| ∅b | .97 | 1.09 | .038 | .043 |
| ∅D | | 22.22 | | .875 |
| e | 10.67 | 11.17 | .420 | .440 |
| e ₁ | 5.21 | 5.71 | .205 | .225 |
| L | 7.93 | | .312 | |
| ∅p | 3.84 | 4.19 | .151 | .165 |
| ∅p ₁ | 3.84 | 4.19 | .151 | .165 |
| q | 30.15 | BSC | 1.187 | BSC |
| R | | 13.33 | | .525 |
| R ₁ | | 4.77 | | .188 |
| s | 16.64 | 17.14 | .655 | .675 |

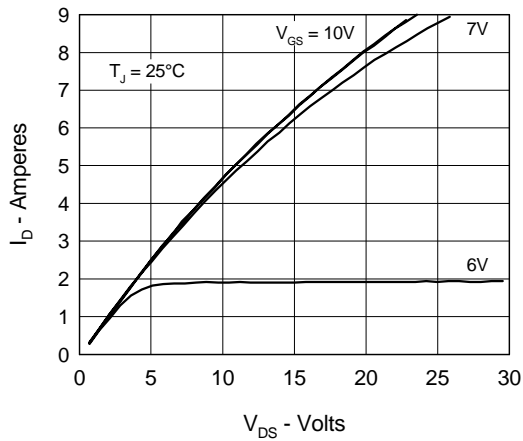
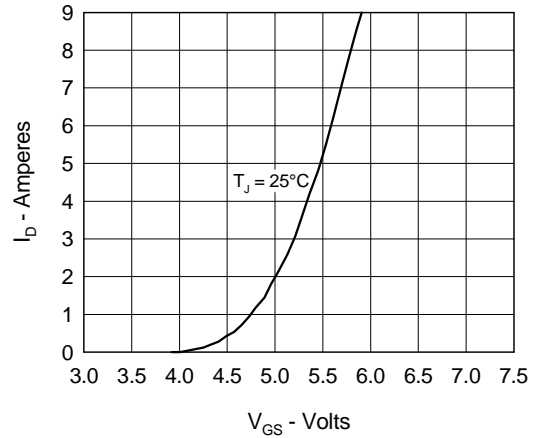
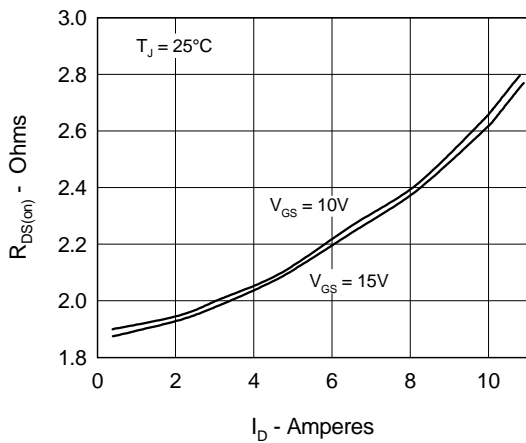
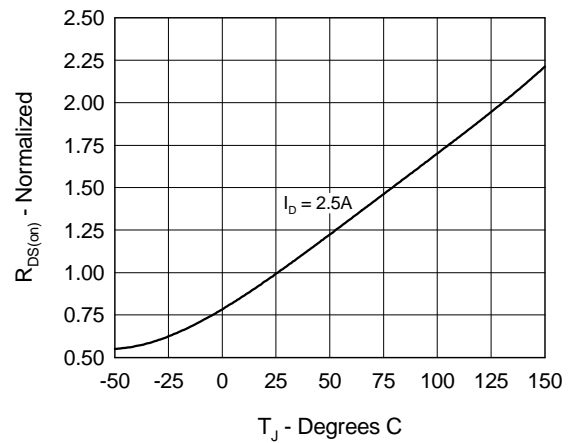
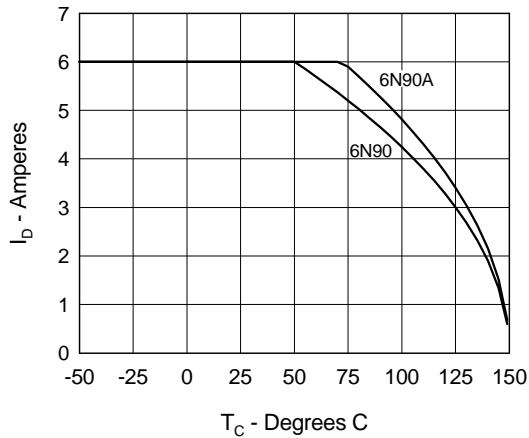
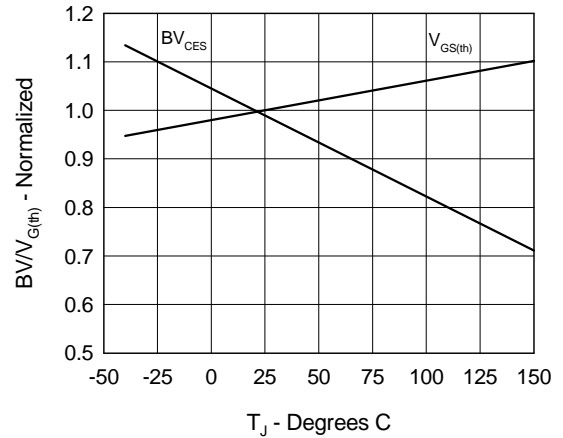
Fig. 1 Output Characteristics

Fig. 2 Input Admittance

Fig. 3 $R_{DS(on)}$ vs. Drain Current

Fig. 4 Temperature Dependence of Drain to Source Resistance

Fig. 5 Drain Current vs. Case Temperature

Fig. 6 Temperature Dependence of Breakdown and Threshold Voltage


Fig.7 Gate Charge Characteristic Curve

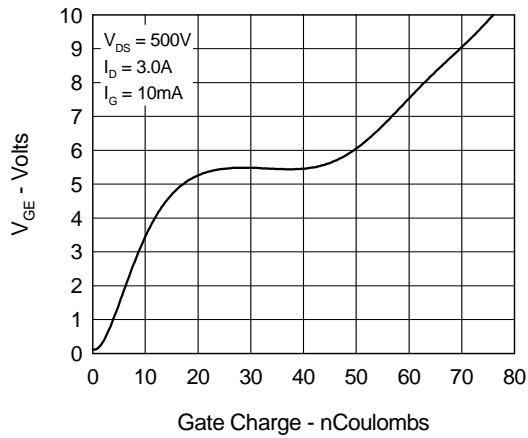


Fig.8 Forward Bias Safe Operating Area

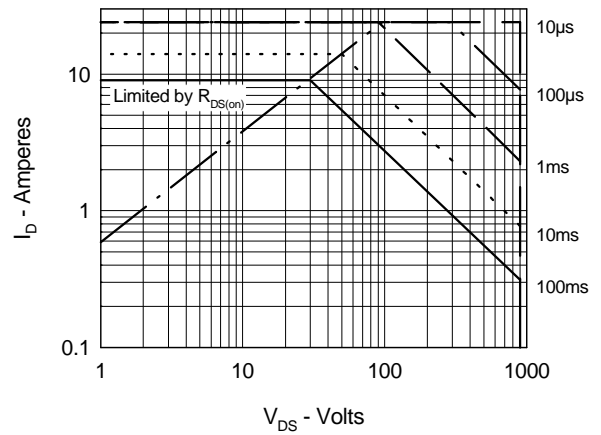


Fig.9 Capacitance Curves

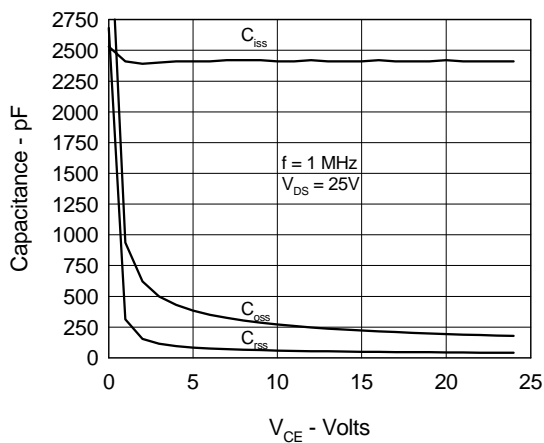


Fig.10 Source Current vs. Source to Drain Voltage

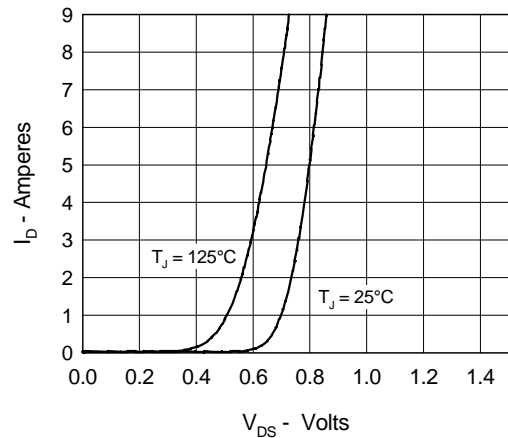


Fig.11 Transient Thermal Impedance

