

MegaMOS™ FET

IXTH / IXTM 21N50
IXTH / IXTM 24N50

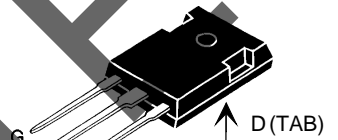
| V_{DSS} | I_{D25} | $R_{DS(on)}$ |
|-----------|-----------|---------------|
| 500 V | 21 A | 0.25 Ω |
| 500 V | 24 A | 0.23 Ω |

N-Channel Enhancement Mode

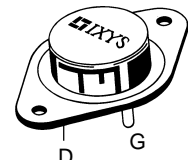


| Symbol | Test Conditions | Maximum Ratings | |
|---------------|---|-----------------------------|------------------|
| V_{DSS} | $T_J = 25^\circ\text{C}$ to 150°C | 500 | V |
| V_{DGR} | $T_J = 25^\circ\text{C}$ to 150°C ; $R_{GS} = 1\text{ M}\Omega$ | 500 | V |
| V_{GS} | Continuous | ± 20 | V |
| V_{GSM} | Transient | ± 30 | V |
| I_{D25} | $T_C = 25^\circ\text{C}$ | 21N50 | 21 A |
| | | 24N50 | 24 A |
| I_{DM} | $T_C = 25^\circ\text{C}$, pulse width limited by T_{JM} | 21N50 | 84 A |
| | | 24N50 | 96 A |
| P_D | $T_C = 25^\circ\text{C}$ | 300 | 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 AE (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

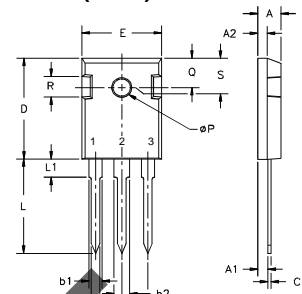
| Symbol | Test Conditions | Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified) | | |
|--------------|--|---|------|---------------------|
| | | min. | typ. | max. |
| V_{DSS} | $V_{GS} = 0\text{ V}$, $I_D = 250\ \mu\text{A}$ | 500 | | V |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$, $I_D = 250\ \mu\text{A}$ | 2 | | V |
| I_{GSS} | $V_{GS} = \pm 20\text{ V}_{DC}$, $V_{DS} = 0$ | | | $\pm 100\text{ nA}$ |
| I_{DSS} | $V_{DS} = 0.8 \cdot V_{DSS}$ $V_{GS} = 0\text{ V}$ | $T_J = 25^\circ\text{C}$ | | 200 μA |
| | | $T_J = 125^\circ\text{C}$ | | 1 mA |
| $R_{DS(on)}$ | $V_{GS} = 10\text{ V}$, $I_D = 0.5\ I_{D25}$ Pulse test, $t \leq 300\ \mu\text{s}$, duty cycle $d \leq 2\%$ | 21N50 | | 0.25 Ω |
| | | 24N50 | | 0.23 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 | 11 | 21 | S | |
| C_{iss} | $V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$ | | 4200 | pF | |
| C_{oss} | | | 450 | pF | |
| C_{rss} | | | 135 | pF | |
| $t_{d(on)}$ | $V_{GS} = 10\text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 I_{D25}$ $R_G = 2\ \Omega$, (External) | | 24 | 30 | ns |
| t_r | | | 33 | 45 | ns |
| $t_{d(off)}$ | | | 65 | 80 | ns |
| t_f | | | 30 | 40 | ns |
| $Q_{g(on)}$ | $V_{GS} = 10\text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 I_{D25}$ | | 160 | 190 | nC |
| Q_{gs} | | | 28 | 40 | nC |
| Q_{gd} | | | 75 | 85 | nC |
| R_{thJC} | | | 0.42 | K/W | |
| R_{thCK} | | | 0.25 | K/W | |

Source-Drain Diode

| Symbol | Test Conditions | Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified) | | | |
|----------|---|---|------|----------|--------|
| | | min. | typ. | max. | |
| I_S | $V_{GS} = 0$ | 21N50 24N50 | | 21 24 | A A |
| I_{SM} | Repetitive; pulse width limited by T_{JM} | 21N50 24N50 | | 84 96 | A 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} | $I_F = I_S, -di/dt = 100\text{ A}/\mu\text{s}, V_R = 100\text{ V}$ | | 600 | | ns |

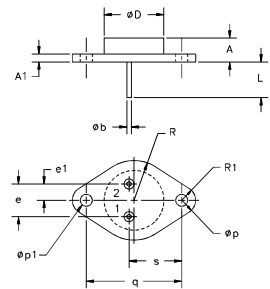
TO-247 AD (IXTH) Outline



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

| 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-204 AE (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 | 1.53 | 3.42 | .060 | .135 |
| ∅b | 1.45 | 1.60 | .057 | .063 |
| ∅D | | 22.22 | | .875 |
| e | 10.67 | 11.17 | .420 | .440 |
| e ₁ | 5.21 | 5.71 | .205 | .225 |
| L | 11.18 | 12.19 | .440 | .480 |
| ∅p | 3.84 | 4.19 | .151 | .165 |
| ∅p ₁ | 3.84 | 4.19 | .151 | .165 |
| q | 30.15 | BSC | 1.187 | BSC |
| R | 12.58 | 13.33 | .495 | .525 |
| R ₁ | 3.33 | 4.77 | .131 | .188 |
| s | 16.64 | 17.14 | .655 | .675 |

Fig. 1 Output Characteristics

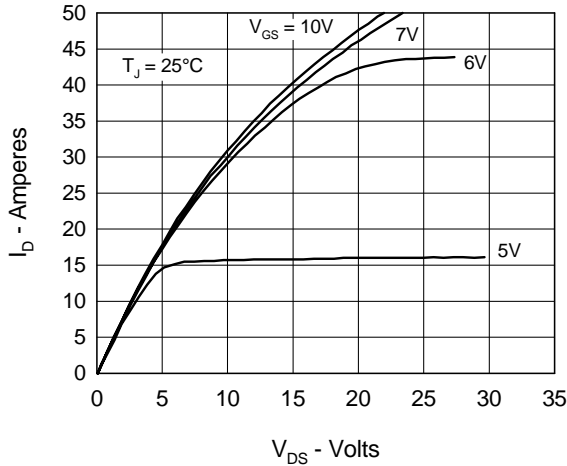


Fig. 2 Input Admittance

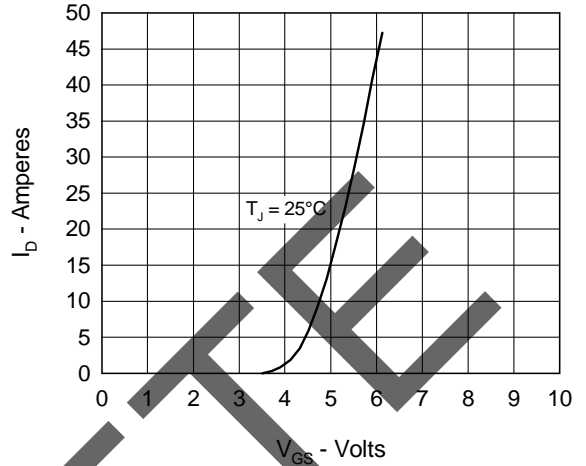


Fig. 3 $R_{DS(on)}$ vs. Drain Current

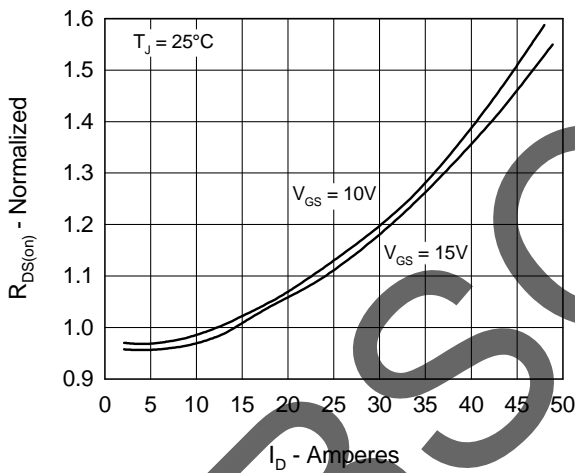


Fig. 4 Temperature Dependence of Drain to Source Resistance

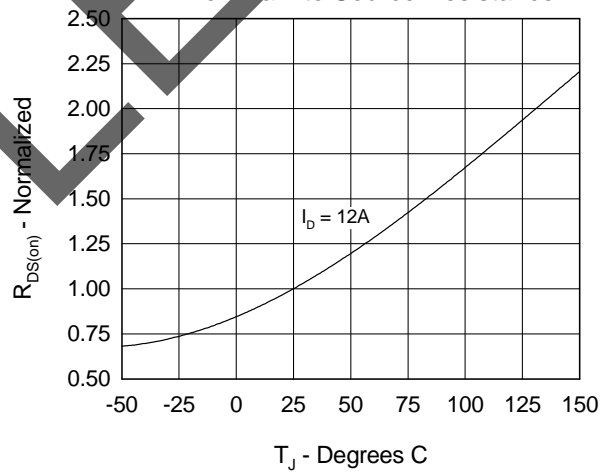


Fig. 5 Drain Current vs. Case Temperature

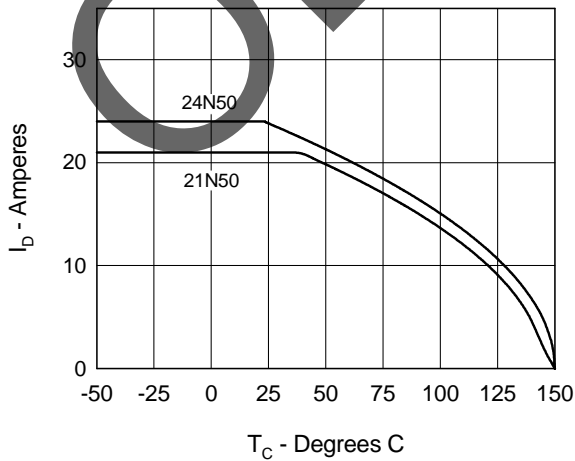


Fig. 6 Temperature Dependence of Breakdown and Threshold Voltage

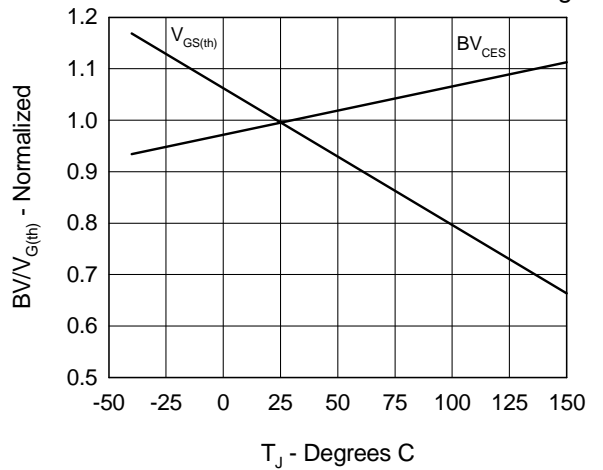


Fig.7 Gate Charge Characteristic Curve

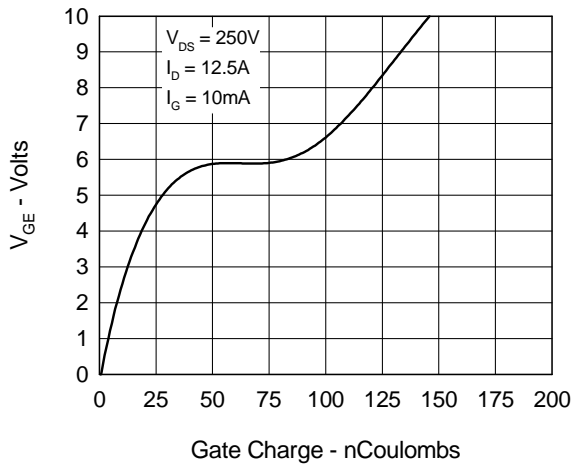


Fig.8 Forward Bias Safe Operating Area

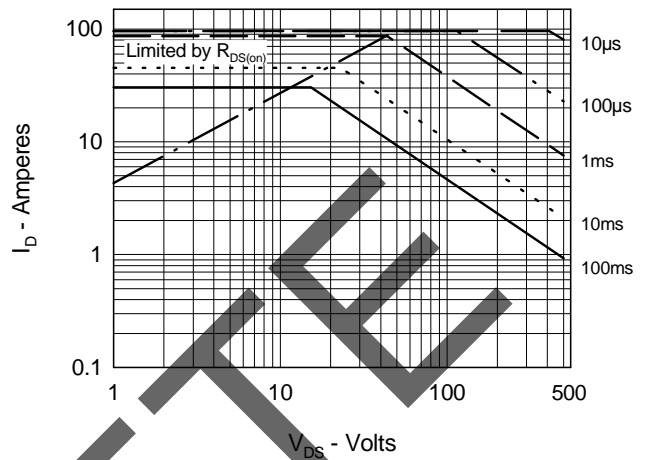


Fig.9 Capacitance Curves

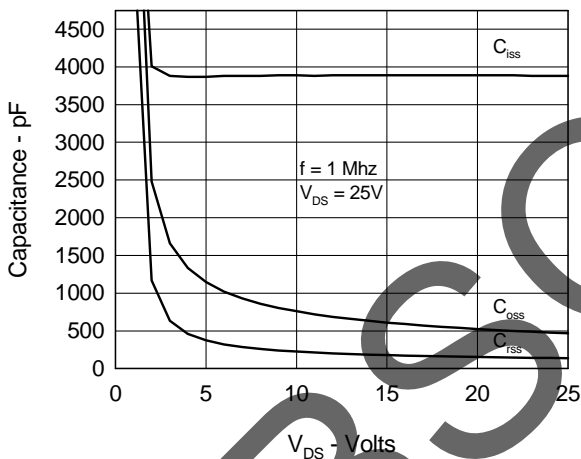


Fig.10 Source Current vs. Source to Drain Voltage

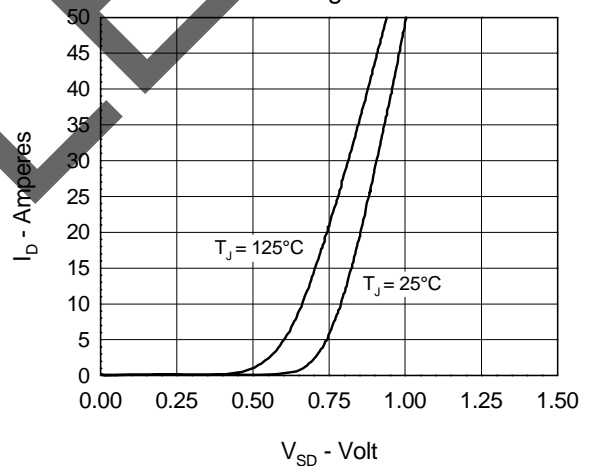
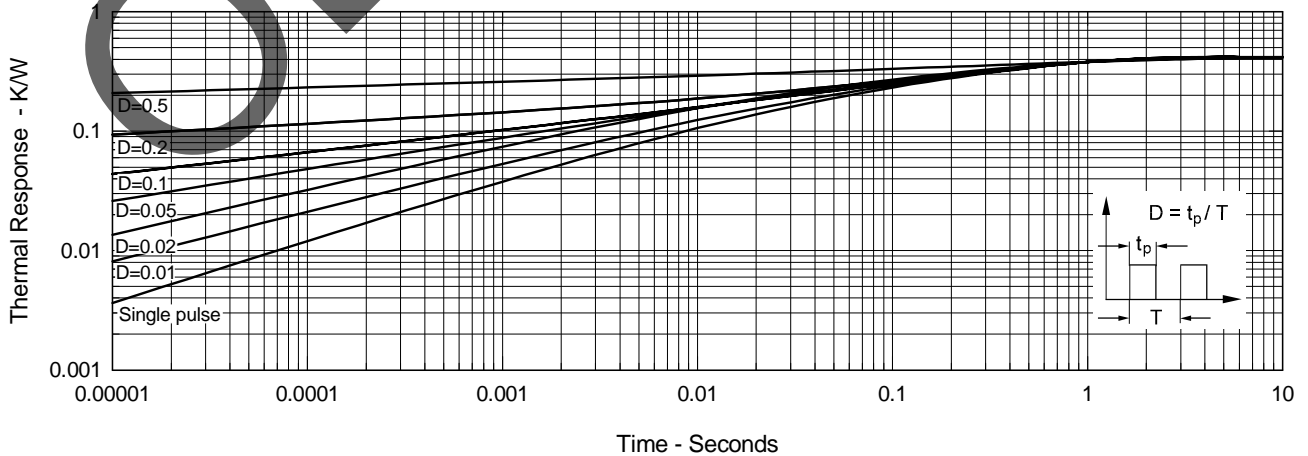


Fig.11 Transient Thermal Impedance





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