

# 60V TrenchT3™ HiPerFET™ Power MOSFETs

Ultra low on-resistance, rugged devices for industrial power conversion applications

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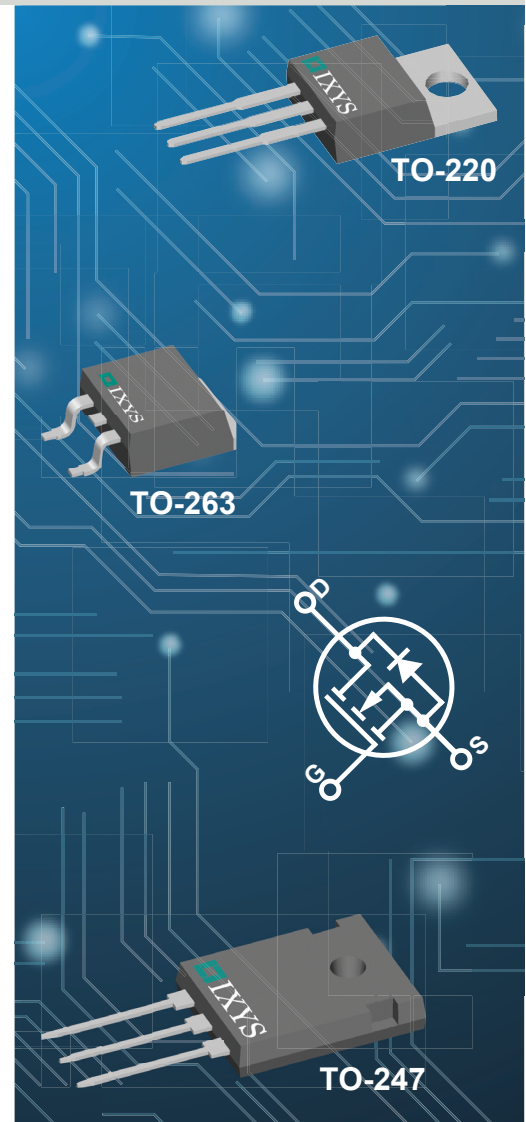
## DESCRIPTION

The 60V TrenchT3™ HiPerFET™ Power MOSFETs represent an expansion of the low-voltage Trench MOSFET product lines from IXYS Corporation (NASDAQ: IXYS), a global manufacturer of power semiconductors and integrated circuits (ICs) for energy efficiency, power management, transportation, medical technology, and motor control applications. With on-resistance as low as 3.1 milliohms, these devices are designed for high-power density, switched-mode power conversion applications.

These new MOSFETs can withstand a junction temperature up to 175°C and are avalanche rated at high avalanche current levels, ensuring device ruggedness in demanding industrial applications. Due to their high-current carrying capability, paralleling multiple devices may not be necessary, thereby simplifying the power system and improving its reliability at the same time. In addition, the fast intrinsic body diode helps achieve high efficiency, especially during high-speed switching.

Well-suited industrial applications include brushed motor drive, brushless DC (BLDC) motor drive, synchronous rectification, high-current switching power supplies, primary-side switches, DC-DC converters, off-line uninterruptible power supplies (UPS), electric forklifts, light electric vehicles (LEV), and cordless home appliances and power tools.

These new 60V TrenchT3™ HiPerFET™ Power MOSFETs are available in the following international standard size packages: TO-220, TO-263, and TO-247. Some example part numbers are IXFA220N06T3, IXFH220N06T3, IXFP270N06T3, and IXFH270N06T3; the first two are rated at 220A and the last two 270A.



## FEATURES

- Ultra low on-resistance  $R_{DS(on)}$
- High current handling capability
- Avalanche rated
- Fast body diode
- 175°C operating temperature
- International standard packages

## ADVANTAGES

- High power density
- Easy to mount
- Space savings

## APPLICATIONS

- Off-line uninterruptible power supplies (UPS)
- DC-DC converters
- Brushed/brushless DC motor drive
- High-current switching power supplies
- Primary-side switches
- Electric forklifts
- Light electric vehicles (LEV)
- Cordless home appliances and power tools
- Unmanned aerial vehicles (UAV)

# Available Parts

| Part Number  | $V_{DSS}$<br>(V) | $I_{D25}$<br>$T_c = 25^\circ\text{C}$<br>(A) | $R_{DS(on)}$<br>max<br>$T_j = 25^\circ\text{C}$<br>(m $\Omega$ ) | $Q_{g(on)}$<br>typ<br>(nC) | $C_{iss}$<br>typ<br>(pF) | $t_{rr}$<br>typ<br>(ns) | $R_{thjc}$<br>max<br>( $^\circ\text{C}/\text{W}$ ) | $P_D$<br>max<br>(W) | Package Type |
|--------------|------------------|--|--|----------------------------|--------------------------|-------------------------|--|---------------------|--------------|
| IXFA220N06T3 | 60               | 220  | 4  | 136                        | 8500                     | 38                      | 0.34   | 440                 | TO-263       |
| IXFH220N06T3 | 60               | 220  | 4  | 136                        | 8500                     | 38                      | 0.34   | 440                 | TO-247       |
| IXFP220N06T3 | 60               | 220  | 4  | 136                        | 8500                     | 38                      | 0.34   | 440                 | TO-220       |
| IXFA270N06T3 | 60               | 270  | 3.1  | 200                        | 12600                    | 47                      | 0.31   | 480                 | TO-263       |
| IXFH270N06T3 | 60               | 270  | 3.1  | 200                        | 12600                    | 47                      | 0.31   | 480                 | TO-247       |
| IXFP270N06T3 | 60               | 270  | 3.1  | 200                        | 12600                    | 47                      | 0.31   | 480                 | TO-220       |

## Application Examples

Application Circuits Legend

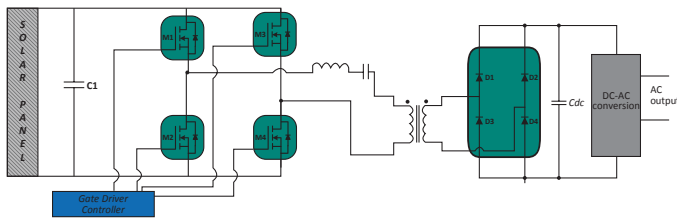


Figure 1: Solar micro-inverter

Figure 2 demonstrates a brushless DC (BLDC) motor drive typically used in cordless power tools. Six TrenchT3™ HiPerFET™ **IXFP270N06T3** MOSFETs (M1, M2, M3, M4, M5, and M6) are utilized to form a 3-phase inverter stage that drives a brushless DC motor. These high avalanche current rated MOSFETs ensure the ruggedness of the system.

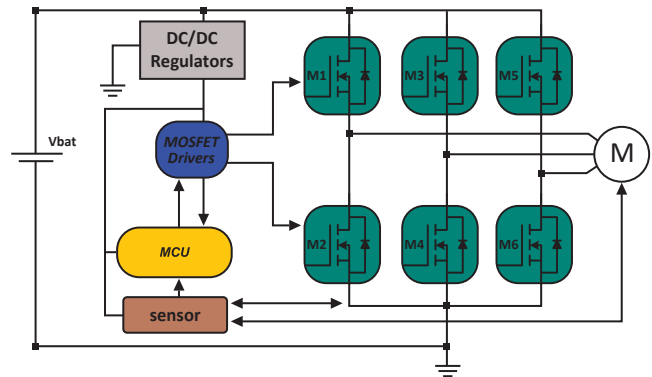


Figure 2: Brushless DC (BLDC) motor

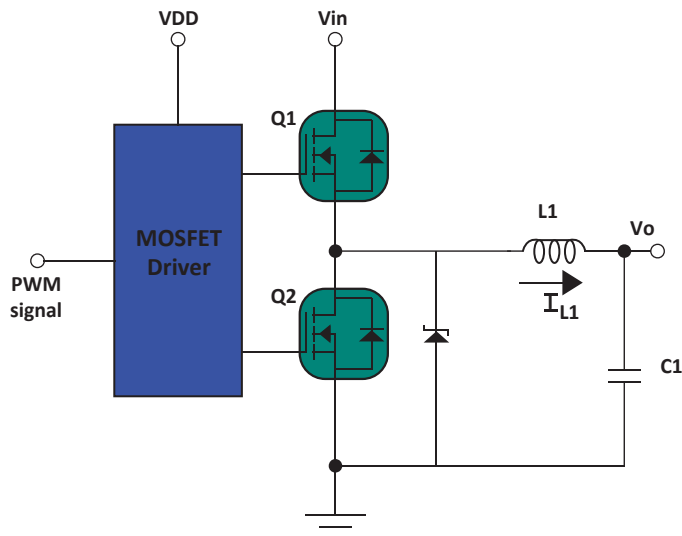


Figure 3: Synchronous buck converter

Figure 3 represents a DC-DC synchronous buck converter circuit which makes use of the TrenchT3™ **IXTA220N06T3** (Q1 and Q2). Q1 functions as the high-side switch and Q2 the low-side synchronous switch in place of a diode. With an  $R_{DS(on)}$  of 4m $\Omega$ , the **IXFA220N06T3** enables the converter to achieve a higher efficiency.