

**500V / 8.0A**  
**N-Channel Enhancement Mode MOSFET**

500V,  $R_{DS(ON)}=0.9\Omega@V_{GS}=10V, I_D=4.0A$

### Features

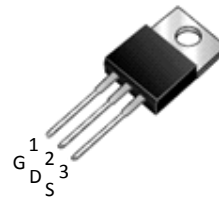
- Low ON Resistance
- Fast Switching
- Low Gate Charge & Low  $C_{RSS}$
- Fully Characterized Avalanche Voltage and Current
- Specially Designed for AC Adapter, PFC and SMPS
- In compliance with EU RoHS 2002/95/EC Directives

### Mechanical Information

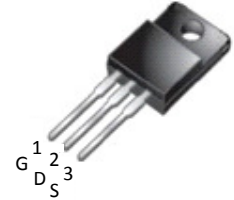
- Case: TO-220AB / ITO-220AB Molded Plastic
- Terminals : Solderable per MIL-STD-750, Method 2026

### Marking & Ordering Information

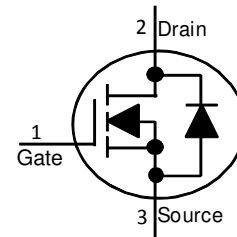
| TYPE     | MARKING | PACKAGE   | PACKING    |
|----------|---------|-----------|------------|
| HY8N50T  | 8N50T   | TO-220AB  | 50PCS/TUBE |
| HY8N50FT | 8N50FT  | ITO-220AB | 50PCS/TUBE |



TO-220AB



ITO-220AB



### Absolute Maximum Ratings ( $T_c=25^\circ\text{C}$ unless otherwise noted )

| Parameter                                                               |                        | Symbol         | HY8N50T     | HY8N50FT | Units            |
|-------------------------------------------------------------------------|------------------------|----------------|-------------|----------|------------------|
| Drain-Source Voltage                                                    |                        | $V_{DS}$       | 500         |          | V                |
| Gate-Source Voltage                                                     |                        | $V_{GS}$       | $\pm 30$    |          | V                |
| Continuous Drain Current                                                | $T_c=25^\circ\text{C}$ | $I_D$          | 8           | 8        | A                |
| Pulsed Drain Current <sup>1)</sup>                                      |                        | $I_{DM}$       | 32          | 32       | A                |
| Maximum Power Dissipation                                               | $T_c=25^\circ\text{C}$ | $P_D$          | 125         | 45       | W                |
| Derating Factor                                                         |                        |                | 1.0         | 0.36     |                  |
| Avalanche Energy with Single Pulse<br>$I_{AS}=8A, V_{DD}=50V, L=14.5mH$ |                        | $E_{AS}$       | 460         |          | mJ               |
| Operating Junction and Storage Temperature Range                        |                        | $T_J, T_{STG}$ | -55 to +150 |          | $^\circ\text{C}$ |

**Note :** 1. Maximum DC current limited by the package

### Thermal Characteristics

| PARAMETER                              | Symbol          | HY8N50T | HY8N50FT | Units              |
|----------------------------------------|-----------------|---------|----------|--------------------|
| Junction-to-Case Thermal Resistance    | $R_{\theta JC}$ | 1.0     | 2.78     | $^\circ\text{C/W}$ |
| Junction-to Ambient Thermal Resistance | $R_{\theta JA}$ | 62.5    | 100      | $^\circ\text{C/W}$ |

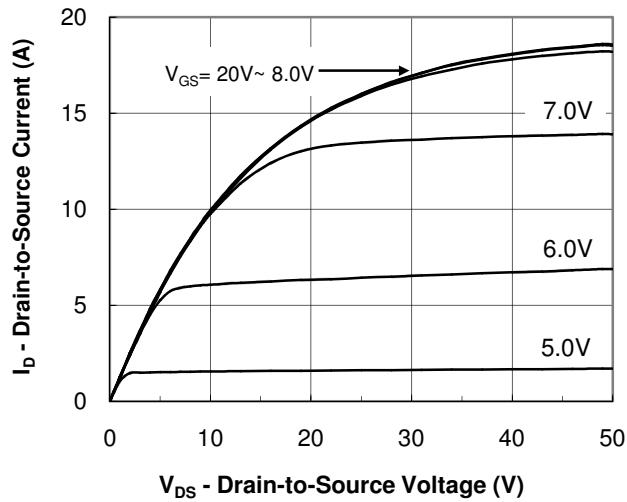
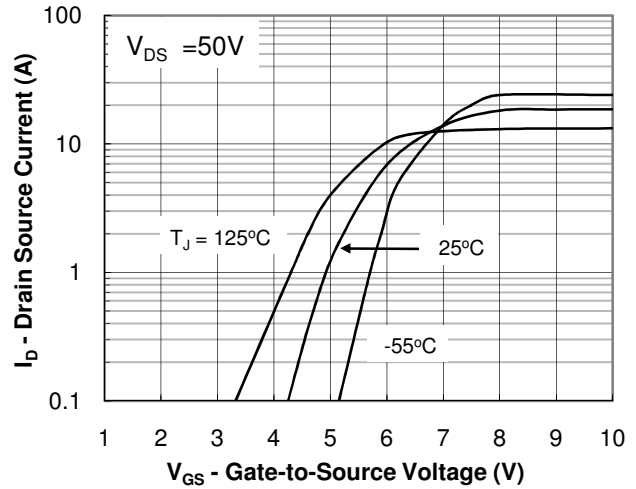
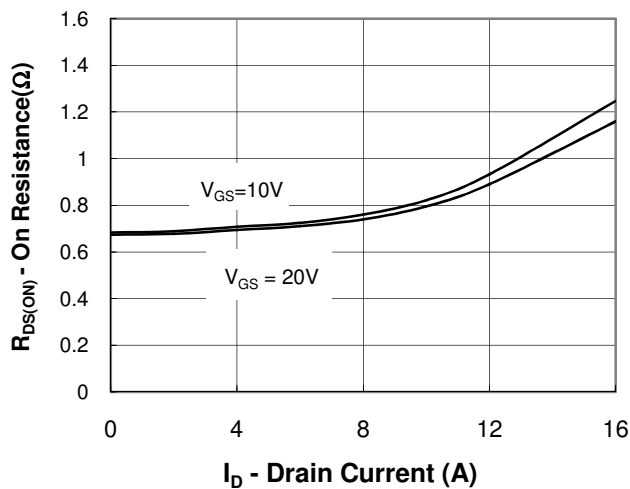
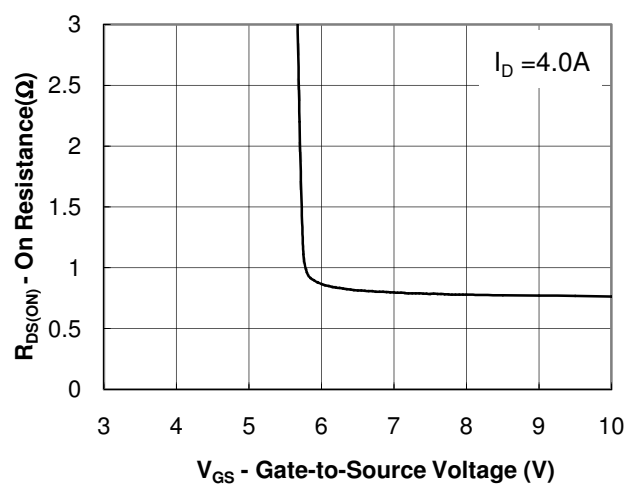
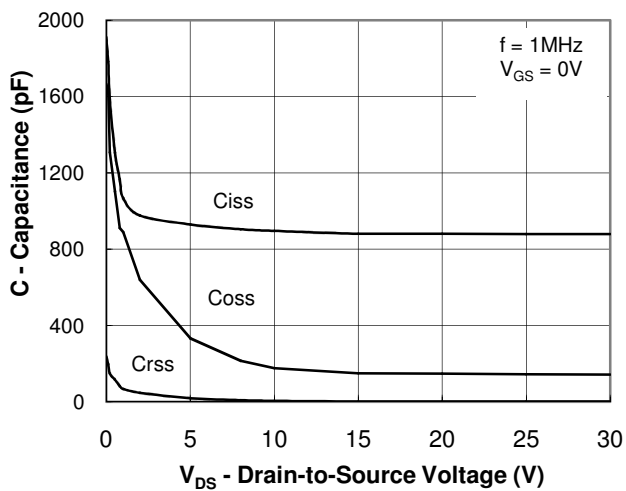
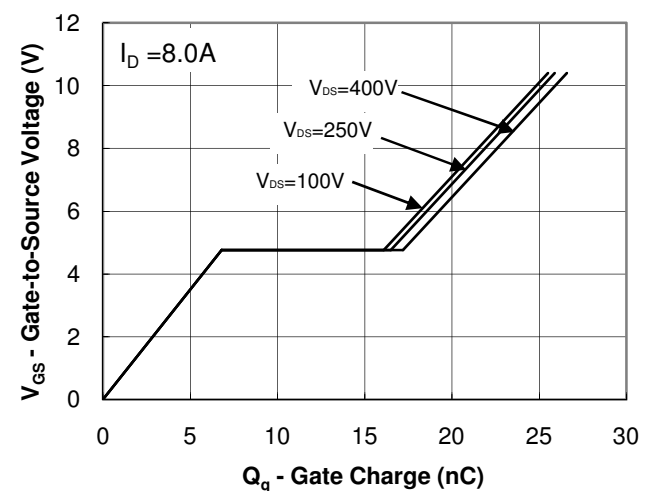
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**Electrical Characteristics (  $T_c=25^{\circ}\text{C}$  unless otherwise noted )**

| Parameter                        | Symbol       | Test Condition                                        | Min. | Typ. | Max.      | Units    |
|----------------------------------|--------------|-------------------------------------------------------|------|------|-----------|----------|
| Static                           |              |                                                       |      |      |           |          |
| Drain-Source Breakdown Voltage   | $BV_{DSS}$   | $V_{GS}=0V, I_D=250\mu A$                             | 500  | -    | -         | V        |
| Gate Threshold Voltage           | $V_{GS(th)}$ | $V_{DS}=V_{GS}, I_D=250\mu A$                         | 2.0  | -    | 4.0       | V        |
| Drain-Source On-State Resistance | $R_{DS(on)}$ | $V_{GS}=10V, I_D=4.0A$                                | -    | 0.68 | 0.9       | $\Omega$ |
| Zero Gate Voltage Drain Current  | $I_{DSS}$    | $V_{DS}=500V, V_{GS}=0V$                              | -    | -    | 10        | $\mu A$  |
| Gate Body Leakage                | $I_{GSS}$    | $V_{GS}=\pm 30V, V_{DS}=0V$                           | -    | -    | $\pm 100$ | nA       |
| Dynamic                          |              |                                                       |      |      |           |          |
| Total Gate Charge                | $Q_g$        | $V_{DS}=400V, I_D=8.0A$<br>$V_{GS}=10V$               | -    | 26.6 | -         | nC       |
| Gate-Source Charge               | $Q_{gs}$     |                                                       | -    | 6.8  | -         |          |
| Gate-Drain Charge                | $Q_{gd}$     |                                                       | -    | 10.4 | -         |          |
| Turn-On Delay Time               | $t_{d(on)}$  | $V_{DD}=250V, I_D=8.0A$<br>$V_{GS}=10V, R_G=25\Omega$ | -    | 16.8 | 28        | ns       |
| Turn-On Rise Time                | $t_r$        |                                                       | -    | 28.6 | 32        |          |
| Turn-Off Delay Time              | $t_{d(off)}$ |                                                       | -    | 48.2 | 58        |          |
| Turn-Off Fall Time               | $t_f$        |                                                       | -    | 32.6 | 42        |          |
| Input Capacitance                | $C_{iss}$    | $V_{DS}=25V, V_{GS}=0V$<br>$f=1.0MHz$                 | -    | 880  | 945       | pF       |
| Output Capacitance               | $C_{oss}$    |                                                       | -    | 145  | 175       |          |
| Reverse Transfer Capacitance     | $C_{rss}$    |                                                       | -    | 2.4  | 6.2       |          |
| Source-Drain Diode               |              |                                                       |      |      |           |          |
| Max. Diode Forward Current       | $I_S$        | -                                                     | -    | -    | 8.0       | A        |
| Max.Pulsed Source Current        | $I_{SM}$     | -                                                     | -    | -    | 32        | A        |
| Diode Forward Voltage            | $V_{SD}$     | $I_S=8.0A, V_{GS}=0V$                                 | -    | -    | 1.5       | V        |
| Reverse Recovery Time            | $t_{rr}$     | $V_{GS}=0V, I_F=8.0A$<br>$di/dt=100A/\mu s$           | -    | 260  | -         | ns       |
| Reverse Recovery Charge          | $Q_{rr}$     |                                                       | -    | 2.2  | -         | $\mu C$  |

**NOTE :** Plus Test : Pluse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$ .

### Typical Characteristics Curves ( $T_C=25^\circ\text{C}$ , unless otherwise noted)



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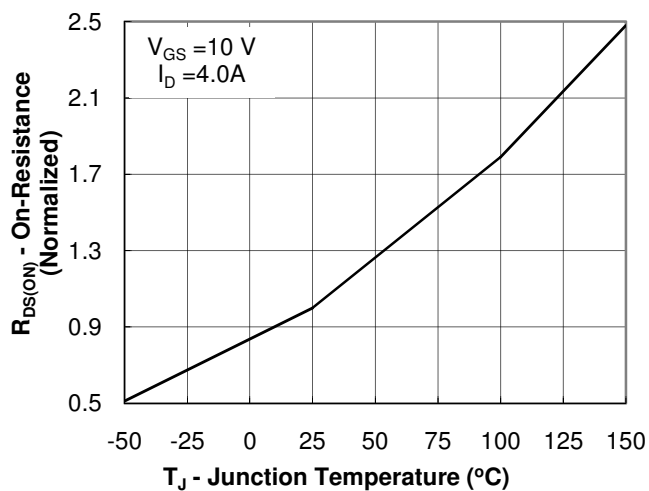


**Fig.7 On-Resistance  
vs Junction Temperature**

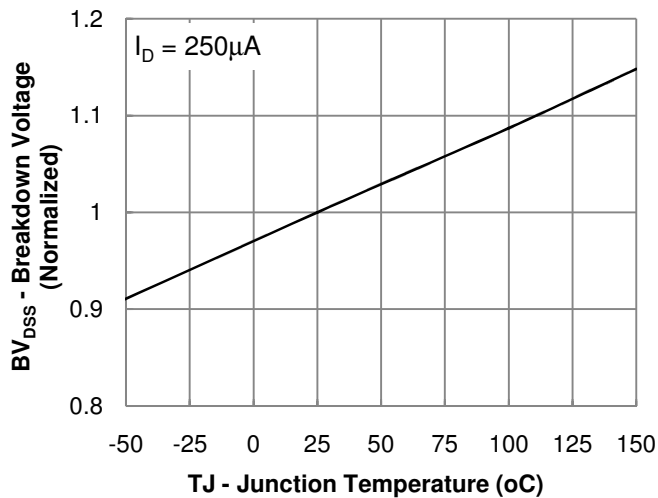


**Fig.8 Breakdown Voltage  
vs Junction Temperature**

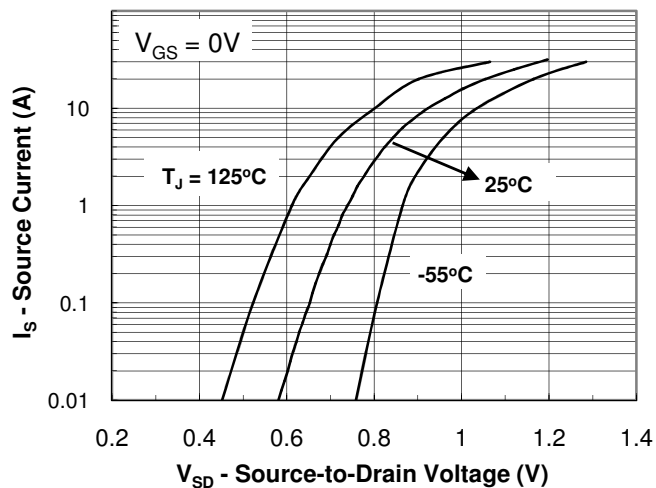


**Fig.9 Body Diode  
Forward Voltage Characteristic**