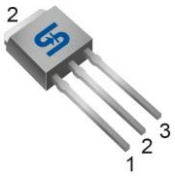
# TSM60N750

600V, 6A, 0.75Ω
N-Channel Power MOSFET

**TO-252 (DPAK)**


**TO-251 (IPAK)**




**Pin Definition:**
1. Gate
2. Drain
3. Source

## Key Parameter Performance

| Parameter | Value | Unit |
|---|---|---|
| $V_{DS}$ | 600 | V |
| $R_{DS(on)}$ (max) | 0.75 | Ω |
| $Q_g$ | 10.8 | nC |

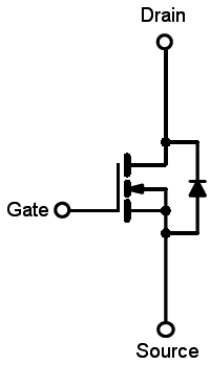
## Features

- Super-Junction technology
- High performance due to small figure-of-merit
- High ruggedness performance
- High commutation performance

## Application

- Power Supply.
- Lighting

## Block Diagram




N-Channel MOSFET

## Ordering Information

| Part No. | Package | Packing |
|---|---|---|
| TSM60N750CH C5G | TO-251 | 75pcs / Tube |
| TSM60N750CP ROG | TO-252 | 2.5kpcs / 13” Reel |

**Note:** “G” denotes for Halogen- and Antimony-free as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds

## Absolute Maximum Ratings ($T_A$=25°C unless otherwise noted)

| Parameter | | Symbol | Limit IPAK/DPAK | Unit |
|---|---|---|---|---|
| Drain-Source Voltage | | $V_{DS}$ | 600 | V |
| Gate-Source Voltage | | $V_{GS}$ | ±30 | V |
| Continuous Drain Current (Note 1) | $T_C$ = 25°C | $I_D$ | 6 | A |
| Pulsed Drain Current (Note 2) | | $I_{DM}$ | 18 | A |
| Total Power Dissipation @ $T_C$=25°C | | $P_{DTOT}$ | 62.5 | W |
| Single Pulsed Avalanche Energy (Note 3) | | $E_{AS}$ | 90 | mJ |
| Single Pulsed Avalanche Current (Note 3) | | $I_{AS}$ | 1.9 | A |
| Operating Junction and Storage Temperature Range | | $T_J$, $T_{STG}$ | - 55 to +150 | °C |

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## Thermal Performance

| Parameter | Symbol | Limit | Unit |
|---|---|---|---|
| | | IPAK/DPAK | |
| Junction to Case Thermal Resistance | $R_{\Theta JC}$ | 2 | °C/W |
| Junction to Ambient Thermal Resistance | $R_{\Theta JA}$ | 62 | °C/W |

## Electrical Specifications ($T_J$=25°C unless otherwise noted)

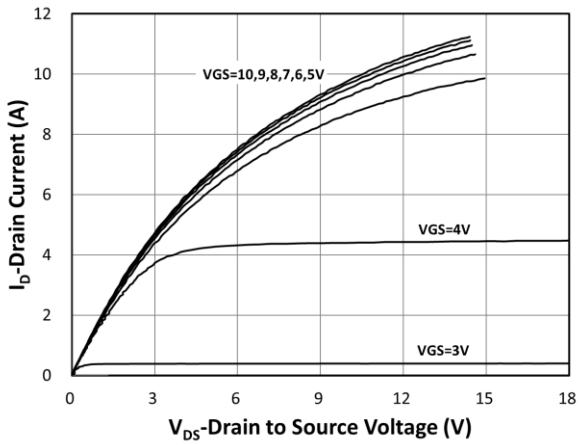
| Parameter | Conditions | Symbol | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **Static** (Note 4) | | | | | | |
| Drain-Source Breakdown Voltage | $V_{GS}$ = 0V, $I_D$ = 250μA | $BV_{DSS}$ | 600 | -- | -- | V |
| Gate Threshold Voltage | $V_{DS}$ = $V_{GS}$, $I_D$ = 250μA | $V_{GS(TH)}$ | 2 | 3 | 4 | V |
| Gate Body Leakage | $V_{GS}$ = ±30V, $V_{DS}$ = 0V | $I_{GSS}$ | -- | -- | ±100 | nA |
| Zero Gate Voltage Drain Current | $V_{DS}$ = 600V, $V_{GS}$ = 0V | $I_{DSS}$ | -- | -- | 1 | μA |
| Drain-Source On-State Resistance | $V_{GS}$ = 10V, $I_D$ = 3A | $R_{DS(ON)}$ | -- | 0.53 | 0.75 | Ω |
| **Dynamic** (Note 5) | | | | | | |
| Total Gate Charge | $V_{DS}$ = 380V, $I_D$ = 6A, $V_{GS}$ = 10V | $Q_g$ | -- | 10.8 | -- | nC |
| Gate-Source Charge | | $Q_{gs}$ | -- | 2.7 | -- | |
| Gate-Drain Charge | | $Q_{gd}$ | -- | 3.7 | -- | |
| Input Capacitance | $V_{DS}$ = 100V, $V_{GS}$ = 0V, f = 1.0MHz | $C_{iss}$ | -- | 554 | -- | pF |
| Output Capacitance | | $C_{oss}$ | -- | 46 | -- | |
| Gate Resistance | f=1MHz, open drain | $R_g$ | -- | 2.7 | -- | Ω |
| **Switching** (Note 6) | | | | | | |
| Turn-On Delay Time | $V_{DD}$ = 380V, $R_{GEN}$ = 25Ω, $I_D$ = 6A, $V_{GS}$ = 10V, | $t_{d(on)}$ | -- | 17.3 | -- | ns |
| Turn-On Rise Time | | $t_r$ | -- | 22 | -- | |
| Turn-Off Delay Time | | $t_{d(off)}$ | -- | 28 | -- | |
| Turn-Off Fall Time | | $t_f$ | -- | 22 | -- | |
| **Source-Drain Diode** (Note 4) | | | | | | |
| Forward On Voltage | $I_S$=6A, $V_{GS}$=0V | $V_{SD}$ | -- | -- | 1.4 | V |
| Reverse Recovery Time | $V_R$=200V, $I_S$=3A dI$_F$/dt=100A/μs | $t_{rr}$ | -- | 182 | -- | ns |
| Reverse Recovery Charge | | $Q_{rr}$ | -- | 1.3 | -- | μC |

**Notes:**

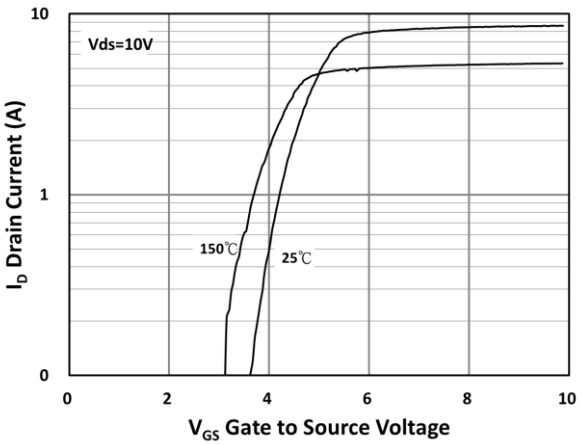
1. Current limited by package
2. Pulse width limited by the maximum junction temperature
3. L=50mH, $I_{AS}$=1.9A, $V_{DD}$=50V, $R_G$=25Ω, Starting $T_J$=25°C
4. Pulse test: PW ≤ 300μs, duty cycle ≤ 2%
5. For DESIGN AID ONLY, not subject to production testing.
6. Switching time is essentially independent of operating temperature.

## Electrical Characteristics Curves

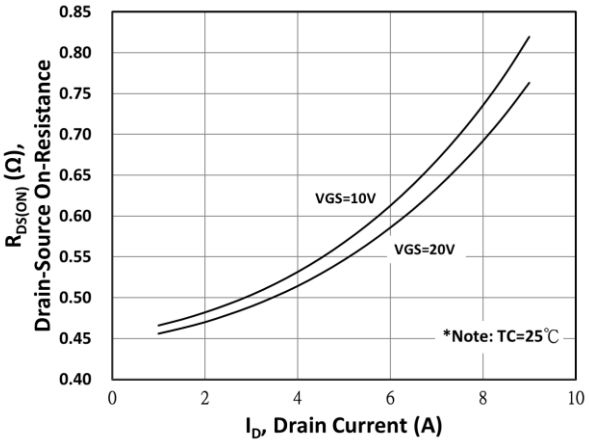
### Output Characteristics



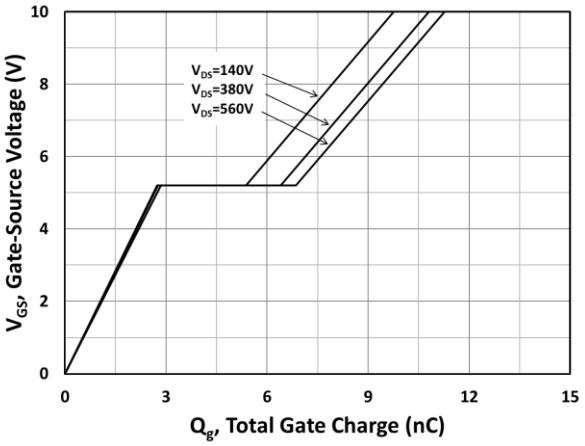

### Transfer Characteristics



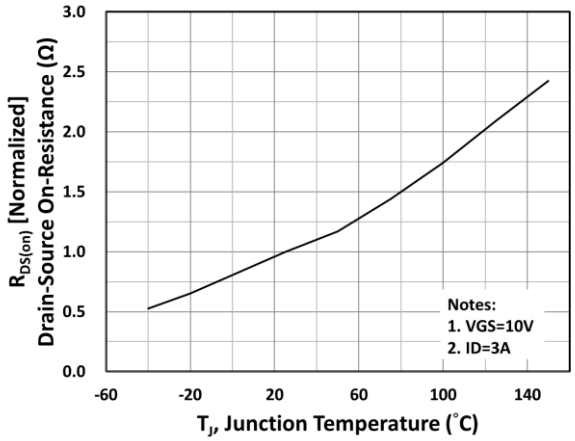

### On-Resistance vs. Drain Current



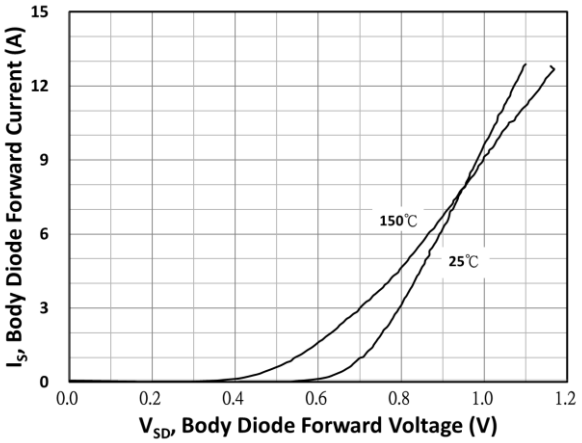

### Gate-Source Voltage vs. Gate Charge




### On-Resistance vs. Junction Temperature

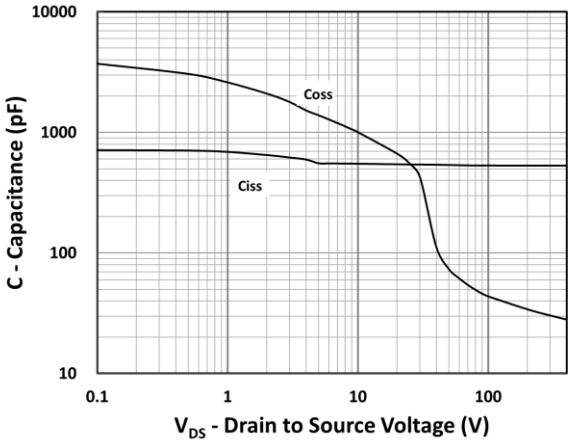



### Source-Drain Diode Forward Current vs. Voltage

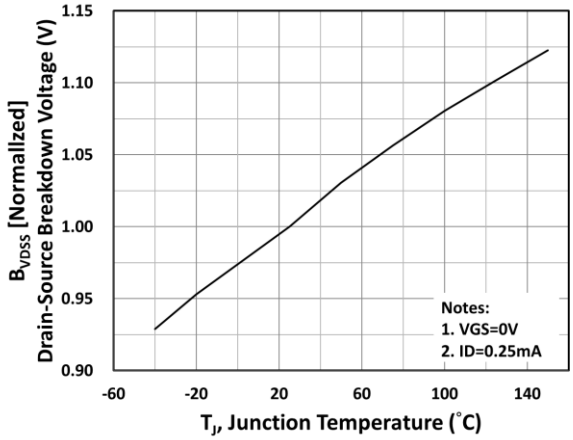


## Electrical Characteristics Curves

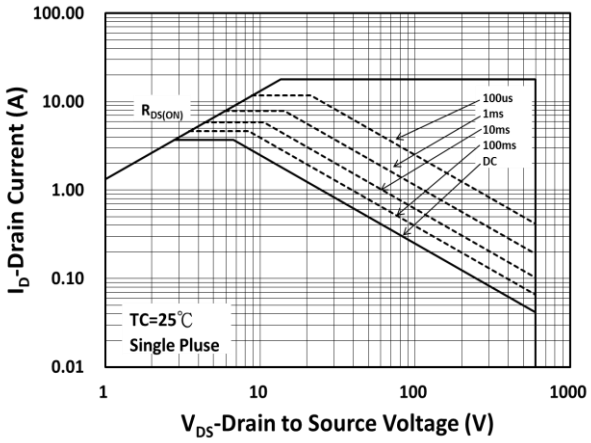
### Capacitance vs. Drain-Source Voltage



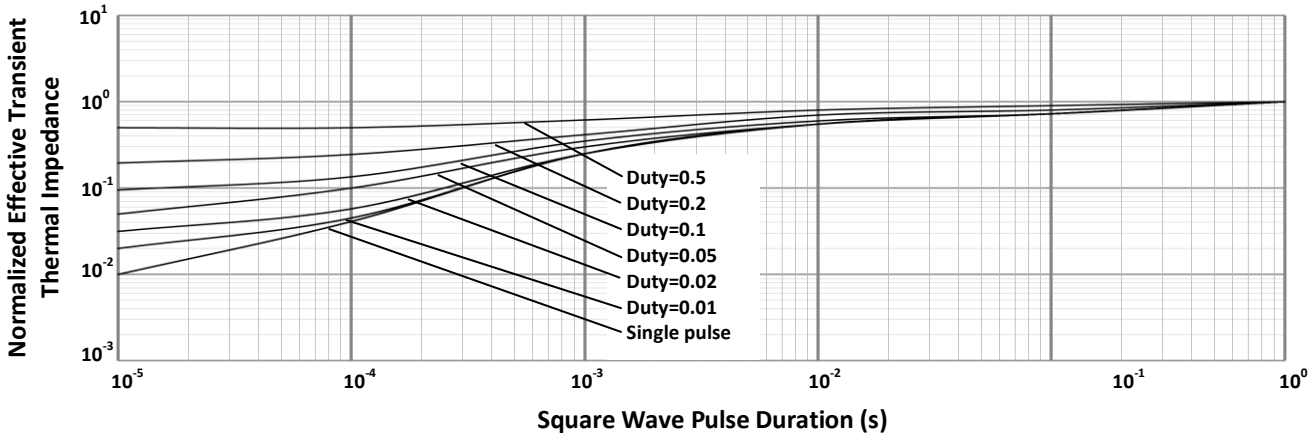

### $BV_{DSS}$ vs. Junction Temperature




### Maximum Safe Operating Area (DPAK/IPAK)




### Normalized Thermal Transient Impedance, Junction-to-Case (DPAK/IPAK)



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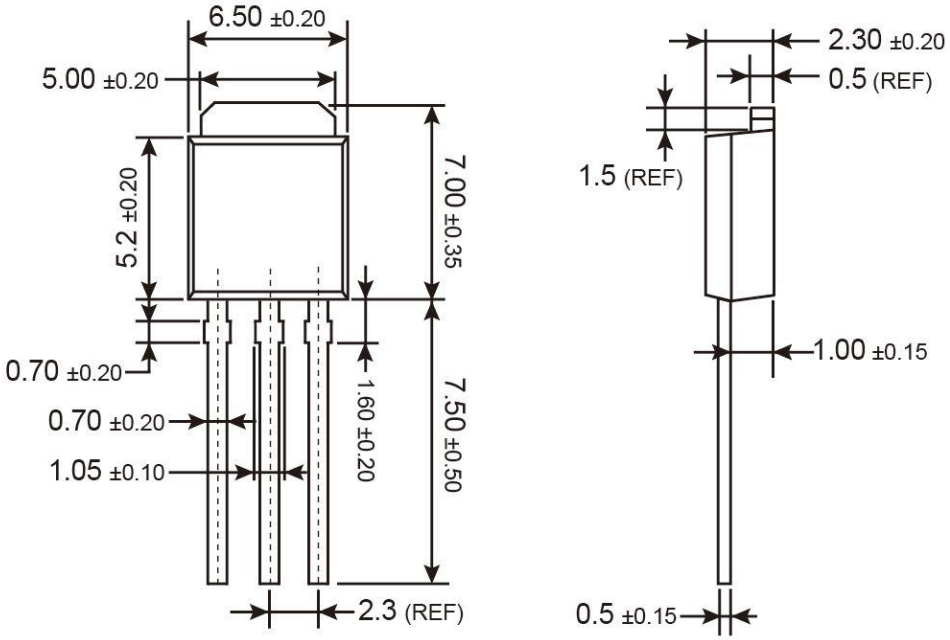
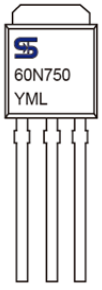
## TO-251 (IPAK) Mechanical Drawing




Unit: Millimeters

## Marking Diagram




**Y** = Year Code
**M** = Month Code for Halogen Free Product
(**O**=Jan, **P**=Feb, **Q**=Mar, **R**=Apl, **S**=May, **T**=Jun, **U**=Jul, **V**=Aug, **W**=Sep, **X**=Oct, **Y**=Nov, **Z**=Dec)
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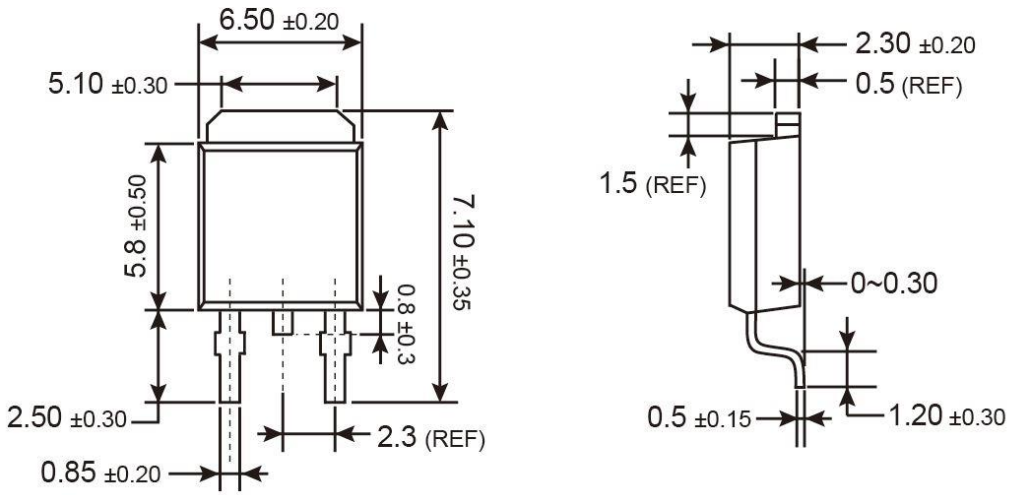


Unit: Millimeters

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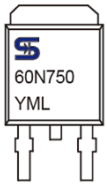


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