

Pin Definition:

1. Gate
2. Drain
3. Source

Key Parameter Performance

| Parameter | Value | Unit |
|--------------------|-------|----------|
| V_{DS} | 250 | V |
| $R_{DS(on)}$ (max) | 0.6 | Ω |
| Q_g | 8.4 | nC |

Features

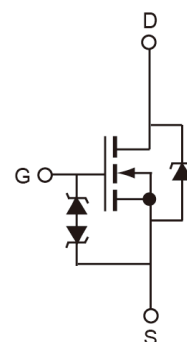
- 100% avalanche tested
- Improved ESD performance

Ordering Information

| Part No. | Package | Packing |
|------------------|---------|--------------------|
| TSM600N25ECH C5G | TO-251 | 75pcs / Tube |
| TSM600N25ECP 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

Block Diagram



N-Channel MOSFET

Absolute Maximum Ratings

| Parameter | Symbol | Limit | Unit | |
|---|-----------|---------------------------|------------------|---|
| Drain-Source Voltage | V_{DS} | 250 | V | |
| Gate-Source Voltage | V_{GS} | ± 30 | V | |
| Continuous Drain Current | I_D | $T_C = 25^\circ\text{C}$ | 8 | A |
| | | $T_C = 100^\circ\text{C}$ | 3.6 | A |
| Pulsed Drain Current ^(Note 1) | I_{DM} | 32 | A | |
| Single Pulse Avalanche Energy ^(Note 2) | E_{AS} | 147 | mJ | |
| Repetitive Avalanche Current ^(Note 1) | I_{AR} | 8 | A | |
| Repetitive Avalanche Energy ^(Note 1) | E_{AR} | 5.2 | mJ | |
| Power Dissipation @ $T_C = 25^\circ\text{C}$ | P_D | 52 | W | |
| Peak Diode Recovery ^(Note 3) | dv/dt | 4.5 | V/ns | |
| Operating Junction Temperature | T_J | 150 | $^\circ\text{C}$ | |
| Storage Temperature Range | T_{STG} | -55 to +150 | $^\circ\text{C}$ | |

Thermal Performance

| Parameter | Symbol | Limit | Unit |
|--|-----------------|-------|--------------------|
| Thermal Resistance - Junction to Case | $R_{\theta JC}$ | 2.4 | $^\circ\text{C/W}$ |
| Thermal Resistance - Junction to Ambient | $R_{\theta JA}$ | 110 | |

Electrical Specifications (T_c=25°C unless otherwise noted)

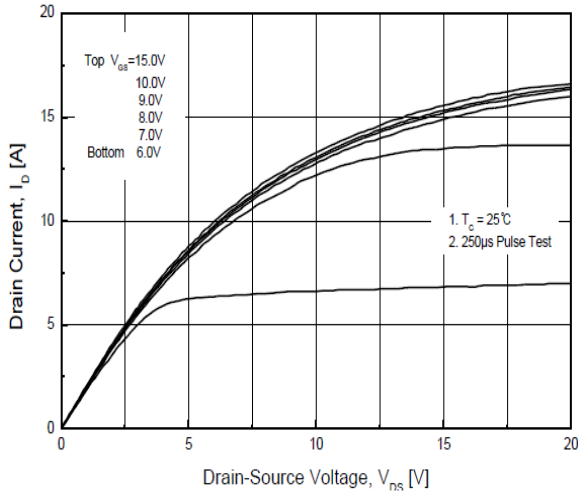
| Parameter | Conditions | Symbol | Min | Typ | Max | Unit |
|---|--|---------------------|-----|-----|------|------|
| Static | | | | | | |
| Drain-Source Breakdown Voltage | V _{GS} = 0V, I _D = 250μA | BV _{DSS} | 250 | -- | -- | V |
| Drain-Source On-State Resistance | V _{GS} = 10V, I _D = 4A | R _{DS(ON)} | -- | 0.5 | 0.6 | Ω |
| Gate Threshold Voltage | V _{DS} = V _{GS} , I _D = 250μA | V _{GS(TH)} | 3 | -- | 5 | V |
| Zero Gate Voltage Drain Current | V _{DS} = 250V, V _{GS} = 0V | I _{DSS} | -- | -- | 1 | μA |
| | V _{DS} = 200V, T _c = 125°C | | -- | -- | 10 | |
| Gate Body Leakage | V _{GS} = ±30V, V _{DS} = 0V | I _{GSS} | -- | -- | ±100 | μA |
| Forward Transconductance ^(Note 4) | V _{DS} = 30V, I _D = 4A | g _{fs} | -- | 7.5 | -- | S |
| Dynamic | | | | | | |
| Total Gate Charge ^(Note 4,5) | V _{DS} = 200V, I _D = 8A, V _{GS} = 10V | Q _g | -- | 8.4 | -- | nC |
| Gate-Source Charge ^(Note 4,5) | | Q _{gs} | -- | 1.9 | -- | |
| Gate-Drain Charge ^(Note 4,5) | | Q _{gd} | -- | 4 | -- | |
| Input Capacitance | V _{DS} = 25V, V _{GS} = 0V, f = 1.0MHz | C _{iss} | -- | 423 | -- | pF |
| Output Capacitance | | C _{oss} | -- | 74 | -- | |
| Reverse Transfer Capacitance | | C _{rss} | -- | 12 | -- | |
| Switching | | | | | | |
| Turn-On Delay Time ^(Note 4,5) | V _{DD} = 125V, I _D = 8A, R _{GEN} = 25Ω | t _{d(on)} | -- | 14 | -- | ns |
| Turn-On Rise Time ^(Note 4,5) | | t _r | -- | 25 | -- | |
| Turn-Off Delay Time ^(Note 4,5) | | t _{d(off)} | -- | 30 | -- | |
| Turn-Off Fall Time ^(Note 4,5) | | t _f | -- | 14 | -- | |
| Source-Drain Diode Ratings and Characteristic | | | | | | |
| Maximum Continuous Drain-Source Diode Forward Current | | I _S | -- | -- | 8 | A |
| Maximum Pulse Drain-Source Diode Forward Current | | I _{SM} | -- | -- | 32 | A |
| Diode-Source Forward Voltage | V _{GS} = 0V, I _S = 8A | V _{SD} | -- | -- | 1.5 | V |
| Reverse Recovery Time ^(Note 4) | V _{GS} = 0V, I _S = 8A di/dt = 100A/μs | t _{rr} | -- | 157 | -- | ns |
| Reverse Recovery Charge ^(Note 4) | | Q _{rr} | -- | 0.6 | -- | μC |

Note:

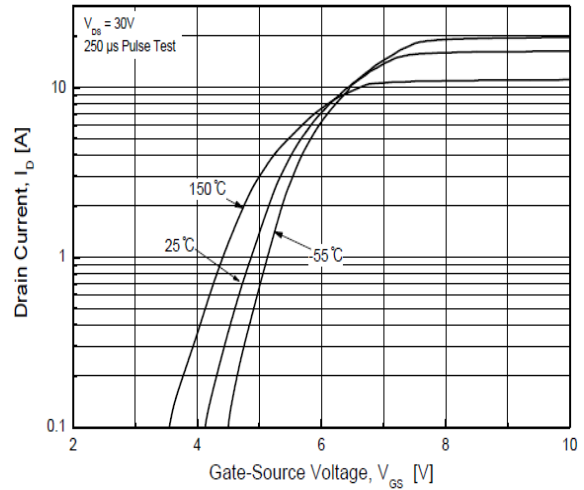
- Pulse width limited by safe operating area
- L=3.68mH, I_{AS} =8A, V_{DD} = 50V, R_G = 25Ω, Starting T_J = 25°C
- I_{SD} ≤8A, di/dt ≤ 200A/μs, V_{DD} ≤ BV_{DS}, Starting T_J=25°C
- Pulse test: pulse width ≤300μs, duty cycle ≤2%
- Switching time is essentially independent of operating temperature.

Electrical Characteristics Curves

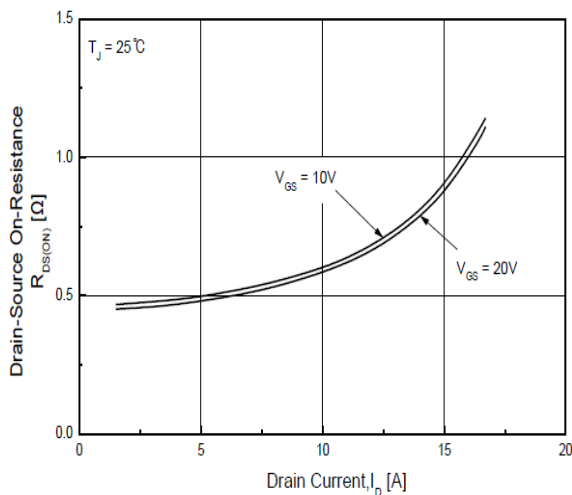
Output Characteristics



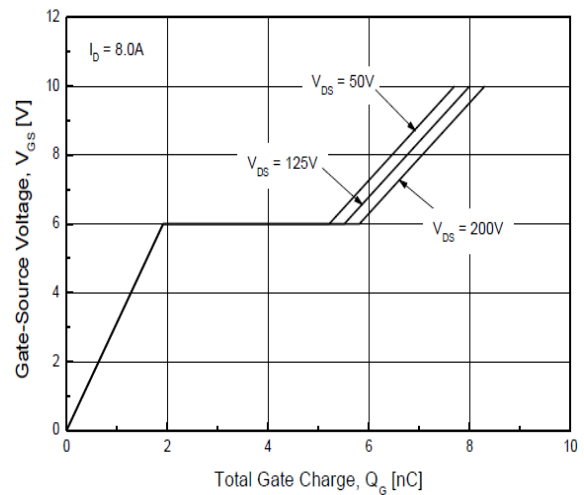
Transfer Characteristics



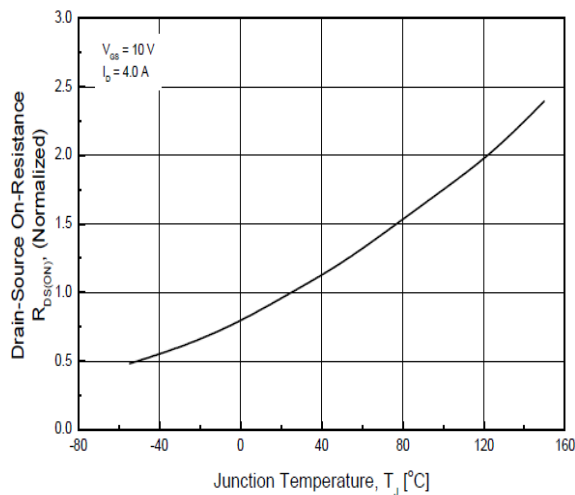
On-Resistance vs. Drain Current



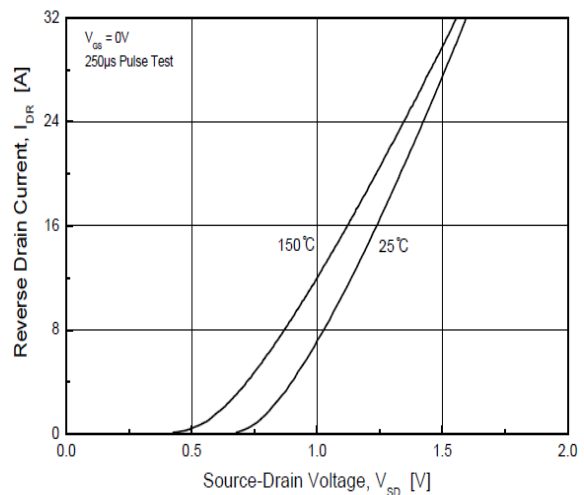
Gate Charge



On-Resistance vs. Junction Temperature

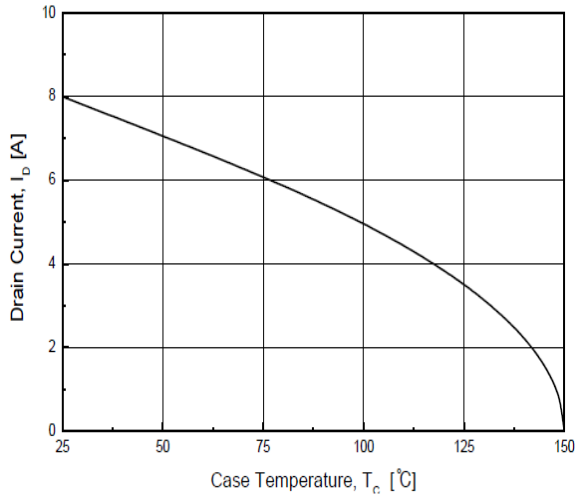


Source-Drain Diode Forward Voltage

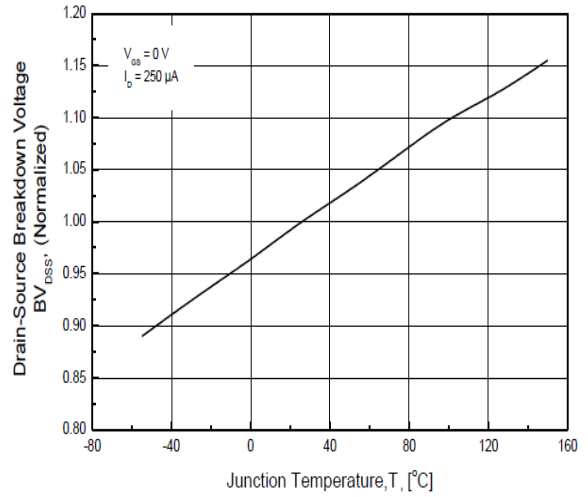


Electrical Characteristics Curves

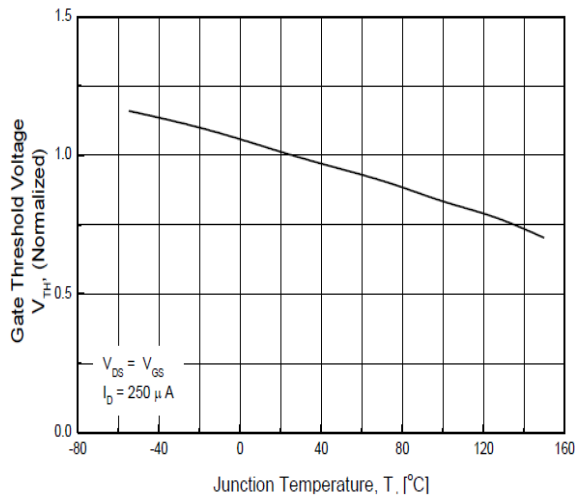
Drain Current vs. Case Temperature



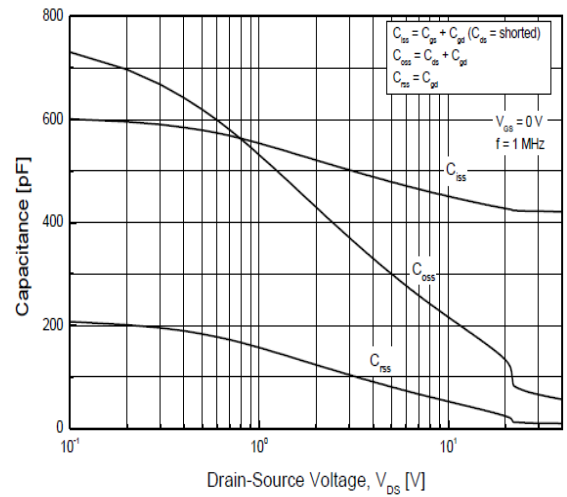
BV_{DSS} vs. Junction Temperature



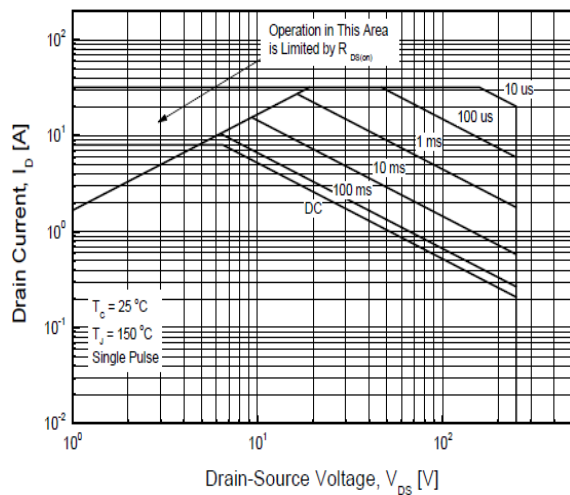
V_{TH} vs. Junction Temperature



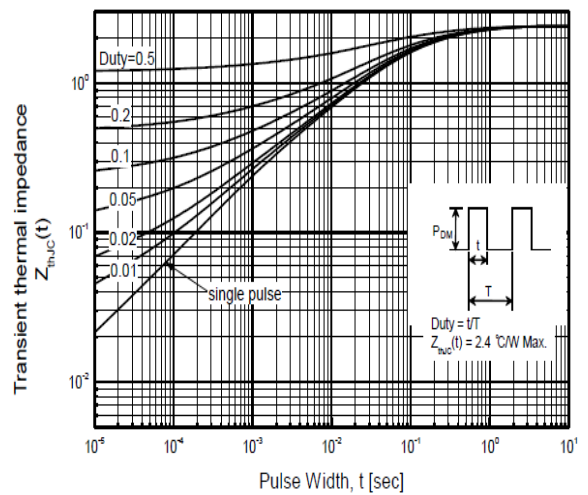
Capacitance vs. Drain-Source Voltage



Maximum Safe Operating Area

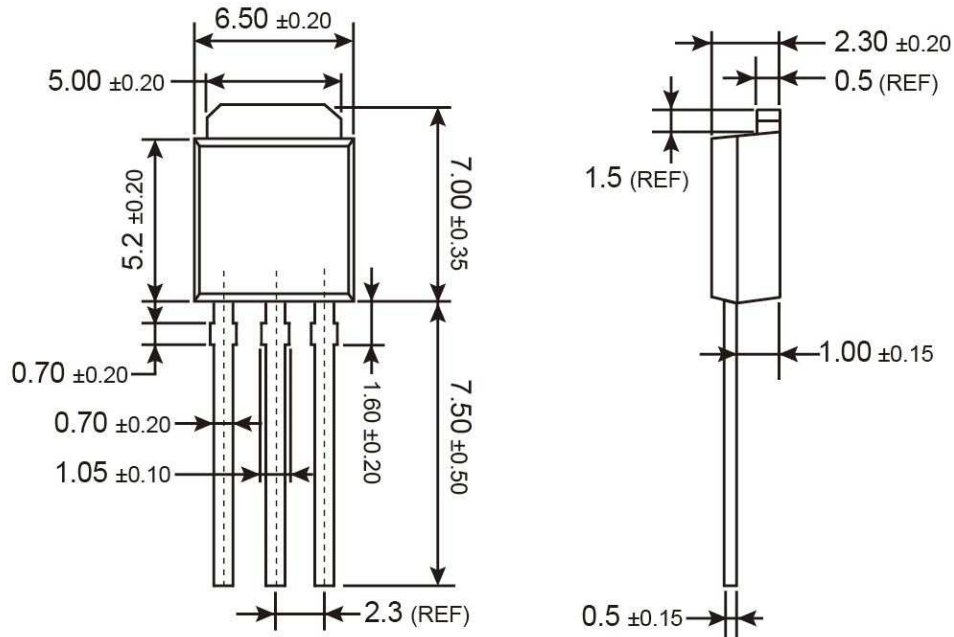


Transient Thermal Impedance



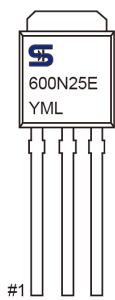


TO-251 Mechanical Drawing



Unit: Millimeters

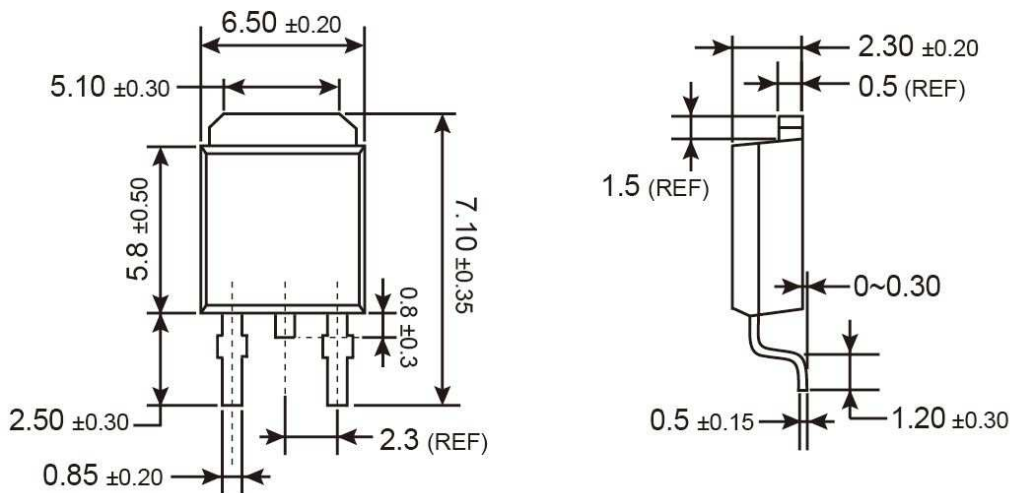
Marking Diagram



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

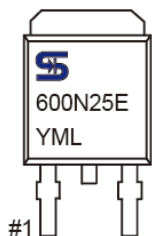


TO-252 Mechanical Drawing



Unit: Millimeters

Marking Diagram



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

Notice

Specifications of the products displayed herein are subject to change without notice. TSC or anyone on its behalf, assumes no responsibility or liability for any errors or inaccuracies.

Information contained herein is intended to provide a product description only. No license, express or implied, to any intellectual property rights is granted by this document. Except as provided in TSC's terms and conditions of sale for such products, TSC assumes no liability whatsoever, and disclaims any express or implied warranty, relating to sale and/or use of TSC products including liability or warranties relating to fitness for a particular purpose, merchantability, or infringement of any patent, copyright, or other intellectual property right.

The products shown herein are not designed for use in medical, life-saving, or life-sustaining applications. Customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify TSC for any damages resulting from such improper use or sale.