

## N-Channel Power MOSFET

1000V, 2.5A, 6Ω

### FEATURES

- 100% avalanche tested
- Advanced planar process
- Compliant to RoHS Directive 2011/65/EU and in accordance to WEEE 2002/96/EC
- Halogen-free according to IEC 61249-2-21

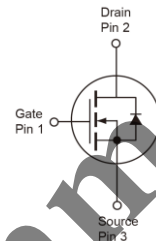
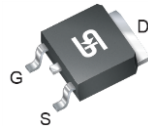
### APPLICATIONS

- AC/DC LED Lighting
- Power Supply
- Power Meter

KEY PERFORMANCE PARAMETERS		
PARAMETER	VALUE	UNIT
$V_{DS}$	1000	V
$R_{DS(on)}$ (max)	6	Ω
$Q_g$	19	nC



TO-252 (DPAK)



Notes: MSL 3 (Moisture Sensitivity Level) per J-STD-020

### ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ unless otherwise noted)

PARAMETER	SYMBOL	Limit	UNIT
Drain-Source Voltage	$V_{DS}$	1000	V
Gate-Source Voltage	$V_{GS}$	±30	V
Continuous Drain Current <sup>(Note 1)</sup>	$I_D$	$T_C = 25^\circ\text{C}$	2.5
		$T_C = 100^\circ\text{C}$	1.57
Pulsed Drain Current <sup>(Note 2)</sup>	$I_{DM}$	10	A
Total Power Dissipation @ $T_C = 25^\circ\text{C}$	$P_{DTOT}$	99	W
Single Pulse Avalanche Energy <sup>(Note 3)</sup>	$E_{AS}$	20	mJ
Single Pulse Avalanche Current <sup>(Note 3)</sup>	$I_{AS}$	1.4	A
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	- 55 to +150	°C

### THERMAL PERFORMANCE

PARAMETER	SYMBOL	Limit	UNIT
Junction to Case Thermal Resistance	$R_{\theta JC}$	1.26	°C/W
Junction to Ambient Thermal Resistance	$R_{\theta JA}$	62	°C/W

**Thermal Performance Note:**  $R_{\theta JA}$  is the sum of the junction-to-case and case-to-ambient thermal resistances. The case-thermal reference is defined at the solder mounting surface of the drain pins.  $R_{\theta JA}$  is guaranteed by design while  $R_{\theta CA}$  is determined by the user's board design.  $R_{\theta JA}$  shown below for single device operation on FR-4 PCB in still air.

<b>ELECTRICAL SPECIFICATIONS</b> ( $T_A = 25^\circ\text{C}$ unless otherwise noted)						
PARAMETER	CONDITIONS	SYMBOL	MIN	TYP	MAX	UNIT
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = 250\mu A$	$BV_{DSS}$	1000	--	--	V
Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\mu A$	$V_{GS(TH)}$	3.5	4.5	5.5	V
Gate Body Leakage	$V_{GS} = \pm 30V, V_{DS} = 0V$	$I_{GSS}$	--	--	$\pm 100$	nA
Zero Gate Voltage Drain Current	$V_{DS} = 1000V, V_{GS} = 0V$	$I_{DSS}$	--	--	1	$\mu A$
Drain-Source On-State Resistance (Note 4)	$V_{GS} = 10V, I_D = 1.25A$	$R_{DS(on)}$	--	5.6	6	$\Omega$
<b>Dynamic</b> (Note 5)						
Total Gate Charge	$V_{DS} = 800V, I_D = 2.5A,$ $V_{GS} = 10V$	$Q_g$	--	19	--	nC
Gate-Source Charge		$Q_{gs}$	--	6	--	
Gate-Drain Charge		$Q_{gd}$	--	10	--	
Input Capacitance	$V_{DS} = 25V, V_{GS} = 0V,$ $f = 1.0\text{MHz}$	$C_{iss}$	--	664	--	pF
Output Capacitance		$C_{oss}$	--	40	--	
Reverse Transfer Capacitance		$C_{rss}$	--	17	--	
Gate Resistance	$f = 1.0\text{MHz}, \text{open drain}$	$R_g$	--	2.2	--	$\Omega$
<b>Switching</b> (Note 6)						
Turn-On Delay Time	$V_{DD} = 500V, R_G = 25\Omega,$ $I_D = 1.25A, V_{GS} = 10V$	$t_{d(on)}$	--	45	--	ns
Turn-On Rise Time		$t_r$	--	25	--	
Turn-Off Delay Time		$t_{d(off)}$	--	70	--	
Turn-Off Fall Time		$t_f$	--	28	--	
<b>Source-Drain Diode</b>						
Forward Voltage (Note 4)	$I_S = 2.5A, V_{GS} = 0V$	$V_{SD}$	--	--	1.4	V
Reverse Recovery Time	$V_R = 100V, I_S = 2.5A$	$t_{rr}$	--	378	--	ns
Reverse Recovery Charge		$di_f/dt = 100A/\mu s$	$Q_{rr}$	--	1.62	--

**Notes:**

1. Current limited by package
2. Pulse width limited by the maximum junction temperature
3.  $L = 20\text{mH}, I_{AS} = 1.4A, V_{DD} = 50V, R_G = 25\Omega$ , Starting  $T_J = 25^\circ\text{C}$
4. Pulse test:  $PW \leq 300\mu s$ , duty cycle  $\leq 2\%$
5. For DESIGN AID ONLY, not subject to production testing.
6. Switching time is essentially independent of operating temperature.

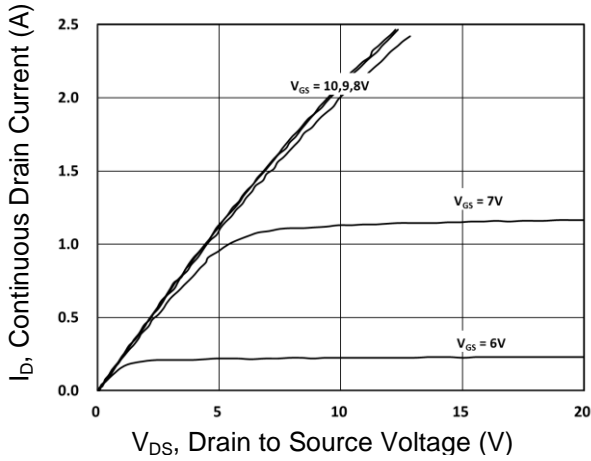
**ORDERING INFORMATION**

PART NO.	PACKAGE	PACKING
TSM3N100CP ROG	TO-252 (DPAK)	2,500pcs / 13" Reel

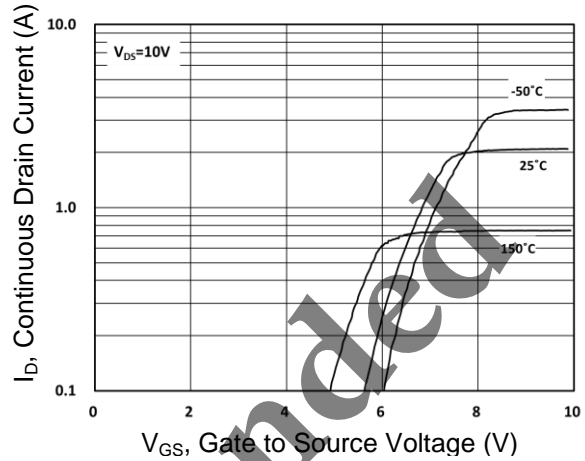
**CHARACTERISTICS CURVES**

( $T_C = 25^\circ\text{C}$  unless otherwise noted)

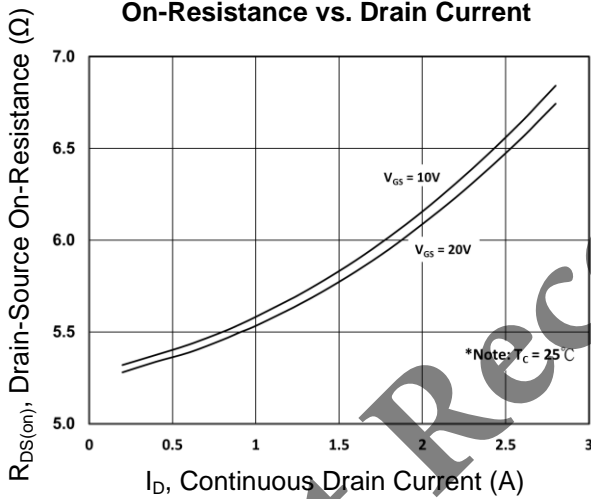
**Output Characteristics**



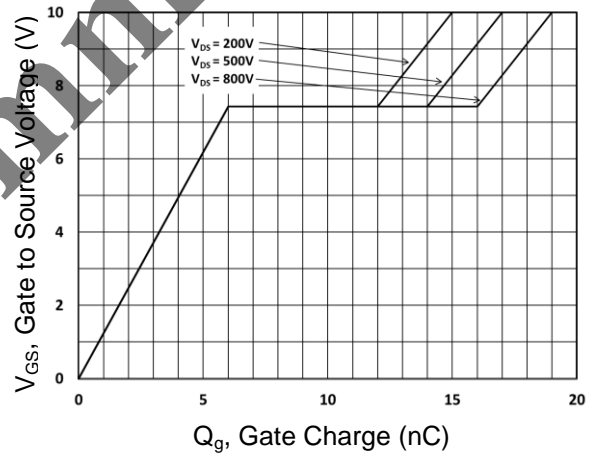
**Transfer Characteristics**



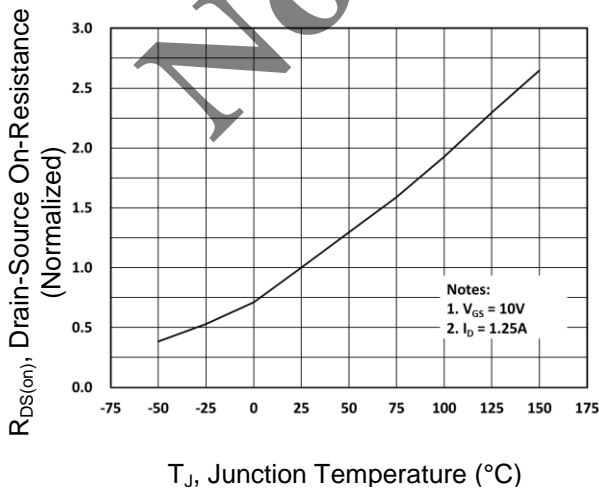
**On-Resistance vs. Drain Current**



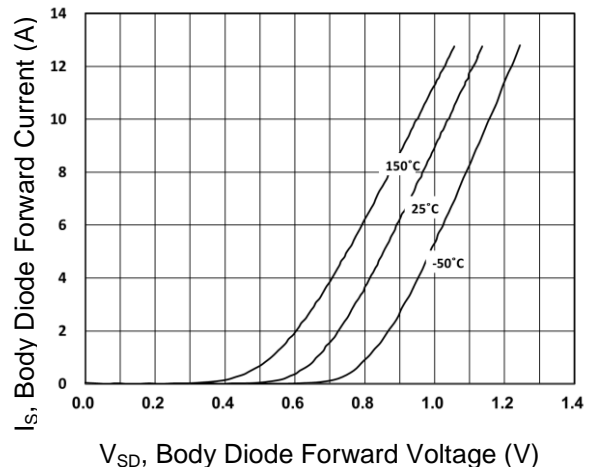
**Gate-Source Voltage vs. Gate Charge**



**On-Resistance vs. Junction Temperature**



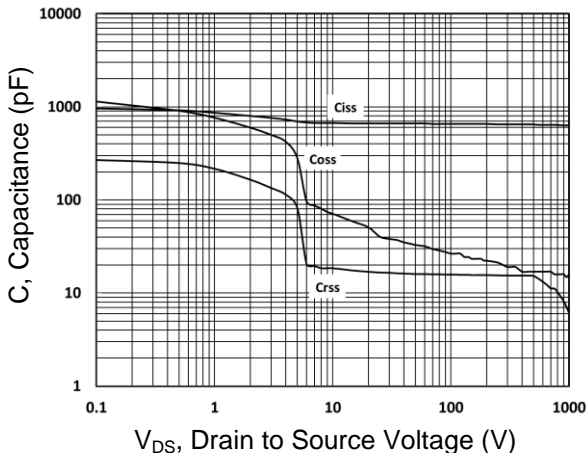
**Source-Drain Diode Forward Current vs. Voltage**



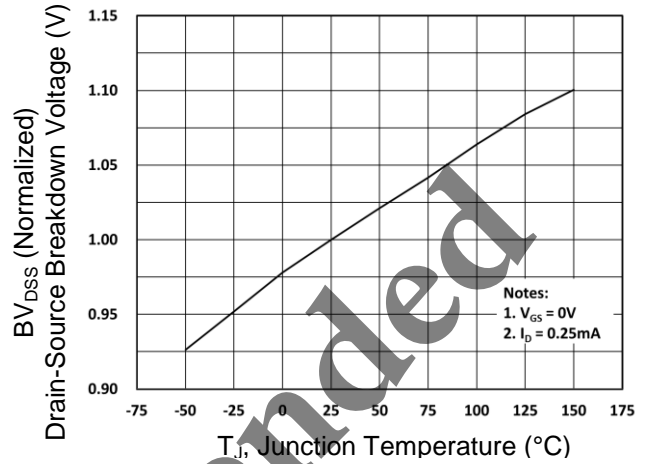
**CHARACTERISTICS CURVES**

( $T_C = 25^\circ\text{C}$  unless otherwise noted)

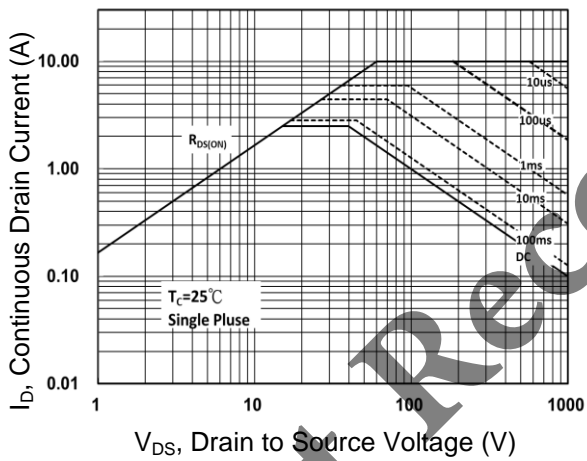
**Capacitance vs. Drain-Source Voltage**



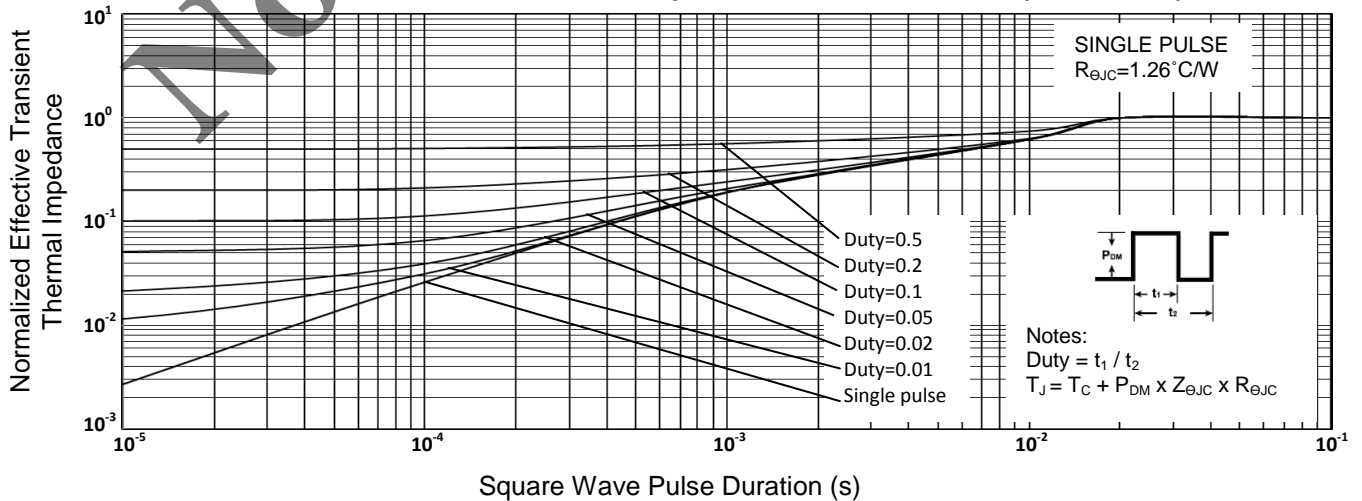
**$BV_{DSS}$  vs. Junction Temperature**



**Maximum Safe Operating Area**

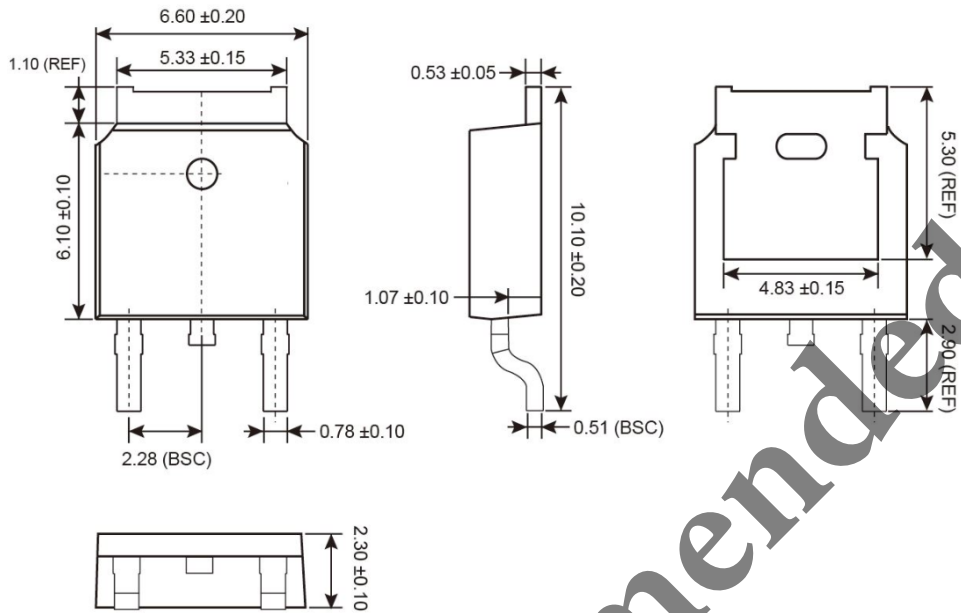


**Normalized Thermal Transient Impedance, Junction-to-Case (DPAK/IPAK)**

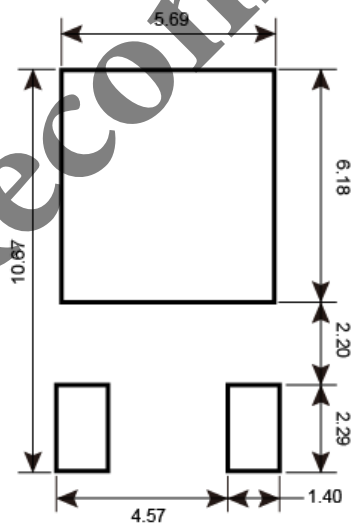


**PACKAGE OUTLINE DIMENSIONS** (Unit: Millimeters)

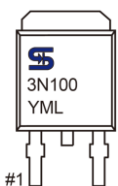
**TO-252**



**SUGGESTED PAD LAYOUT**



**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 (1~9, A~Z)

**Not Recommended**

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