

## N-Channel Power MOSFET

800V, 0.3A, 21.6Ω

### FEATURES

- Advanced planar process
- 100% avalanche tested
- Fast switching

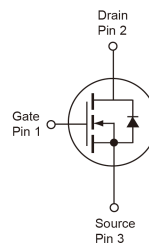
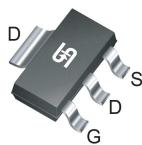
### APPLICATION

- Power Supply
- Lighting

KEY PERFORMANCE PARAMETERS		
PARAMETER	VALUE	UNIT
$V_{DS}$	800	V
$R_{DS(on)}$ (max)	21.6	Ω
$Q_g$	5	nC



**SOT-223**



**Notes:** Moisture sensitivity level: level 3. Per J-STD-020

ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ unless otherwise noted)			
PARAMETER	SYMBOL	LIMIT	UNIT
Drain-Source Voltage	$V_{DS}$	800	V
Gate-Source Voltage	$V_{GS}$	±30	V
Continuous Drain Current	$I_D$	0.3	A
Pulsed Drain Current <sup>(Note 1)</sup>	$I_{DM}$	1	A
Single Pulse Avalanche Energy <sup>(Note 2)</sup>	$E_{AS}$	90	mJ
Avalanche Current, Repetitive or Not-Repetitive <sup>(Note 1)</sup>	$I_{AR}$	1	A
Total Power Dissipation @ $T_C = 25^\circ\text{C}$	$P_{DTOT}$	2.1	W
Operating Junction Temperature	$T_J$	150	°C
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	- 55 to +150	°C

THERMAL PERFORMANCE			
PARAMETER	SYMBOL	LIMIT	UNIT
Junction to Ambient Thermal Resistance	$R_{\theta JA}$	60	°C/W

**Notes:**  $R_{\theta JA}$  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	$V_{GS} = 0\text{V}, I_D = 1\text{mA}$	$BV_{DSS}$	800	--	--	V
Drain-Source On-State Resistance	$V_{GS} = 10\text{V}, I_D = 0.15\text{A}$	$R_{DS(ON)}$	--	18	21.6	$\Omega$
Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$	$V_{GS(TH)}$	3	--	5	V
Zero Gate Voltage Drain Current	$V_{DS} = 800\text{V}, V_{GS} = 0\text{V}$	$I_{DSS}$	--	--	25	$\mu\text{A}$
Gate Body Leakage	$V_{GS} = \pm 30\text{V}, V_{DS} = 0\text{V}$	$I_{GSS}$	--	--	$\pm 10$	$\mu\text{A}$
Forward Transconductance	$V_{DS} = 40\text{V}, I_D = 0.1\text{A}$	$g_{fs}$	--	0.36	--	S
Diode Forward Voltage	$I_S = 0.2\text{A}, V_{GS} = 0\text{V}$	$V_{SD}$	--	--	1.4	V
<b>Dynamic</b> (Note 3)						
Total Gate Charge	$V_{DS} = 640\text{V}, I_D = 0.3\text{A},$ $V_{GS} = 10\text{V}$	$Q_g$	--	5	6	nC
Gate-Source Charge		$Q_{gs}$	--	1	--	
Gate-Drain Charge		$Q_{gd}$	--	2	--	
Input Capacitance	$V_{DS} = 25\text{V}, V_{GS} = 0\text{V},$ $f = 1.0\text{MHz}$	$C_{iss}$	--	155	200	pF
Output Capacitance		$C_{oss}$	--	20	26	
Reverse Transfer Capacitance		$C_{rss}$	--	2.7	4	
<b>Switching</b> (Note 4)						
Turn-On Delay Time	$V_{GS} = 10\text{V}, I_D = 0.3\text{A},$ $V_{DS} = 400\text{V}, R_G = 25\Omega$	$t_{d(on)}$	--	10	30	ns
Turn-On Rise Time		$t_r$	--	20	50	
Turn-Off Delay Time		$t_{d(off)}$	--	16	45	
Turn-Off Fall Time		$t_f$	--	25	60	

**Note:**

1. Pulse test: pulse width  $\leq 300\mu\text{s}$ , duty cycle  $\leq 2\%$
2. ( $V_{DD} = 50\text{V}, I_{AS} = 0.8\text{A}, L = 170\text{mH}, R_G = 25\Omega$ )
3. For design reference only, not subject to production testing.
4. Switching time is essentially independent of operating temperature.

**ORDERING INFORMATION**

<b>PART NO.</b>	<b>PACKAGE</b>	<b>PACKING</b>
TSM1N80CW RPG	SOT-223	2,500pcs / 13" Reel

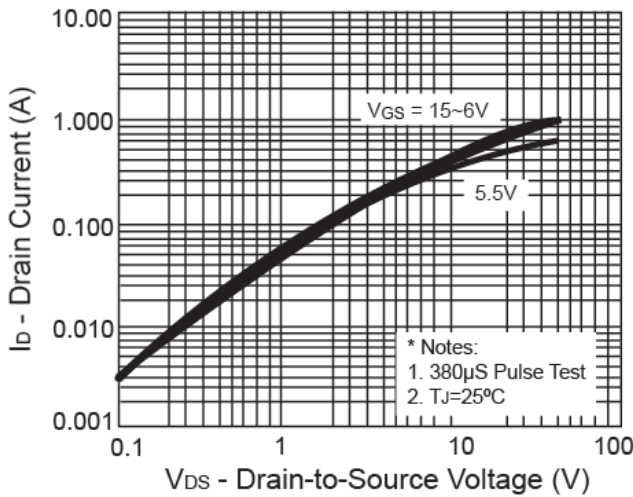
**Note:**

1. Compliant to RoHS Directive 2011/65/EU and in accordance to WEEE 2002/96/EC
2. Halogen-free according to IEC 61249-2-21 definition

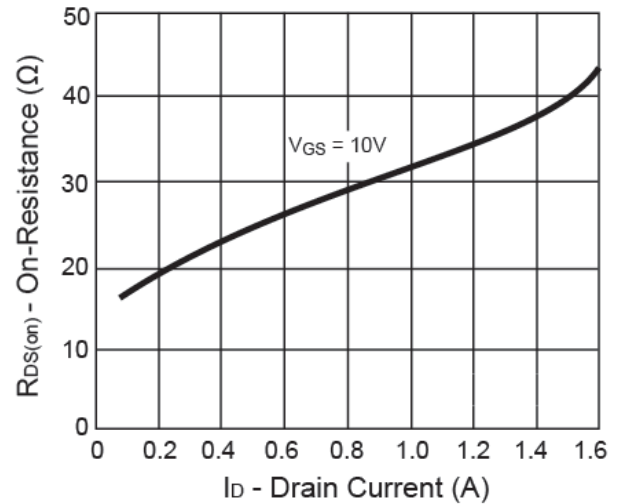
**CHARACTERISTICS CURVES**

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

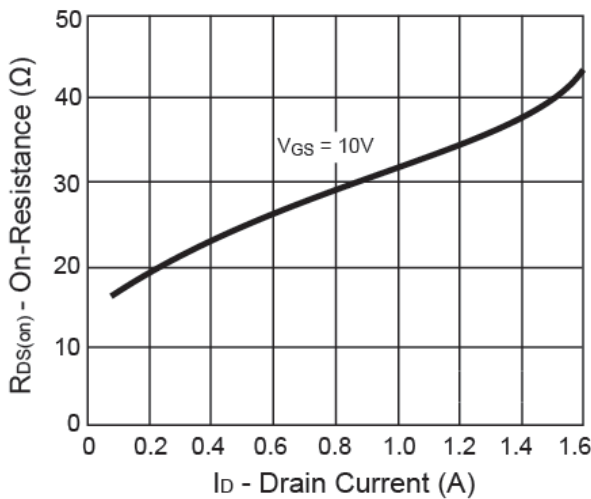
**Output Characteristics**



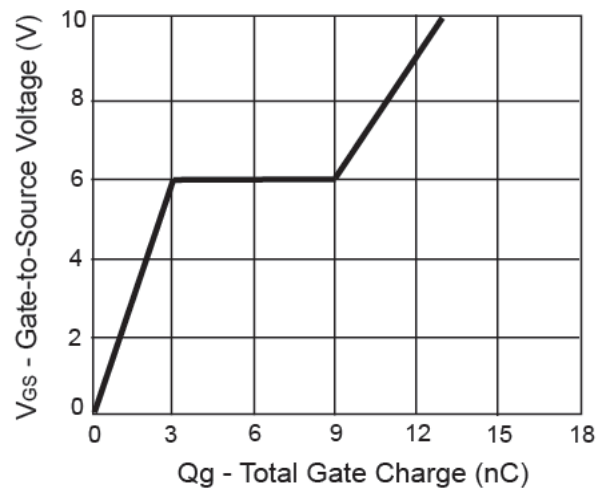
**Transfer Characteristics**



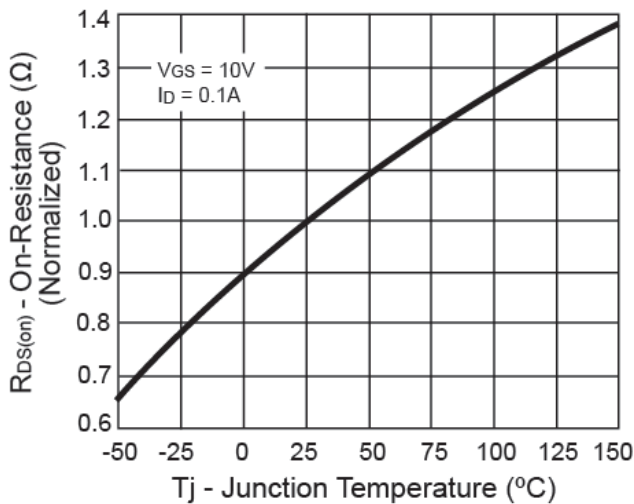
**On-Resistance vs. Drain Current**



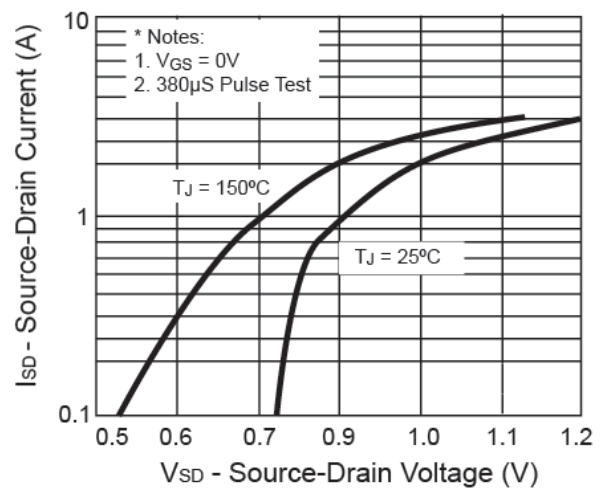
**Gate Charge**



**On-Resistance vs. Junction Temperature**



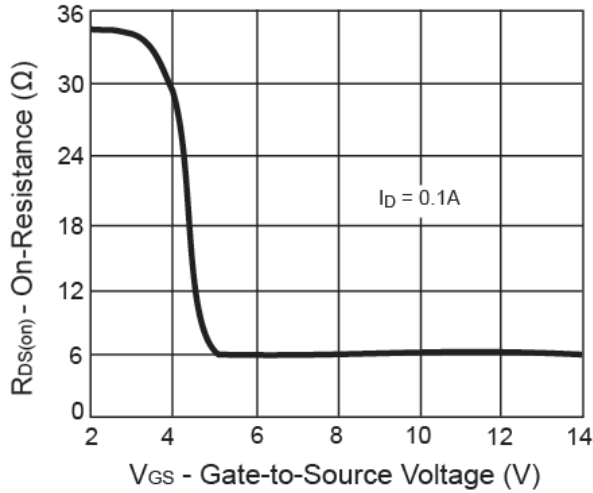
**Source-Drain Diode Forward Voltage**



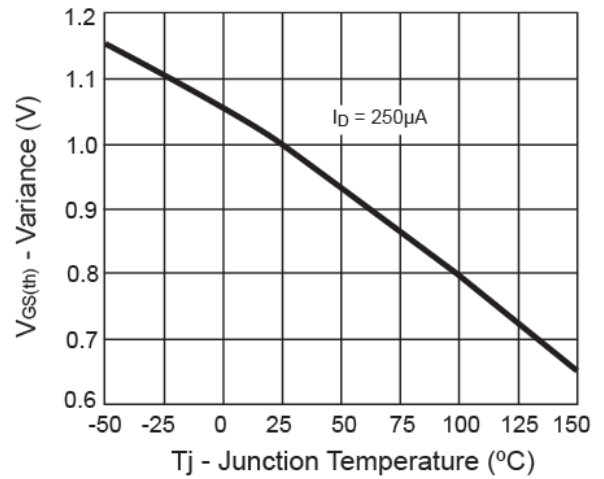
**CHARACTERISTICS CURVES**

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

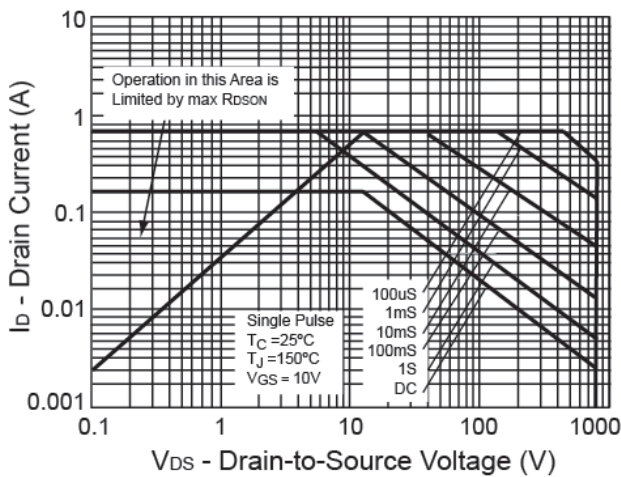
**On-Resistance vs. Gate-Source Voltage**



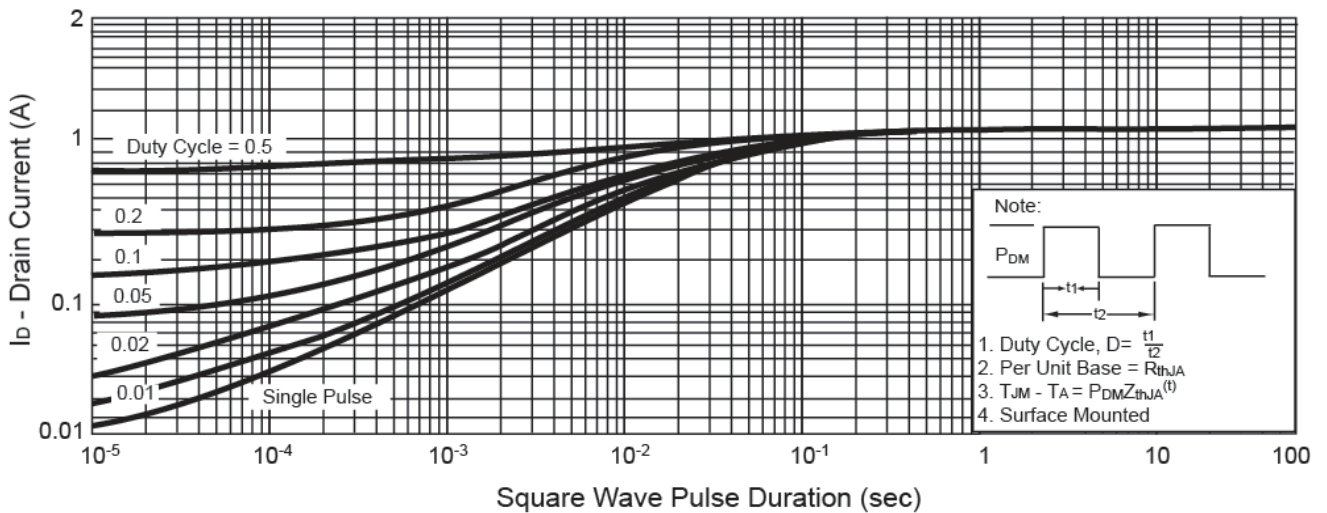
**Threshold Voltage**



**Maximum Safe Operating Area**

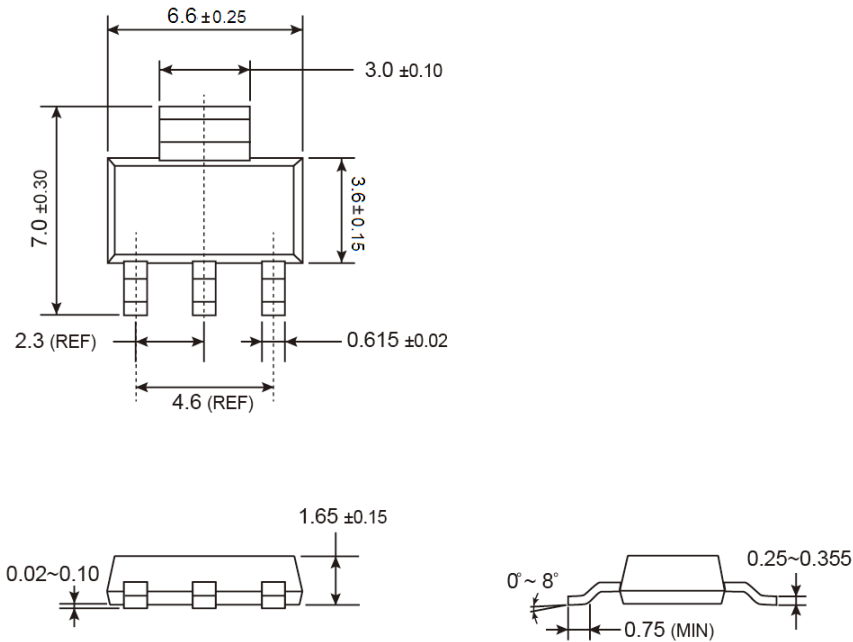


**Normalized Thermal Transient Impedance, Junction-to-Ambient**

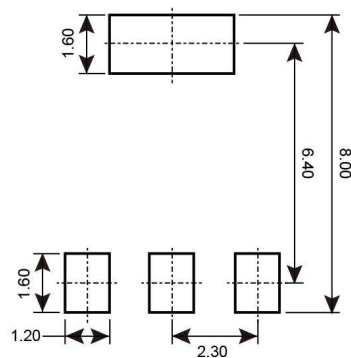


**PACKAGE OUTLINE DIMENSIONS** (Unit: Millimeters)

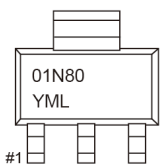
**SOT-223**



**SUGGESTED PAD LAYOUT** (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 (1~9, A~Z)

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