



THE DATASHEET OF TSM1N80CW RPG



N-Channel Power MOSFET

800V, 0.3A, 21.6Ω

FEATURES

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

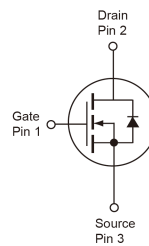
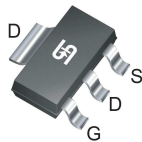
APPLICATION

- 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 ^(Note 1)	I_{DM}	1	A
Single Pulse Avalanche Energy ^(Note 2)	E_{AS}	90	mJ
Avalanche Current, Repetitive or Not-Repetitive ^(Note 1)	I_{AR}	1	A
Total Power Dissipation @ $T_C = 25^\circ\text{C}$	P_{DTOT}	2.1	W
Operating Junction Temperature	T_J	150	$^\circ\text{C}$
Operating Junction and Storage Temperature Range	T_J, T_{STG}	- 55 to +150	$^\circ\text{C}$

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

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

ELECTRICAL SPECIFICATIONS ($T_A = 25^\circ\text{C}$ unless otherwise noted)						
PARAMETER	CONDITIONS	SYMBOL	MIN	TYP	MAX	UNIT
Static						
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	Ω
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	μA
Gate Body Leakage	$V_{GS} = \pm 30\text{V}, V_{DS} = 0\text{V}$	I_{GSS}	--	--	± 10	μA
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
Dynamic (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	
Switching (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

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

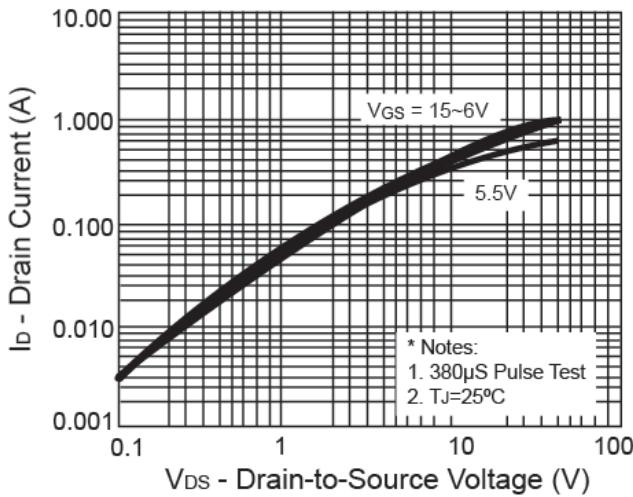
Note:

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

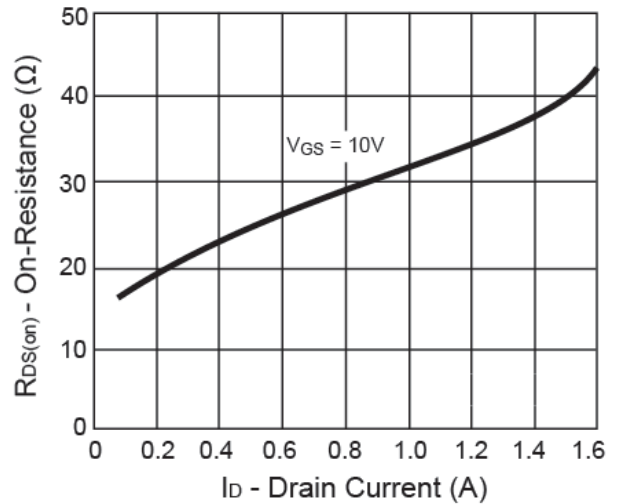
CHARACTERISTICS CURVES

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

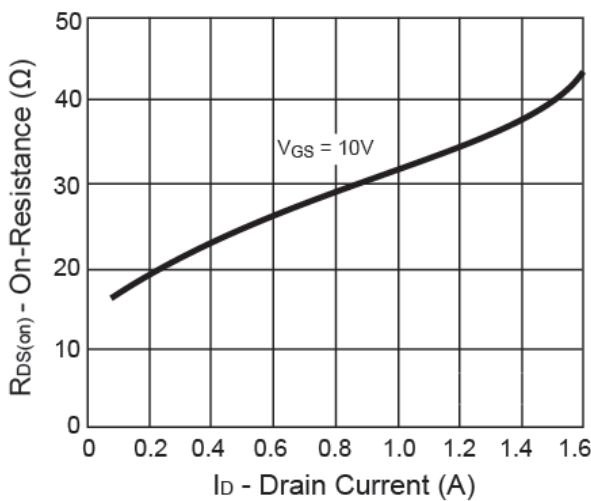
Output Characteristics



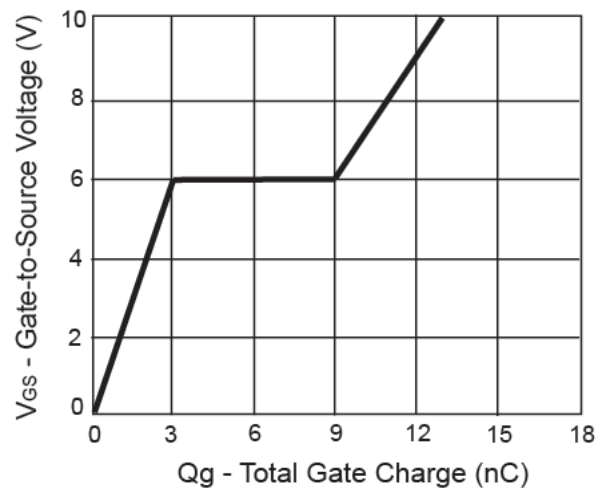
Transfer Characteristics



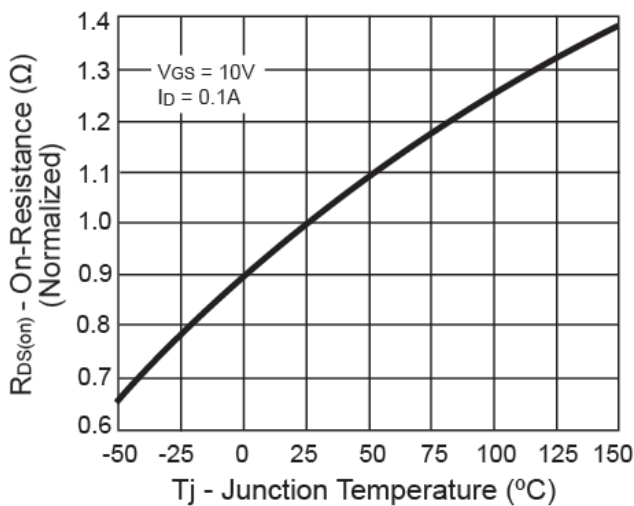
On-Resistance vs. Drain Current



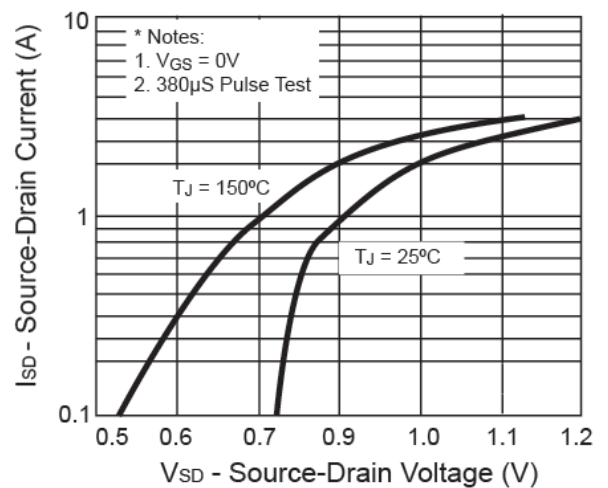
Gate Charge



On-Resistance vs. Junction Temperature



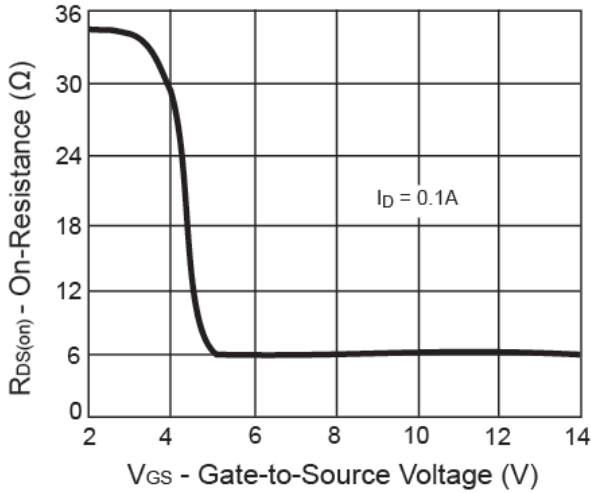
Source-Drain Diode Forward Voltage



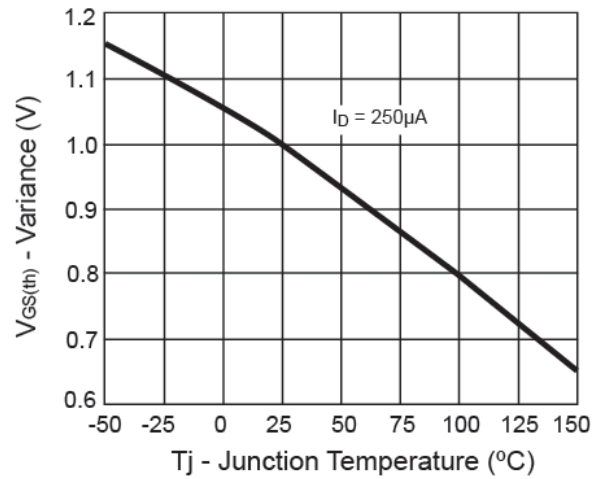
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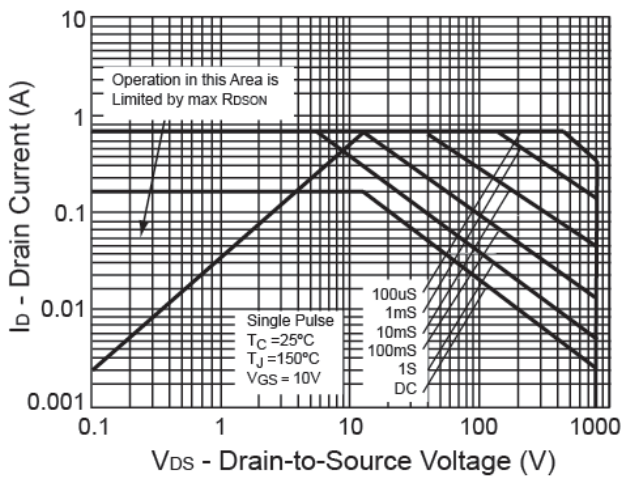
On-Resistance vs. Gate-Source Voltage



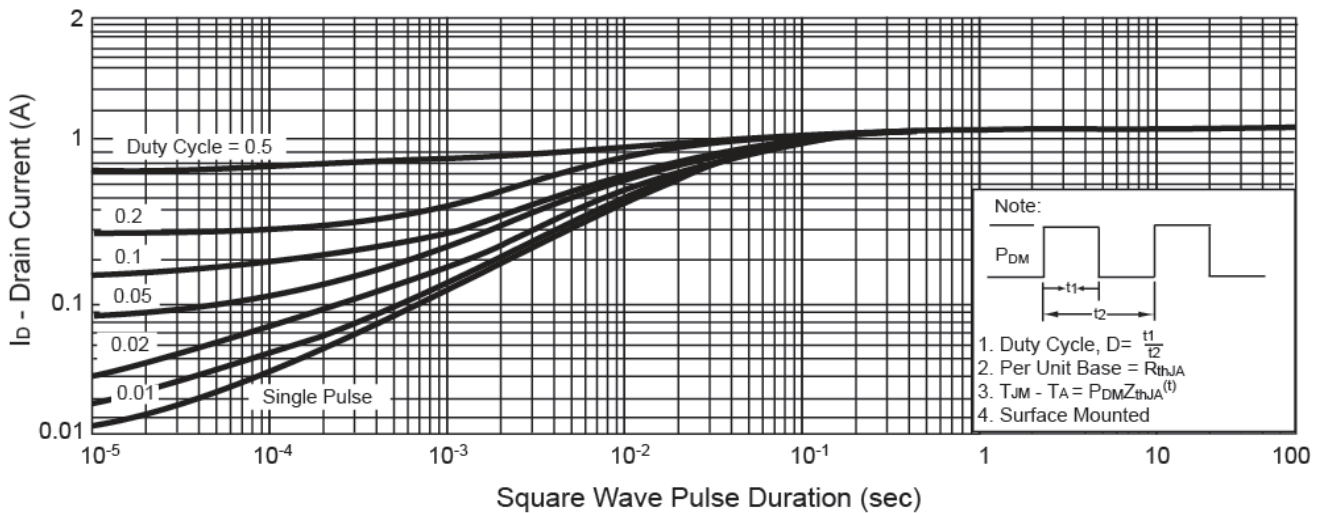
Threshold Voltage



Maximum Safe Operating Area

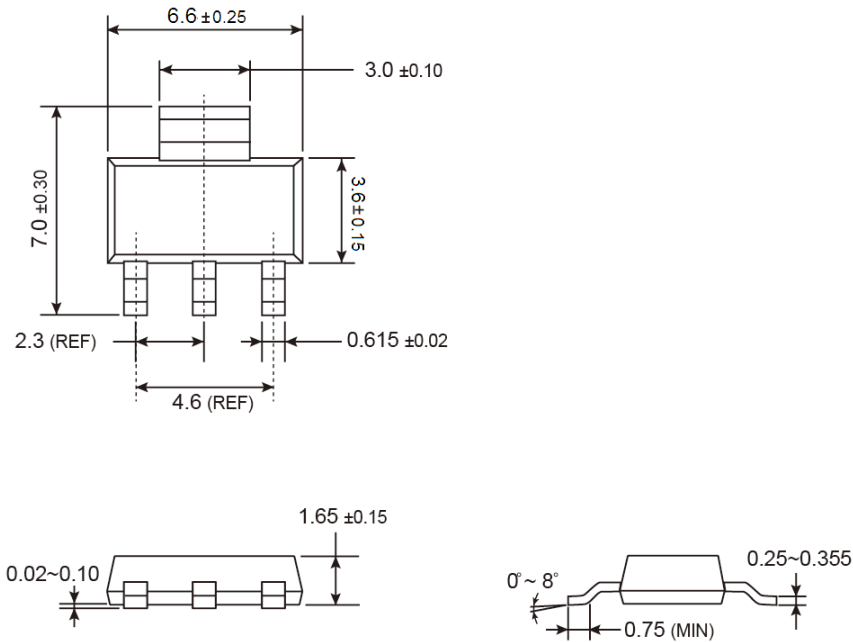


Normalized Thermal Transient Impedance, Junction-to-Ambient

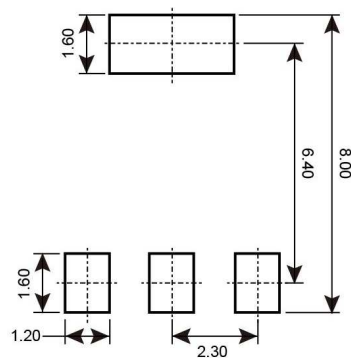


PACKAGE OUTLINE DIMENSIONS (Unit: Millimeters)

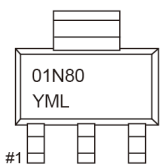
SOT-223



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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