



**THE DATASHEET OF  
TSM080N03PQ56 RLG**



## N-Channel Power MOSFET

30V, 73A, 8mΩ

### FEATURES

- Low  $R_{DS(on)}$  to minimize conductive Losses
- Low gate charge for fast power switching
- 100% UIS and  $R_g$  tested
- Compliant to RoHS Directive 2011/65/EU and in accordance to WEEE 2002/96/EC
- Halogen-free according to IEC 61249-2-21 definition

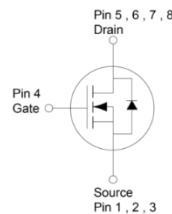
PRODUCT SUMMARY			
PARAMETER	VALUE	UNIT	
$V_{DS}$	30	V	
$R_{DS(on)}$ (max)	$V_{GS} = 10V$	8	mΩ
	$V_{GS} = 4.5V$	12.5	
$Q_g$	7.2	nC	

### APPLICATIONS

- DC-DC Converters
- Battery Power Management
- ORing FET/Load Switch



PDFN56



Notes: MSL 1 (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	$V_{DS}$	30	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current (Note 1)	$I_D$	$T_C = 25^\circ\text{C}$	73
		$T_A = 25^\circ\text{C}$	14
Pulsed Drain Current (Note 1)	$I_{DM}$	292	A
Single Pulse Avalanche Current (Note 2)	$I_{AS}$	23	A
Single Pulse Avalanche Energy (Note 2)	$E_{AS}$	26	mJ
Total Power Dissipation	$P_D$	$T_C = 25^\circ\text{C}$	69
		$T_C = 125^\circ\text{C}$	14
Total Power Dissipation	$P_D$	$T_A = 25^\circ\text{C}$	2.6
		$T_A = 125^\circ\text{C}$	0.5
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	- 55 to +150	$^\circ\text{C}$

THERMAL RESISTANCE			
PARAMETER	SYMBOL	LIMIT	UNIT
Thermal Resistance – Junction to Case	$R_{\theta JC}$	1.8	$^\circ\text{C/W}$
Thermal Resistance – Junction to Ambient	$R_{\theta JA}$	48	$^\circ\text{C/W}$

**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.

<b>ELECTRICAL CHARACTERISTICS</b> ( $T_A = 25^\circ\text{C}$ unless otherwise noted)						
<b>PARAMETER</b>	<b>CONDITIONS</b>	<b>SYMBOL</b>	<b>MIN.</b>	<b>TYP.</b>	<b>MAX.</b>	<b>UNIT</b>
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{GS} = 0\text{V}, I_D = 250\mu\text{A}$	$BV_{DSS}$	30	--	--	V
Gate Threshold Voltage	$V_{GS} = V_{DS}, I_D = 250\mu\text{A}$	$V_{GS(TH)}$	1	1.6	2.5	V
Gate-Source Leakage Current	$V_{GS} = \pm 20\text{V}, V_{DS} = 0\text{V}$	$I_{GSS}$	--	--	$\pm 100$	nA
Drain-Source Leakage Current	$V_{GS} = 0\text{V}, V_{DS} = 30\text{V}$	$I_{DSS}$	--	--	1	$\mu\text{A}$
Drain-Source On-State Resistance (Note 3)	$V_{GS} = 10\text{V}, I_D = 14\text{A}$	$R_{DS(on)}$	--	6.5	8	m $\Omega$
	$V_{GS} = 4.5\text{V}, I_D = 14\text{A}$		--	9.5	12.5	
Forward Transconductance (Note 3)	$V_{DS} = 5\text{V}, I_D = 14\text{A}$	$g_{fs}$	--	30	--	S
<b>Dynamic</b> (Note 4)						
Total Gate Charge	$V_{GS} = 10\text{V}, V_{DS} = 15\text{V}, I_D = 14\text{A}$	$Q_g$	--	14.4	--	nC
Total Gate Charge	$V_{GS} = 4.5\text{V}, V_{DS} = 15\text{V}, I_D = 14\text{A}$	$Q_g$	--	7.2	--	
Gate-Source Charge		$Q_{gs}$	--	2.6	--	
Gate-Drain Charge		$Q_{gd}$	--	3.3	--	
Input Capacitance	$V_{GS} = 0\text{V}, V_{DS} = 15\text{V}, f = 1.0\text{MHz}$	$C_{iss}$	--	843	--	pF
Output Capacitance		$C_{oss}$	--	157	--	
Reverse Transfer Capacitance		$C_{rss}$	--	95	--	
Gate Resistance	$f = 1.0\text{MHz}, \text{open drain}$	$R_g$	0.9	3	6	$\Omega$
<b>Switching</b> (Note 4)						
Turn-On Delay Time	$V_{GS} = 10\text{V}, V_{DS} = 15\text{V}, I_D = 14\text{A}, R_G = 3.3\Omega$	$t_{d(on)}$	--	4.8	--	ns
Rise Time		$t_r$	--	12.5	--	
Turn-Off Delay Time		$t_{d(off)}$	--	27.6	--	
Fall Time		$t_f$	--	8.2	--	
<b>Source-Drain Diode</b>						
Diode Forward Voltage (Note 3)	$V_{GS} = 0\text{V}, I_S = 15\text{A}$	$V_{SD}$	--	--	1	V
Reverse Recovery Time	$I_S = 14\text{A}, di/dt = 100\text{A}/\mu\text{s}$	$t_{rr}$	--	16	--	ns
Reverse Recovery Charge		$Q_{rr}$	--	8.3	--	nC

**Notes:**

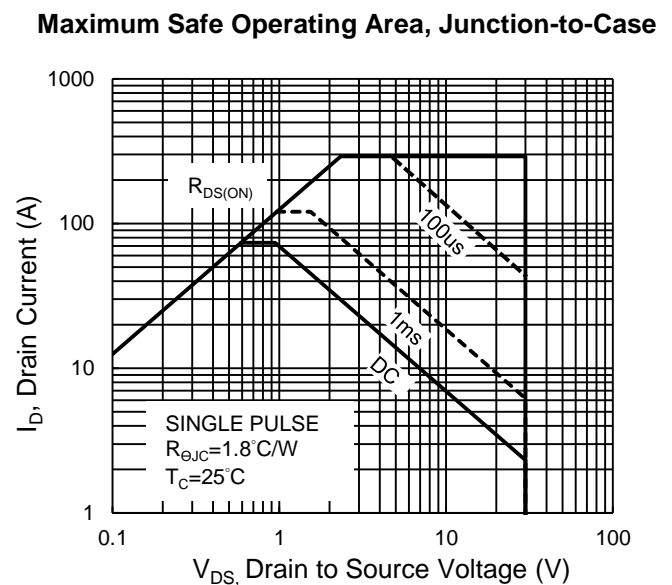
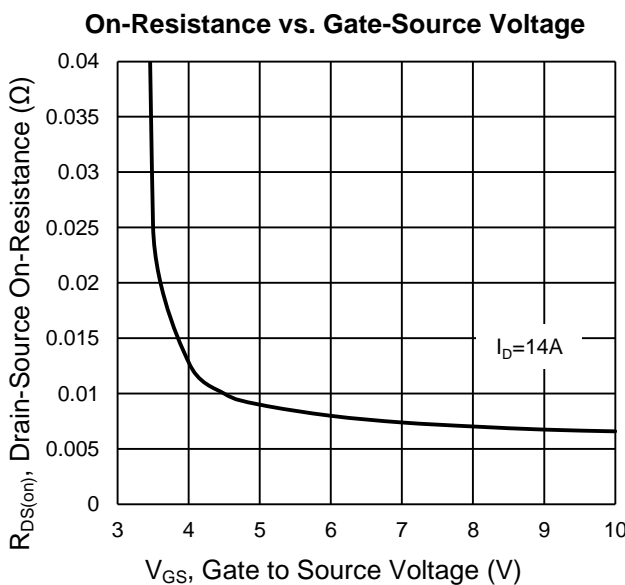
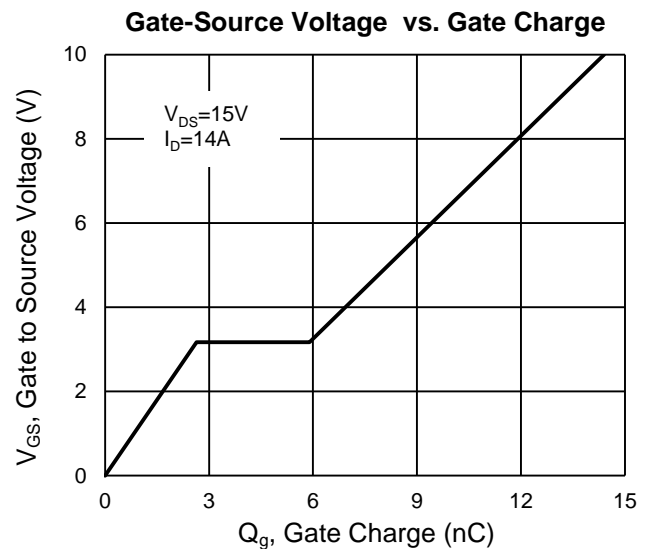
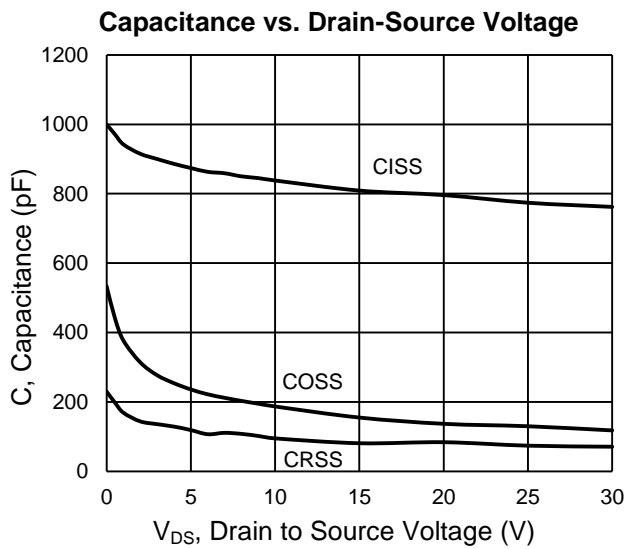
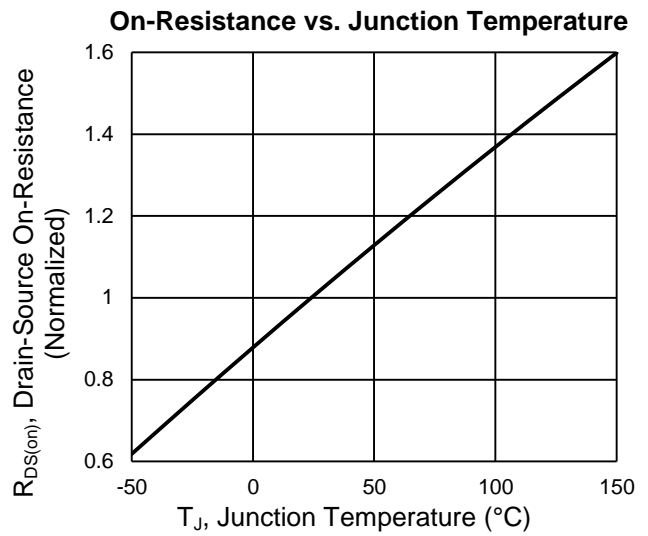
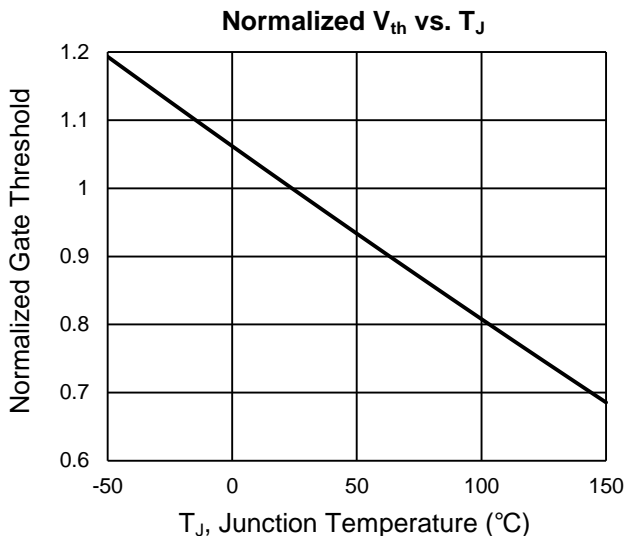
1. Current limited by package.
2.  $L = 0.1\text{mH}, V_{GS} = 10\text{V}, V_{DS} = 25\text{V}, R_G = 25\Omega, I_{AS} = 23\text{A}$ , Starting  $T_J = 25^\circ\text{C}$
3. Pulse test: Pulse Width  $\leq 300\mu\text{s}$ , duty cycle  $\leq 2\%$ .
4. Switching time is essentially independent of operating temperature.

**ORDERING INFORMATION**

<b>PART NO.</b>	<b>PACKAGE</b>	<b>PACKING</b>
TSM080N03PQ56 RLG	PDFN56	2,500pcs / 13" Reel

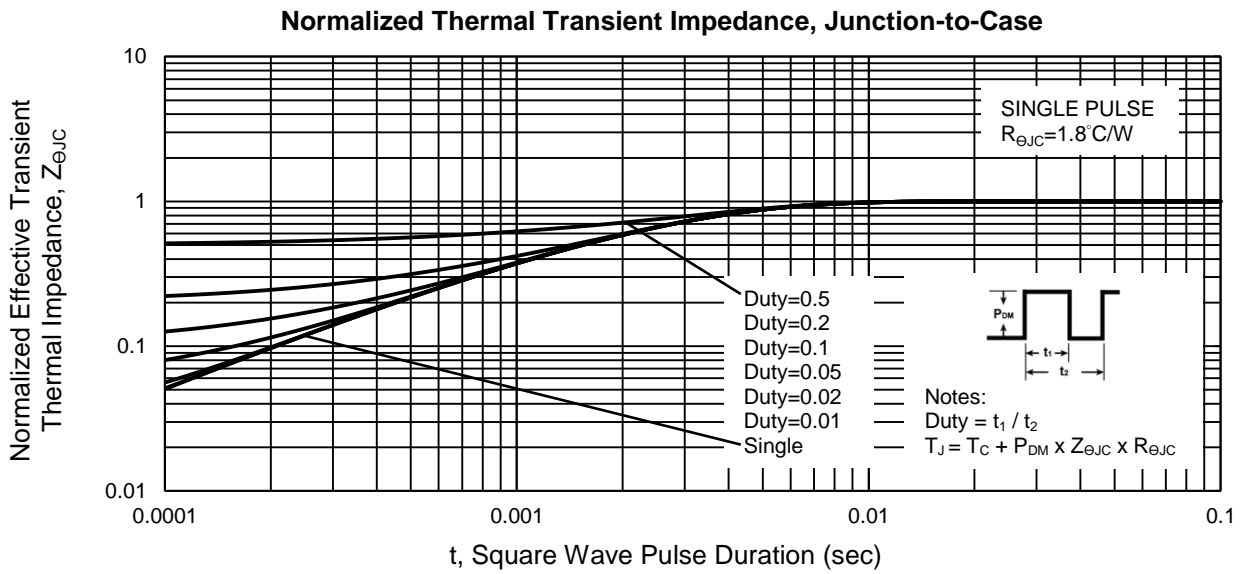
**CHARACTERISTICS CURVES**

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



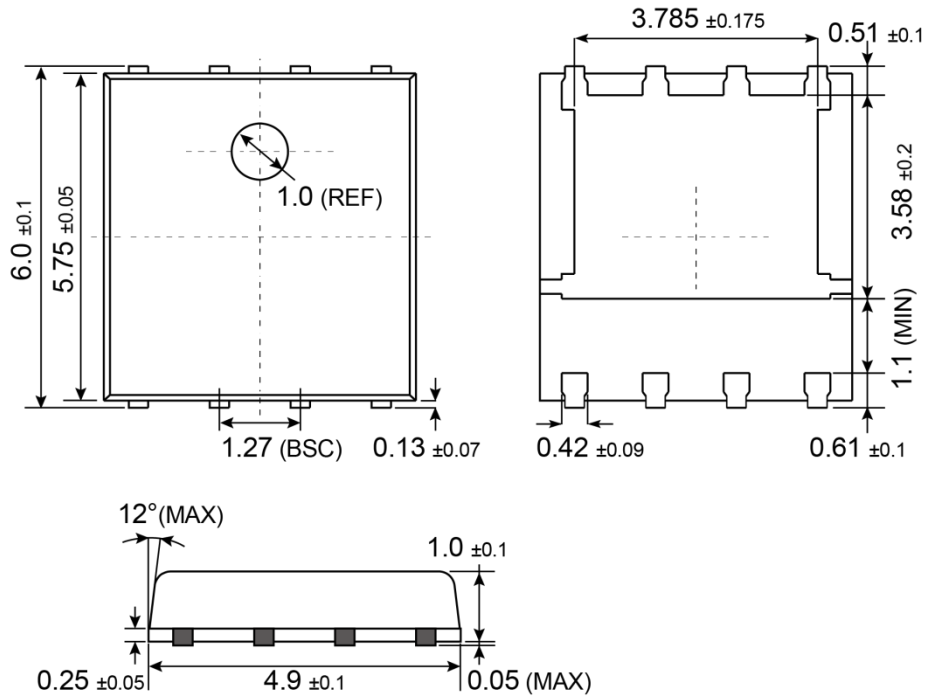
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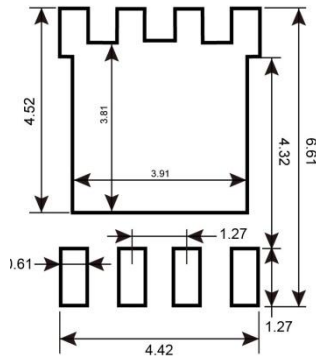


**PACKAGE OUTLINE DIMENSIONS** (Unit: Millimeters)

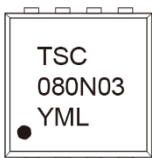
PDFN56



**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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