



Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!



## Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832

Email & Skype: info@chipsmall.com Web: www.chipsmall.com

Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China



# TSM042N03CS

## 30V N-Channel Power MOSFET



**Pin Definition:**

1. Source	8. Drain
2. Source	7. Drain
3. Source	6. Drain
4. Gate	5. Drain

### Key Parameter Performance

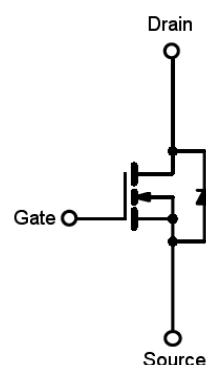
Parameter	Value	Unit
$V_{DS}$	30	V
$R_{DS(on)}$ (max)	$V_{GS} = 10V$	4.2
	$V_{GS} = 4.5V$	6
$Q_g$	24	nC

### Ordering Information

Part No.	Package	Packing
TSM042N03CS RLG	SOP-8	2.5kps / 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 ( $T_C=25^{\circ}C$ 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	$I_D$	$T_C=25^{\circ}C$	30
		$T_C=100^{\circ}C$	19
Pulsed Drain Current <sup>(Note 1)</sup>	$I_{DM}$	120	A
Single Pulse Avalanche Energy <sup>(Note 2)</sup>	$E_{AS}$	125	mJ
Single Pulse Avalanche Current <sup>(Note 2)</sup>	$I_{AS}$	50	A
Power Dissipation @ $T_C = 25^{\circ}C$	$P_D$	7	W
Operating Junction Temperature	$T_J$	175	$^{\circ}C$
Storage Temperature Range	$T_{STG}$	-55 to +175	$^{\circ}C$

### Thermal Performance

Parameter	Symbol	Limit	Unit
Thermal Resistance - Junction to Ambient	$R_{\theta JA}$	62	$^{\circ}C/W$

### Electrical Specifications (T<sub>J</sub>=25°C unless otherwise noted)

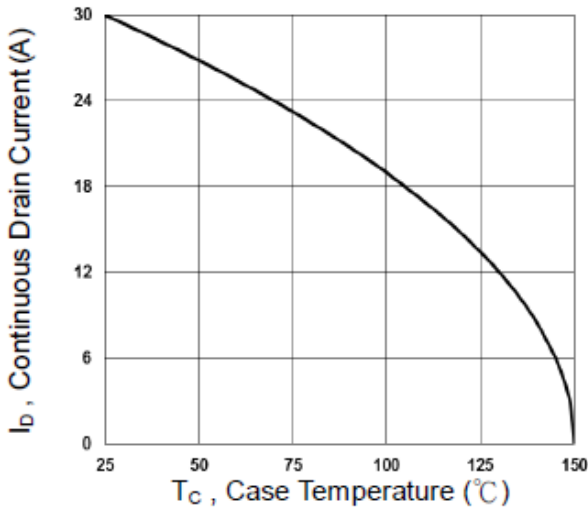
Parameter	Conditions	Symbol	Min	Typ	Max	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA	BV <sub>DSS</sub>	30	--	--	V
Drain-Source On-State Resistance	V <sub>GS</sub> = 10V, I <sub>D</sub> = 12A	R <sub>DS(ON)</sub>	--	3.8	4.2	mΩ
	V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 6A		--	5.2	6	
Gate Threshold Voltage	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA	V <sub>GS(TH)</sub>	1.2	1.6	2.5	V
Zero Gate Voltage Drain Current	V <sub>DS</sub> = 30V, V <sub>GS</sub> = 0V	I <sub>DSS</sub>	--	--	1	μA
	V <sub>DS</sub> = 24V, T <sub>J</sub> = 125°C		--	--	10	
Gate Body Leakage	V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V	I <sub>GSS</sub>	--	--	±100	nA
Forward Transconductance <sup>(Note 3)</sup>	V <sub>DS</sub> = 10V, I <sub>D</sub> = 6A	g <sub>fs</sub>	--	12	--	S
<b>Dynamic</b>						
Total Gate Charge <sup>(Note 3,4)</sup>	V <sub>DS</sub> = 15V, I <sub>D</sub> = 12A, V <sub>GS</sub> = 4.5V	Q <sub>g</sub>	--	24	--	nC
Gate-Source Charge <sup>(Note 3,4)</sup>		Q <sub>gs</sub>	--	4.2	--	
Gate-Drain Charge <sup>(Note 3,4)</sup>		Q <sub>gd</sub>	--	13	--	
Input Capacitance	V <sub>DS</sub> = 25V, V <sub>GS</sub> = 0V, f = 1.0MHz	C <sub>iss</sub>	--	2200	--	pF
Output Capacitance		C <sub>oss</sub>	--	280	--	
Reverse Transfer Capacitance		C <sub>rss</sub>	--	177	--	
<b>Switching</b>						
Turn-On Delay Time <sup>(Note 3,4)</sup>	V <sub>DD</sub> = 15V, I <sub>D</sub> = 15A, V <sub>GS</sub> = 10V, R <sub>GEN</sub> = 3.3Ω	t <sub>d(on)</sub>	--	12.6	--	ns
Turn-On Rise Time <sup>(Note 3,4)</sup>		t <sub>r</sub>	--	19.5	--	
Turn-Off Delay Time <sup>(Note 3,4)</sup>		t <sub>d(off)</sub>	--	42.8	--	
Turn-Off Fall Time <sup>(Note 3,4)</sup>		t <sub>f</sub>	--	13.2	--	
<b>Source-Drain Diode Ratings and Characteristic</b>						
Maximum Continuous Drain-Source Diode Forward Current	Integral reverse diode in the MOSFET	I <sub>S</sub>	--	--	30	A
Maximum Pulse Drain-Source Diode Forward Current		I <sub>SM</sub>	--	--	120	A
Diode Forward Voltage	V <sub>GS</sub> = 0V, I <sub>S</sub> = 1A	V <sub>SD</sub>	--	--	1	V

#### Note:

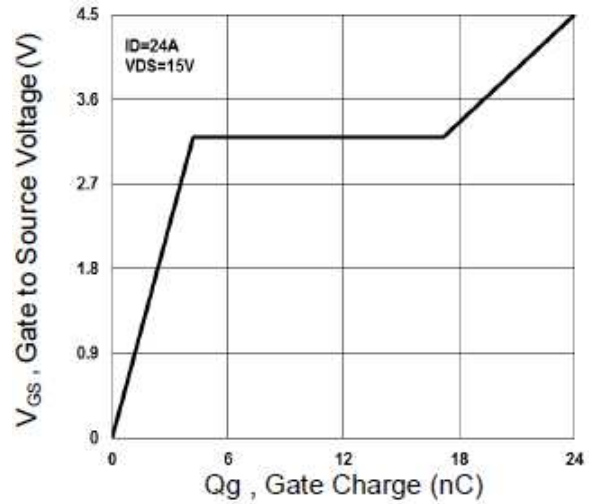
1. Pulse width limited by safe operating area
2. L=0.1mH, I<sub>AS</sub> =50A, V<sub>DD</sub> = 25V, R<sub>G</sub> = 25Ω, Starting T<sub>J</sub> = 25°C
3. Pulse test: pulse width ≤300μs, duty cycle ≤2%
4. Switching time is essentially independent of operating temperature.

### Electrical Characteristics Curve

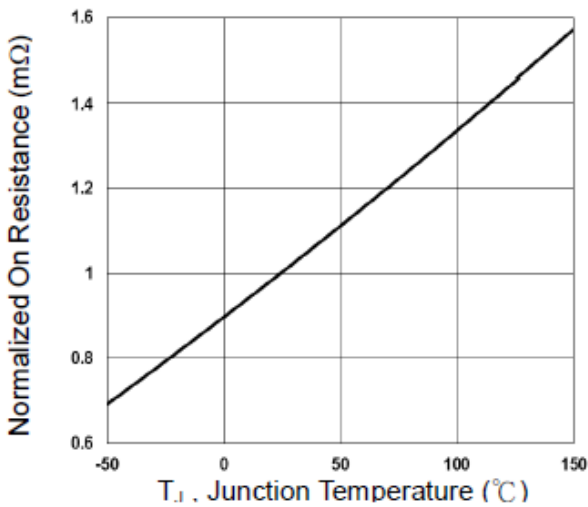
**Continuous Drain Current vs.  $T_C$**



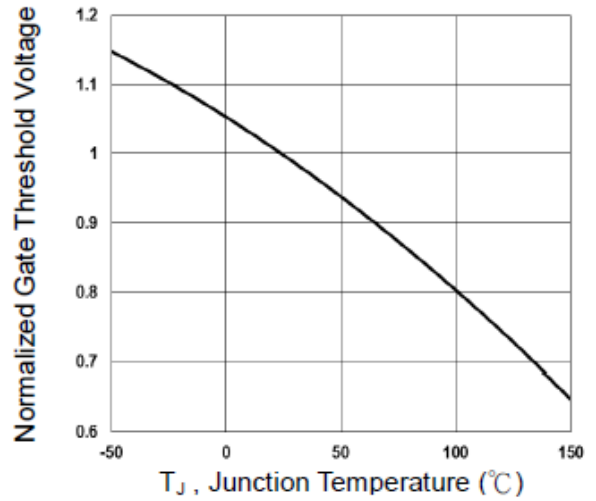
**Gate Charge**



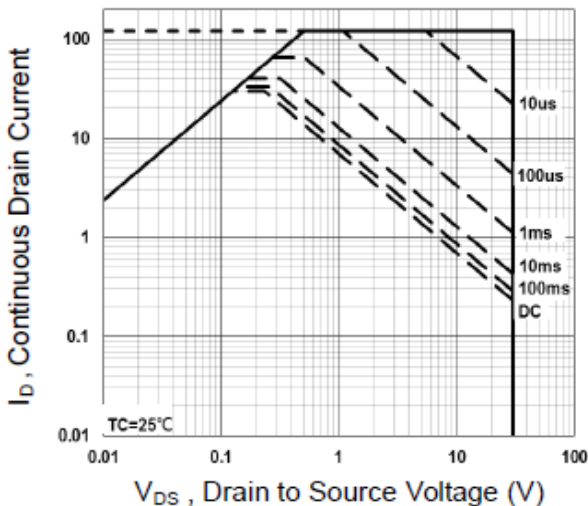
**On-Resistance vs. Junction Temperature**



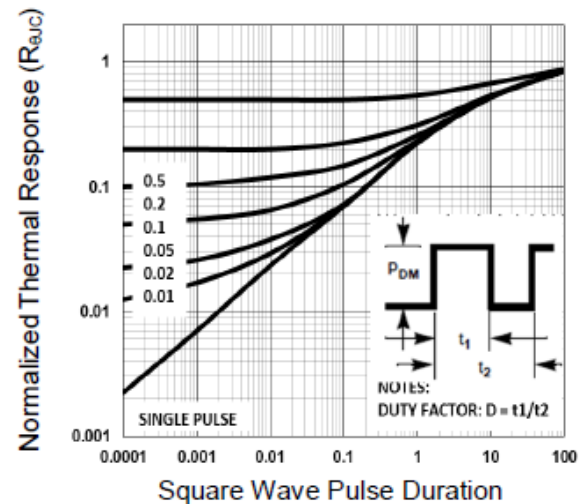
**Threshold Voltage vs. Junction Temperature**



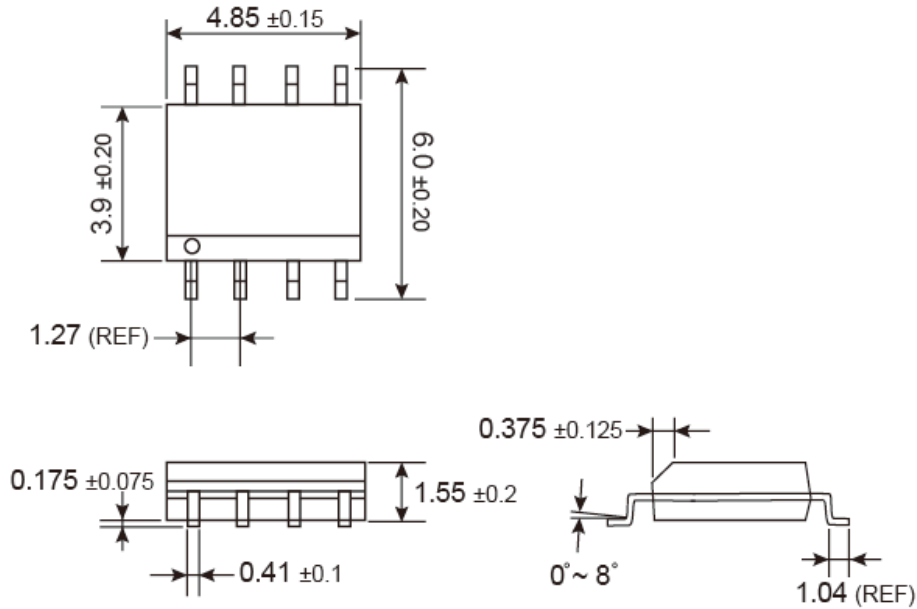
**Maximum Safe Operating Area**



**Normalized Thermal Transient Impedance Curve**

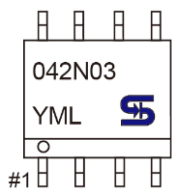


### SOP-8 Mechanical Drawing



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

# TSM042N03CS

## 30V N-Channel Power MOSFET

### 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.