![Chipsmall logo]

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.

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TSM250N02CX

20V N-Channel Power MOSFET

SOT-23

Pin Definition:
1. Gate
2. Source
3. Drain

Key Parameter Performance

Parameter		Value	Unit
V_{DS}		20	V
$R_{DS(on)}$ (max)	V_{GS} = 4.5V	25	m|
	V_{GS} = 2.5V	35	
	V_{GS} = 1.8V	55	
Q_g		7.7	nC

Ordering Information

Part No.	Package	Packing
TSM250N02CX RFG	SOT-23	3kpcs / 7˝ Reel

✍ **Note:** ˋG˵ denotes for Halogen- and Antimony-free as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds

Block Diagram
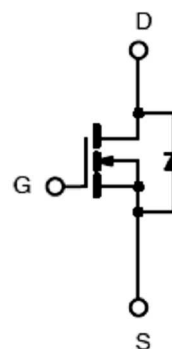
N-Channel MOSFET

Absolute Maximum Ratings (T_C = 25°C unless otherwise noted)

Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V_{DS}	20	V
Gate-Source Voltage		V_{GS}	±10	V
Continuous Drain Current	T_C = 25°C	I_D	5.8	A
	T_C = 100°C		3.7	A
Pulsed Drain Current [(Note 1)]		I_{DM}	23.2	A
Power Dissipation @ T_C = 25°C		P_D	1.56	W
Operating Junction Temperature		T_J	150	°C
Storage Temperature Range		T_{STG}	-55 to +150	°C

Thermal Performance

Parameter	Symbol	Limit	Unit
Thermal Resistance - Junction to Ambient	$R_{\theta JA}$	80	°C/W

TSM250N02CX
20V N-Channel Power MOSFET

Pb-Free / RoHS COMPLIANT

Electrical Specifications ($T_C = 25°C$ unless otherwise noted)

| Parameter	Conditions	Symbol	Min	Typ	Max	Unit
Static						
Drain-Source Breakdown Voltage	$V_{GS} = 0V$, $I_D = 250\mu A$	BV_{DSS}	20	--	--	V
Drain-Source On-State Resistance	$V_{GS} = 4.5V$, $I_D = 4A$	$R_{DS(on)}$	--	20	25	m$\mid$
	$V_{GS} = 2.5V$, $I_D = 3A$		--	27	35	
	$V_{GS} = 1.8V$, $I_D = 2A$		--	39	55	
Gate Threshold Voltage	$V_{DS} = V_{GS}$, $I_D = 250\mu A$	$V_{GS(TH)}$	0.4	0.6	0.8	V
Zero Gate Voltage Drain Current	$V_{DS} = 16V$, $V_{GS} = 0V$	I_{DSS}	--	--	1	μA
	$V_{DS} = 16V$, $T_J = 85°C$		--	--	10	
Gate Body Leakage	$V_{GS} = \pm10V$, $V_{DS} = 0V$	I_{GSS}	--	--	±100	nA
Forward Transconductance [Note 2]	$V_{DS} = 10V$, $I_S = 3A$	g_{fs}	--	6.5	--	S
Dynamic						
Total Gate Charge [Note 2,3]	$V_{DS} = 10V$, $I_D = 4A$, $V_{GS} = 4.5V$	Q_g	--	7.7	--	nC
Gate-Source Charge [Note 2,3]		Q_{gs}	--	0.9	--	
Gate-Drain Charge [Note 2,3]		Q_{gd}	--	2.4	--	
Input Capacitance	$V_{DS} = 10V$, $V_{GS} = 0V$, $f = 1.0MHz$	C_{iss}	--	535	--	pF
Output Capacitance		C_{oss}	--	60	--	
Reverse Transfer Capacitance		C_{rss}	--	34	--	
Switching						
Turn-On Delay Time [Note 2,3]	$V_{DD} = 10V$, $I_D = 1A$, $V_{GS} = 4.5V$, $R_G = 25\mid$	$t_{d(on)}$	--	4.1	--	ns
Turn-On Rise Time [Note 2,3]		t_r	--	11.6	--	
Turn-Off Delay Time [Note 2,3]		$t_{d(off)}$	--	23.9	--	
Turn-Off Fall Time [Note 2,3]		t_f	--	7.6	--	
Source-Drain Diode Ratings and Characteristic						
Maximum Continuous Drain-Source Diode Forward Current	Integral reverse diode in the MOSFET	I_S	--	--	5.8	A
Maximum Pulse Drain-Source Diode Forward Current		I_{SM}	--	--	23.2	A
Diode-Source Forward Voltage	$V_{GS} = 0V$, $I_S = 1A$	V_{SD}	--	--	1	V

Note:
1. Pulse width limited by safe operating area
2. Pulse test: pulse width $\sqcap 300\mu s$, duty cycle $\sqcap 2\%$
3. Switching time is essentially independent of operating temperature.
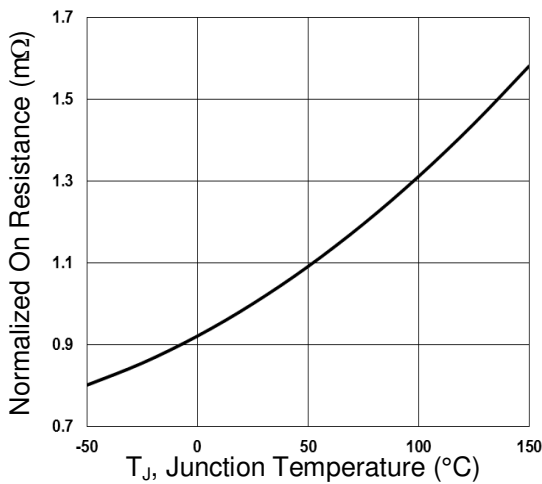
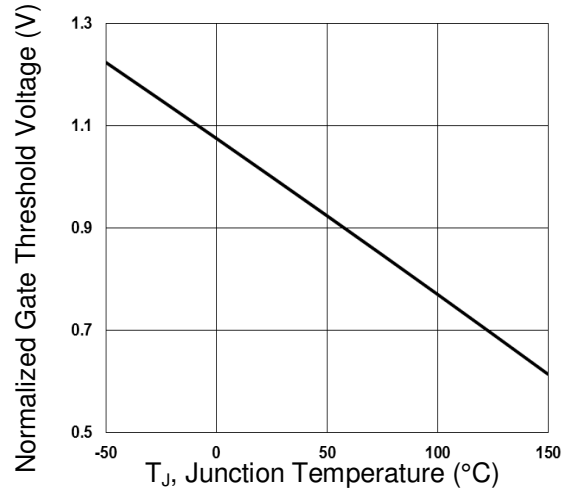## Electrical Characteristics Curve

Continuous Drain Current vs. T_C
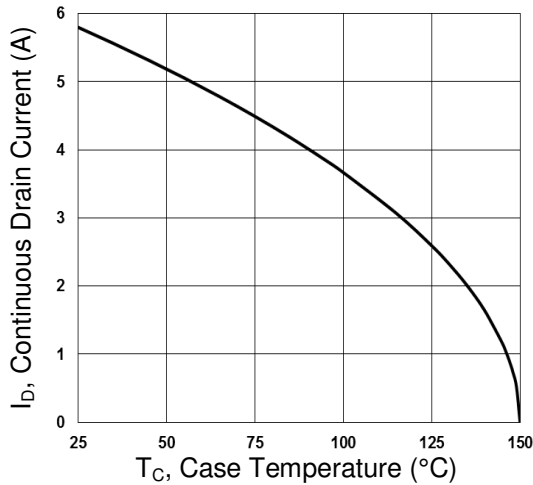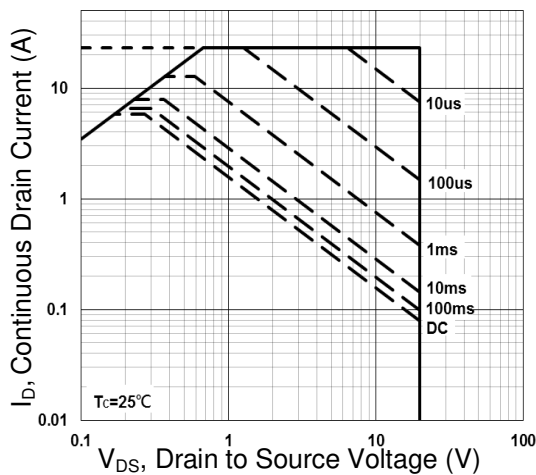

Gate Charge
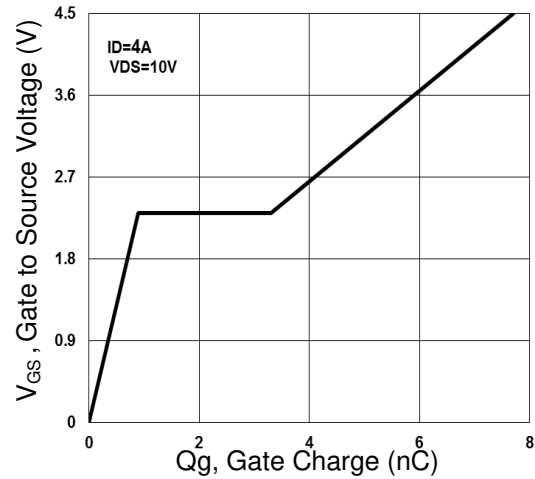
On-Resistance vs. Junction Temperature

Threshold Voltage vs. Junction Temperature

Maximum Safe Operating Area

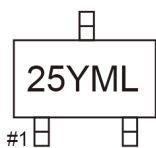**Normalized Thermal Transient Impedance Curve**

TSM250N02CX
20V N-Channel Power MOSFET
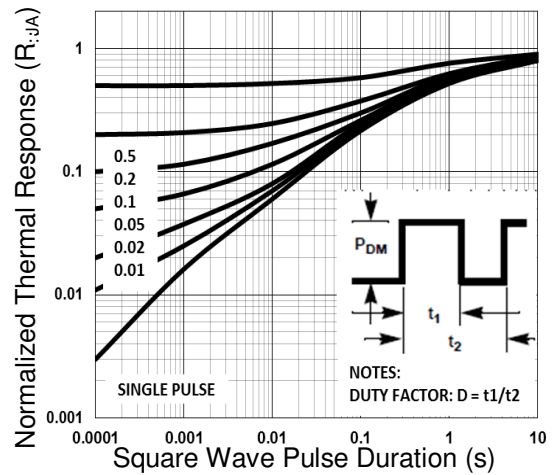
SOT-23 Mechanical Drawing

0.95 (REF)
0.4 ±0.10
2.8 ±0.20
1.6 ±0.20
2.9 ±0.20

1.1 ±0.20
0~0.15
1.9 (REF)

0.15 (REF)
0° ~ 8°
0.45 ±0.10
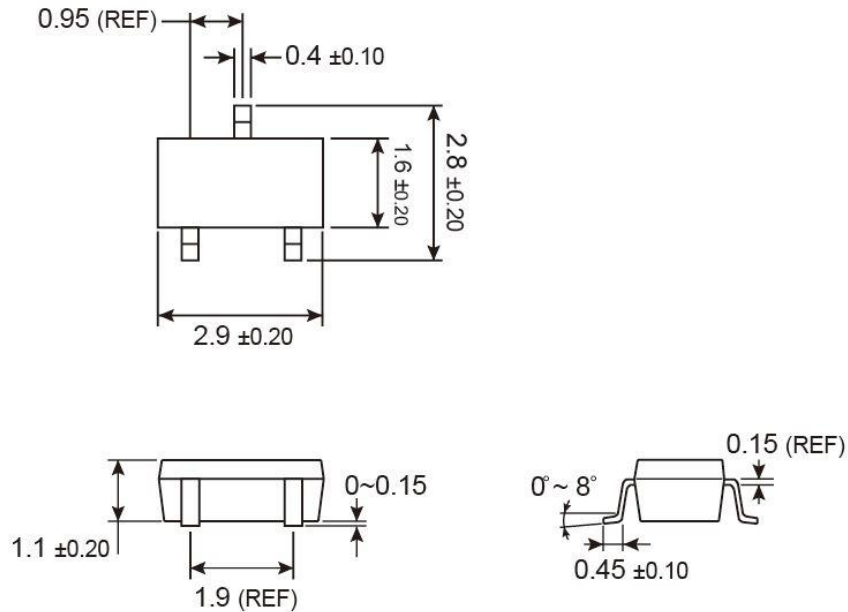
Unit: Millimeters

Marking Diagram

25YML
#1

25 = Device Code

Y = Year Code

M = Month Code for Halogen Free Product
(**O**=Jan, **P**=Feb, **Q**=Mar, **R**=Apl, **S**=May, **T**=Jun, **U**=Jul, **V**=Aug, **W**=Sep, **X**=Oct, **Y**=Nov, **Z**=Dec)

L = Lot Code

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