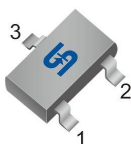


TSM250N02CX

20V N-Channel Power MOSFET

SOT-23



Pin Definition:

1. Gate
2. Source
3. Drain

Key Parameter Performance

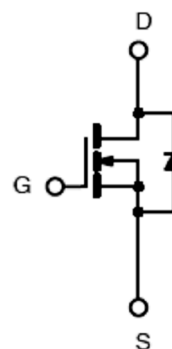
Parameter		Value	Unit
V_{DS}		20	V
$R_{DS(on)}$ (max)	$V_{GS} = 4.5V$	25	$m\Omega$
	$V_{GS} = 2.5V$	35	
	$V_{GS} = 1.8V$	55	
Q_g		7.7	nC

Ordering Information

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

⚠ **Note:** Ⓜ 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}	20	V
Gate-Source Voltage		V_{GS}	± 10	V
Continuous Drain Current	$T_C = 25^\circ C$	I_D	5.8	A
	$T_C = 100^\circ C$		3.7	A
Pulsed Drain Current ^(Note 1)		I_{DM}	23.2	A
Power Dissipation @ $T_C = 25^\circ C$		P_D	1.56	W
Operating Junction Temperature		T_J	150	$^\circ C$
Storage Temperature Range		T_{STG}	-55 to +150	$^\circ C$

Thermal Performance

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

TSM250N02CX

20V N-Channel Power MOSFET

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 = 250μA	BV _{DSS}	20	--	--	V
Drain-Source On-State Resistance	V _{GS} = 4.5V, I _D = 4A	R _{DS(on)}	--	20	25	m _Ω
	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 = 250μA	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} = ±10V, 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 _Ω	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:

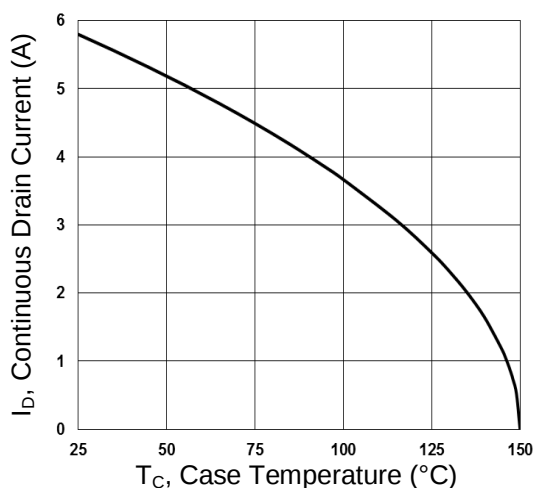
- Pulse width limited by safe operating area
- Pulse test: pulse width ≤ 300μs, duty cycle ≤ 2%
- Switching time is essentially independent of operating temperature.

TSM250N02CX

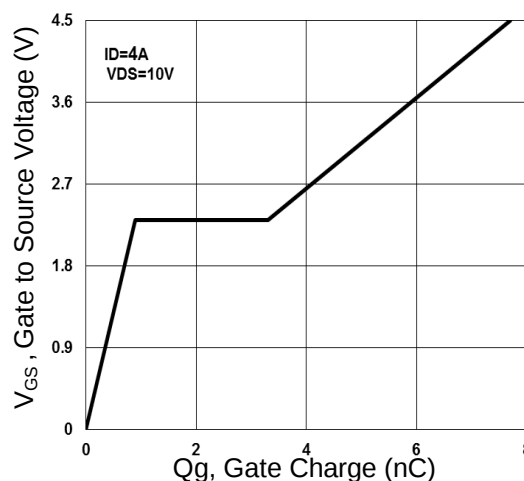
20V N-Channel Power MOSFET

Electrical Characteristics Curve

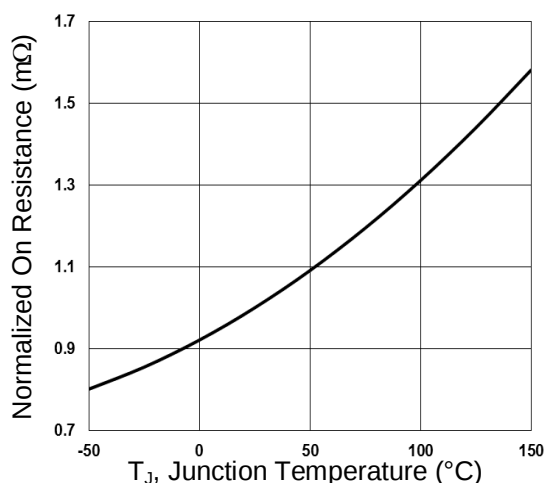
Continuous Drain Current vs. T_C



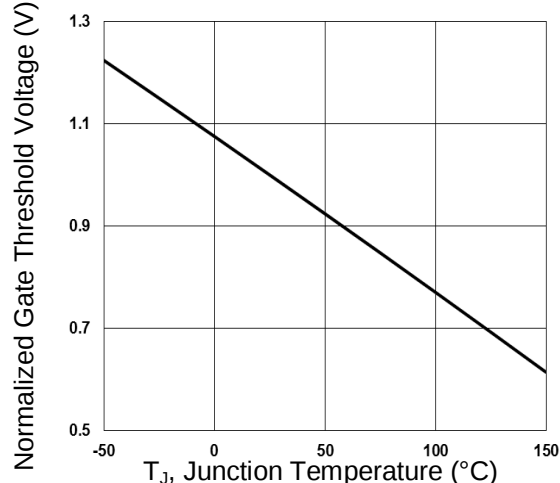
Gate Charge



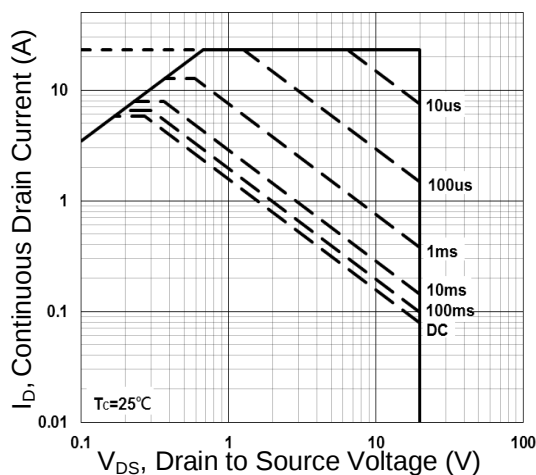
On-Resistance vs. Junction Temperature



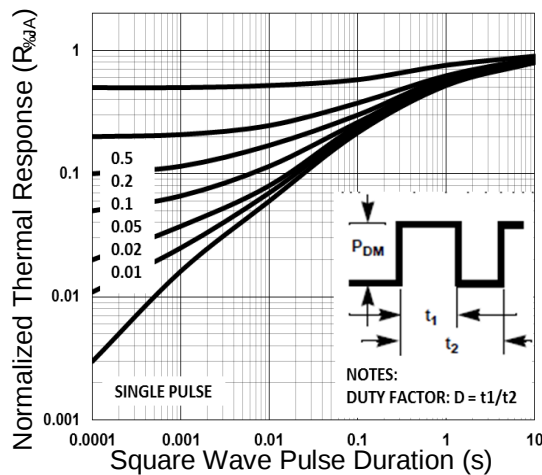
Threshold Voltage vs. Junction Temperature



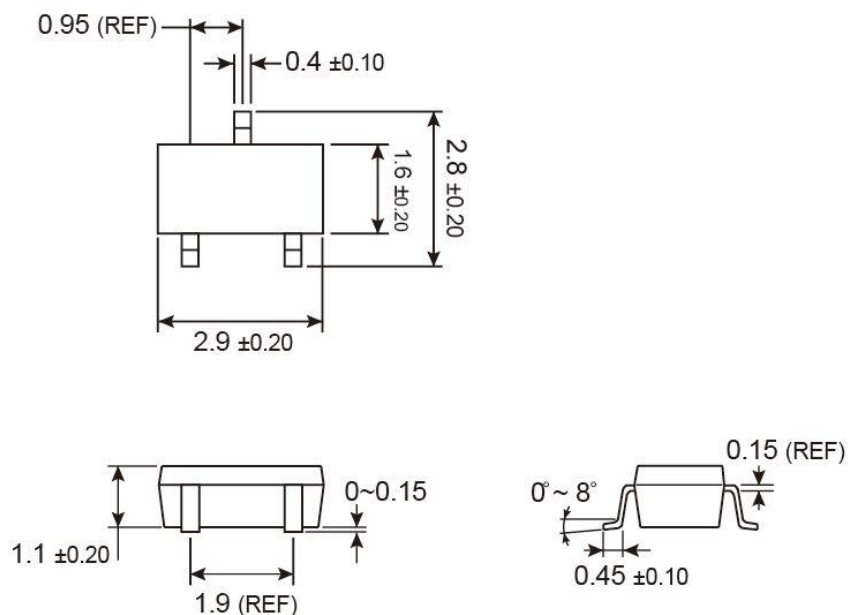
Maximum Safe Operating Area



Normalized Thermal Transient Impedance Curve

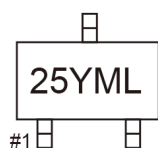


SOT-23 Mechanical Drawing



Unit: Millimeters

Marking Diagram



- 25** = Device Code
- 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

TSM250N02CX

20V N-Channel Power MOSFET

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