

TSM320N03CX

30V N-Channel Power MOSFET

SOT-23



Pin Definition:

1. Gate
2. Source
3. Drain

Key Parameter Performance

Parameter	Value	Unit
V_{DS}	30	V
$R_{DS(on)}$ (max)	$V_{GS} = 4.5V$	32
	$V_{GS} = 2.5V$	40
Q_g	8.4	nC

Features

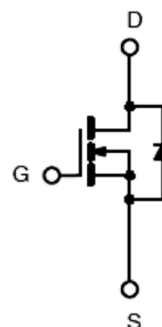
- Improved dv/dt capability
- Fast switching

Ordering Information

Part No.	Package	Packing
TSM320N03CX RFG	SOT-23	3kpcs / 7+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}	± 12	V
Continuous Drain Current	I_D	$T_C = 25^\circ C$	5.3
		$T_C = 100^\circ C$	3.4
Pulsed Drain Current ^(Note 1)	I_{DM}	21.2	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	$^\circ C/W$

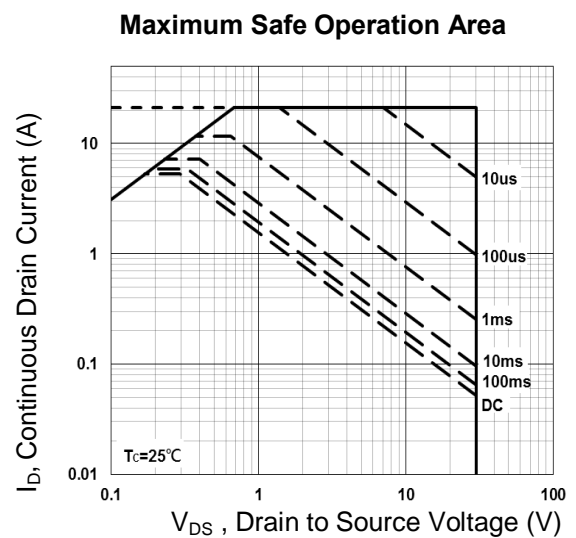
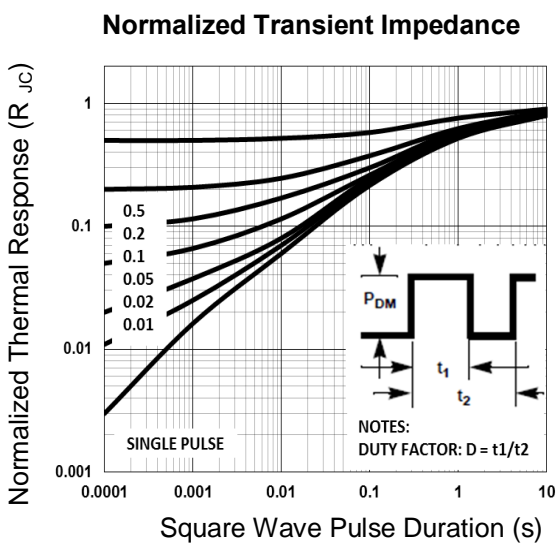
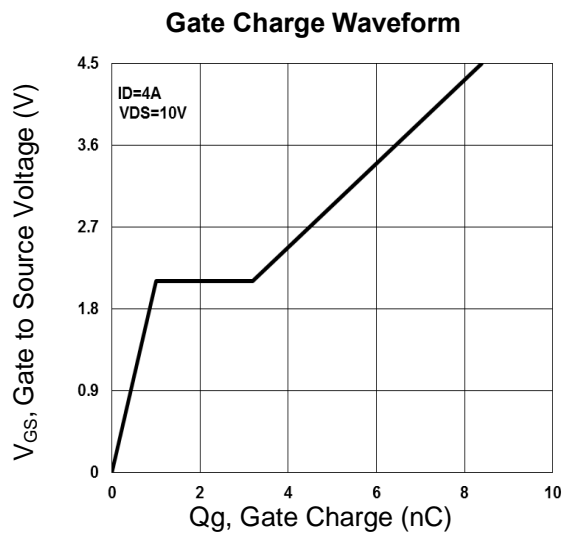
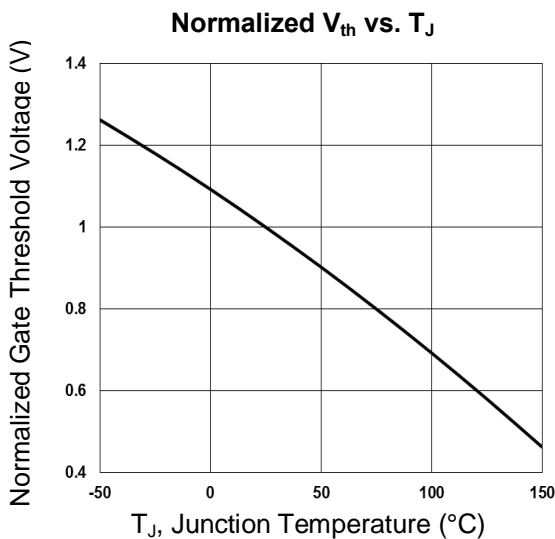
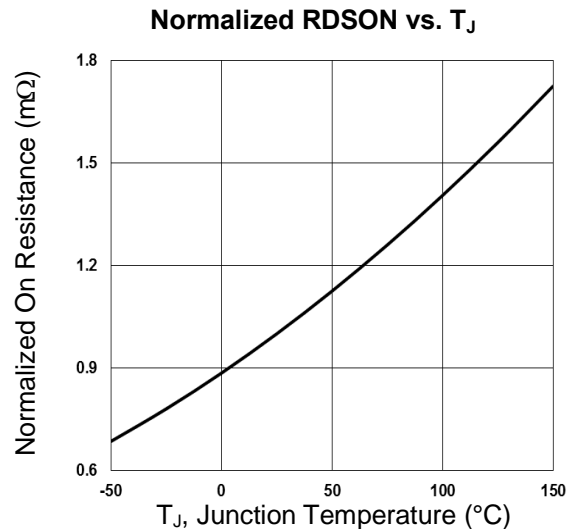
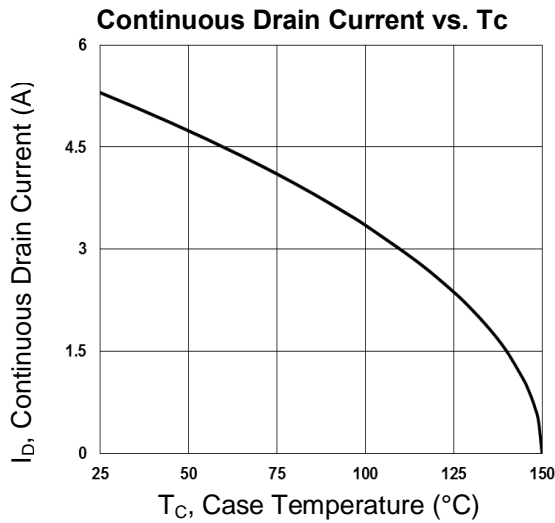
Electrical Specifications ($T_C = 25^\circ\text{C}$ unless otherwise noted)

Parameter	Conditions	Symbol	Min	Typ	Max	Unit
Static						
Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = 250\mu A$	BV_{DSS}	30	--	--	V
Drain-Source On-State Resistance	$V_{GS} = 4.5V, I_D = 4A$	$R_{DS(ON)}$	--	27	32	m
	$V_{GS} = 2.5V, I_D = 3A$		--	32	40	
Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\mu A$	$V_{GS(TH)}$	0.4	0.6	0.9	V
Zero Gate Voltage Drain Current	$V_{DS} = 30V, V_{GS} = 0V$	I_{DSS}	--	--	1	μA
	$V_{DS} = 24V, T_J = 125^\circ\text{C}$		--	--	10	
Gate Body Leakage	$V_{GS} = \pm 12V, V_{DS} = 0V$	I_{GSS}	--	--	± 100	nA
Forward Transconductance ^(Note 2)	$V_{DS} = 10V, I_D = 3A$	g_{fs}	--	7	--	S
Dynamic						
Total Gate Charge ^(Note 2,3)	$V_{DS} = 10V, I_D = 4A,$ $V_{GS} = 4.5V$	Q_g	--	8.4	--	nC
Gate-Source Charge ^(Note 2,3)		Q_{gs}	--	1	--	
Gate-Drain Charge ^(Note 2,3)		Q_{gd}	--	2.2	--	
Input Capacitance	$V_{DS} = 10V, V_{GS} = 0V,$ $f = 1.0\text{MHz}$	C_{iss}	--	695	--	pF
Output Capacitance		C_{oss}	--	45	--	
Reverse Transfer Capacitance		C_{rss}	--	36	--	
Switching						
Turn-On Delay Time ^(Note 2,3)	$V_{DD} = 10V, I_D = 1A,$ $V_{GS} = 4.5V, R_{GEN} = 25$	$t_{d(on)}$	--	4.5	--	ns
Turn-On Rise Time ^(Note 2,3)		t_r	--	13	--	
Turn-Off Delay Time ^(Note 2,3)		$t_{d(off)}$	--	27	--	
Turn-Off Fall Time ^(Note 2,3)		t_f	--	8.3	--	
Source-Drain Diode Ratings and Characteristic						
Maximum Continuous Drain-Source Diode Forward Current	Integral reverse diode in the MOSFET	I_S	--	--	5.3	A
Maximum Pulse Drain-Source Diode Forward Current		I_{SM}	--	--	21.2	A
Diode-Source Forward Voltage	$V_{GS} = 0V, I_S = 1A$	V_{SD}	--	--	1	V

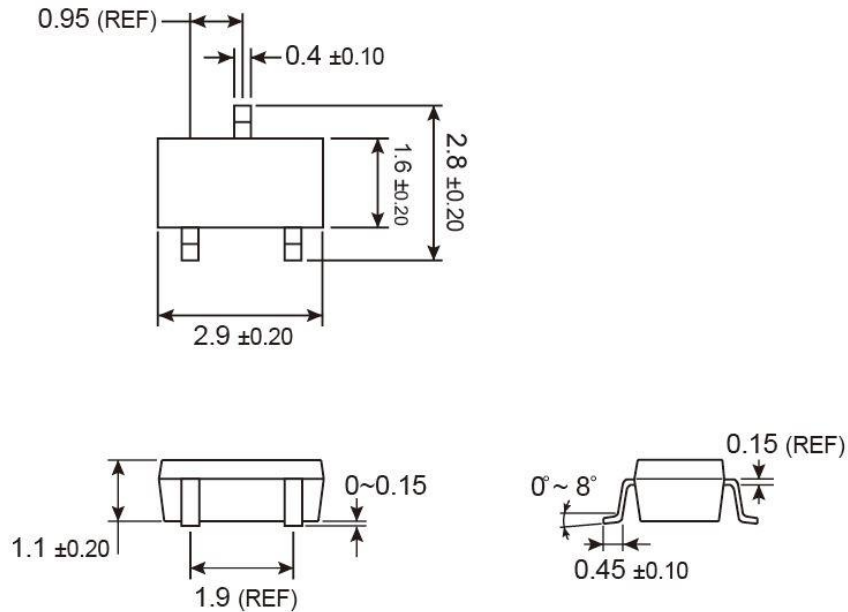
Note:

1. Pulse width limited by safe operating area
2. Pulse test: pulse width $m300\mu s$, duty cycle $m2\%$
3. Switching time is essentially independent of operating temperature.

Electrical Characteristics Curves

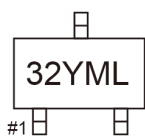


SOT-23 Mechanical Drawing



Unit: Millimeters

Marking Diagram



- 32** = 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

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