

TSM240N03CX6

30V N-Channel Power MOSFET

SOT-26



Pin Definition:

- | | |
|----------|-----------|
| 1. Drain | 6. Drain |
| 2. Drain | 5. Drain |
| 3. Gate | 4. Source |

Note:

MSL 1 (Moisture Sensitivity Level)
per J-STD-020

Key Parameter Performance

Parameter		Value	Unit
V_{DS}		30	V
$R_{DS(on)}$ (max)	$V_{GS} = 10V$	24	mΩ
	$V_{GS} = 4.5V$	34	
Q_g		4.1	nC

Features

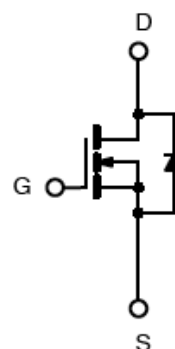
- Halogen-free
- Improved dV/dt capability
- Fast Switching

Ordering Information

Ordering code	Package	Packing
TSM240N03CX6 RFG	SOT-26	3kpcs / 7" Reel

Note: Halogen-free according to IEC 61249-2-21 definition

Block Diagram



N-Channel MOSFET

Absolute Maximum Ratings ($T_C = 25^\circ\text{C}$ unless otherwise noted)

Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V _{DS}	30	V
Gate-Source Voltage		V _{GS}	±20	V
Continuous Drain Current	T _C = 25°C	I _D	6.5	A
	T _C = 100°C		4.1	A
Pulsed Drain Current ^(Note 1)		I _{DM}	26	A
Single Pulse Avalanche Energy ^(Note 2)		E _{AS}	32	mJ
Power Dissipation @ T _C = 25°C		P _D	1.56	W
Operating Junction Temperature		T _J	-55 to +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	$^\circ\text{C/W}$

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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	$V_{GS} = 10V, I_D = 6A$	$R_{DS(on)}$	--	17	24	mΩ
	$V_{GS} = 4.5V, I_D = 4A$		--	22	34	
Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\mu A$	$V_{GS(TH)}$	1.2	1.4	2.5	V
Zero Gate Voltage Drain Current	$V_{DS} = 30V, V_{GS} = 0V$	I_{DSS}	--	--	1	μA
	$V_{DS} = 24V, T_J = 125^{\circ}C$		--	--	10	
Gate Body Leakage	$V_{GS} = \pm 20V, V_{DS} = 0V$	I_{GSS}	--	--	±100	nA
Forward Transconductance (Note 3)	$V_{DS} = 10V, I_D = 4A$	g_{fs}	--	6.5	--	S
Dynamic						
Total Gate Charge (Note 3,4)	$V_{DS} = 15V, I_D = 6A,$ $V_{GS} = 4.5V$	Q_g	--	4.1	--	nC
Gate-Source Charge (Note 3,4)		Q_{gs}	--	1	--	
Gate-Drain Charge (Note 3,4)		Q_{gd}	--	2.1	--	
Input Capacitance	$V_{DS} = 25V, V_{GS} = 0V,$ $f = 1.0MHz$	C_{iss}	--	345	--	pF
Output Capacitance		C_{oss}	--	55	--	
Reverse Transfer Capacitance		C_{rss}	--	32	--	
Switching						
Turn-On Delay Time (Note 3,4)	$V_{DD} = 15V, I_D = 1A,$ $V_{GS} = 10V, R_{GEN} = 6\Omega$	$t_{d(on)}$	--	2.8	--	ns
Turn-On Rise Time (Note 3,4)		t_r	--	7.2	--	
Turn-Off Delay Time (Note 3,4)		$t_{d(off)}$	--	15.8	--	
Turn-Off Fall Time (Note 3,4)		t_f	--	4.6	--	
Source-Drain Diode Ratings and Characteristic						
Maximum Continuous Drain-Source Diode Forward Current	Integral reverse diode in the MOSFET	I_S	--	--	6.5	A
Maximum Pulse Drain-Source Diode Forward Current		I_{SM}	--	--	26	A
Diode-Source Forward Voltage	$V_{GS} = 0V, I_S = 1A$	V_{SD}	--	--	1	V

Note:

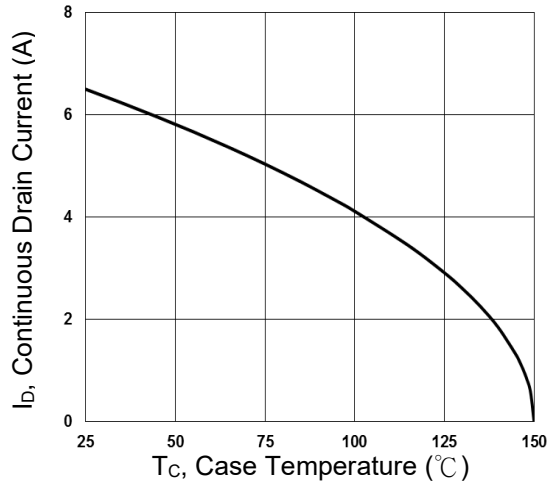
- Pulse width limited by safe operating area
- $L = 1\text{mH}, I_{AS} = 8A, V_{DD} = 25V, R_G = 25\Omega$, Starting $T_J = 25^\circ\text{C}$
- Pulse test: pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
- Switching time is essentially independent of operating temperature.

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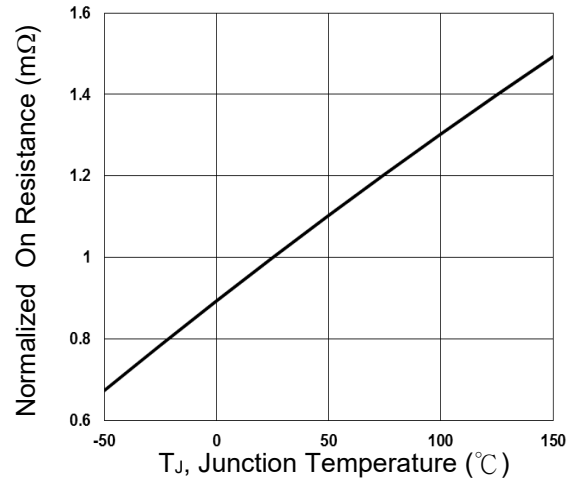
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Electrical Characteristics Curve

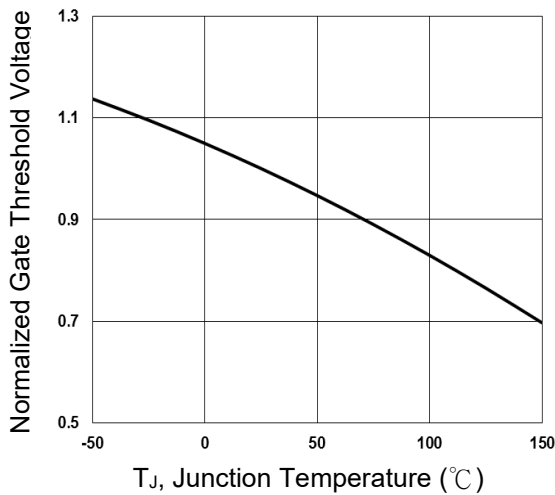
Continuous Drain Current vs. T_c



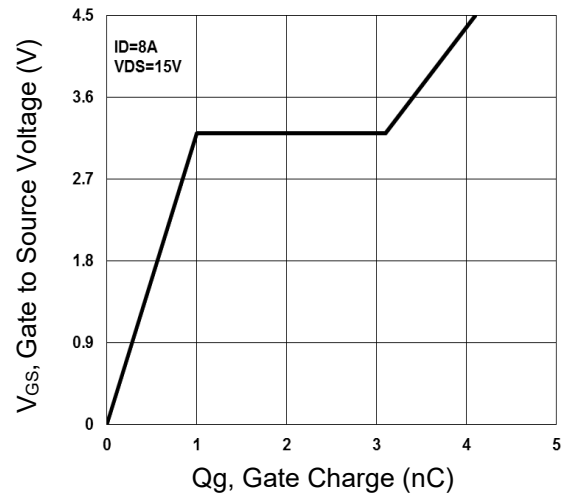
Normalized $R_{DS(on)}$ vs. T_J



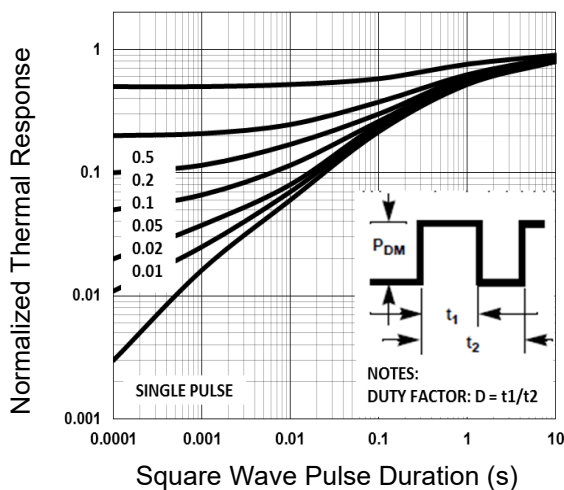
Normalized V_{th} vs. T_J



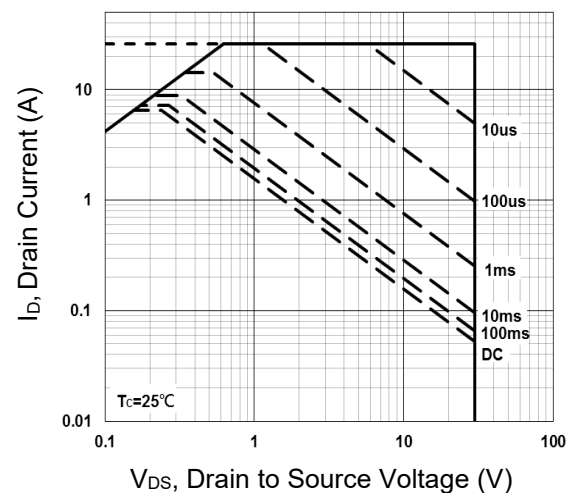
Gate Charge Waveform



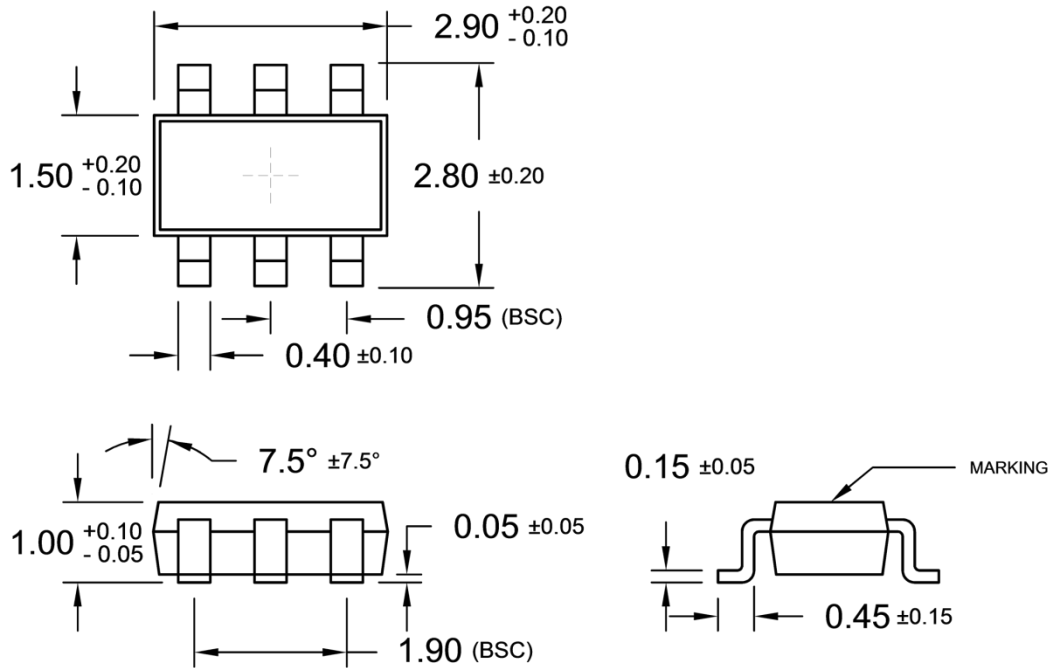
Normalized Transient Impedance



Maximum Safe Operation Area

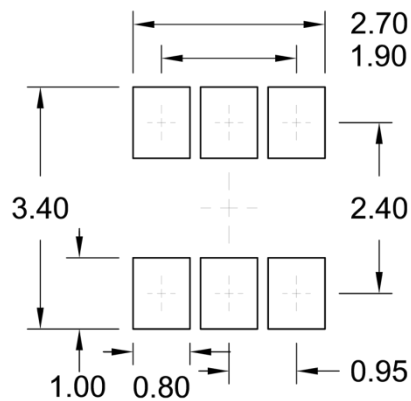


SOT-26 Mechanical Drawing

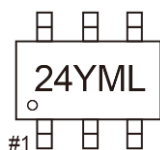


Unit: Millimeters

SUGGESTED PAD LAYOUT (Unit: Millimeters)



Marking Diagram



- 24** = 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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