

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

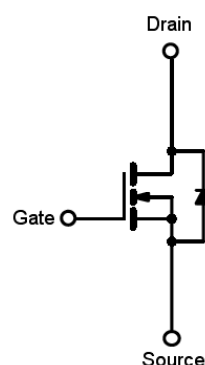
Parameter	Value	Unit
V_{DS}	30	V
$R_{DS(on)}$ (max)	$V_{GS} = 10V$	4.2
	$V_{GS} = 4.5V$	6
Q_g	24	nC

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}	± 20	V
Continuous Drain Current	I_D	$T_c=25^{\circ}C$	30
		$T_c=100^{\circ}C$	19
Pulsed Drain Current ^(Note 1)	I_{DM}	120	A
Single Pulse Avalanche Energy ^(Note 2)	E_{AS}	125	mJ
Single Pulse Avalanche Current ^(Note 2)	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_J=25°C unless otherwise noted)

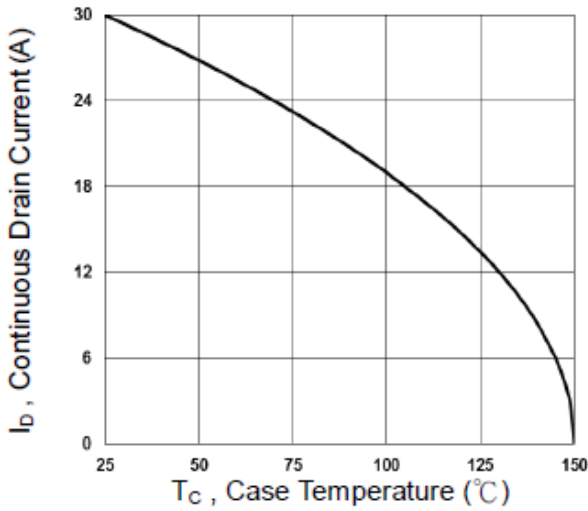
Parameter	Conditions	Symbol	Min	Typ	Max	Unit
Static						
Drain-Source Breakdown Voltage	V _{GS} = 0V, I _D = 250μA	BV _{DSS}	30	--	--	V
Drain-Source On-State Resistance	V _{GS} = 10V, I _D = 12A	R _{DS(ON)}	--	3.8	4.2	mΩ
	V _{GS} = 4.5V, I _D = 6A		--	5.2	6	
Gate Threshold Voltage	V _{DS} = V _{GS}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

Note:

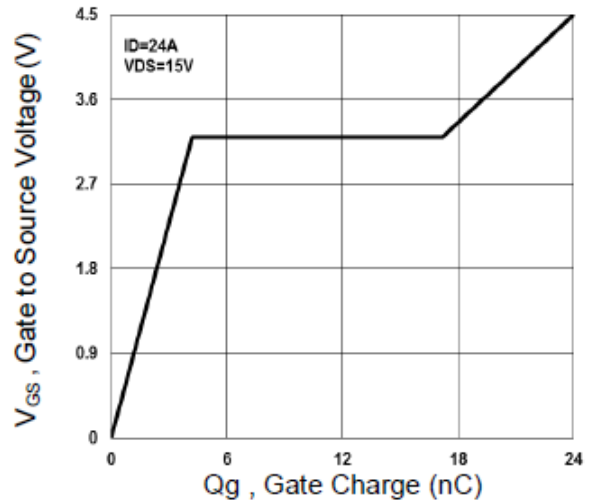
1. Pulse width limited by safe operating area
2. L=0.1mH, I_{AS} =50A, V_{DD} = 25V, R_G = 25Ω, Starting T_J = 25°C
3. Pulse test: pulse width ≤300μs, duty cycle ≤2%
4. Switching time is essentially independent of operating temperature.

Electrical Characteristics Curve

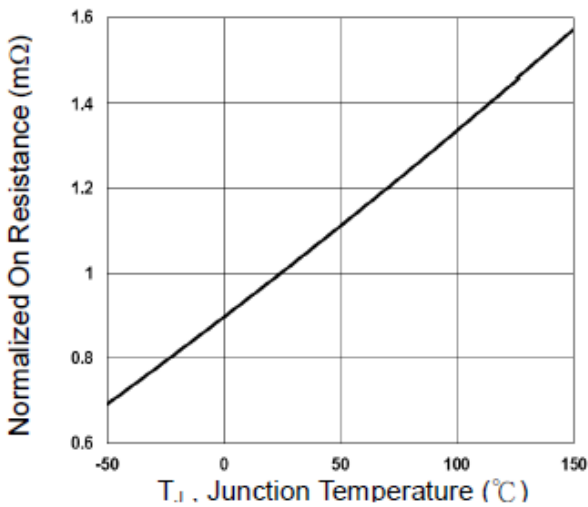
Continuous Drain Current vs. T_c



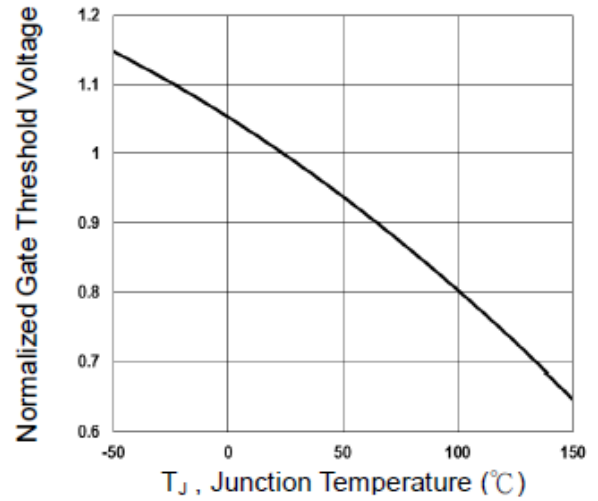
Gate Charge



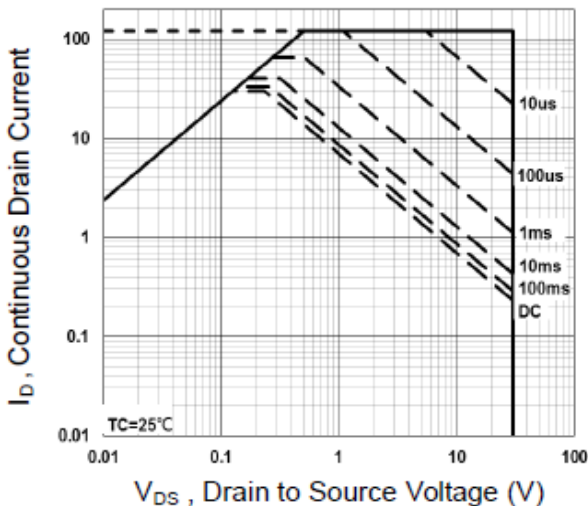
On-Resistance vs. Junction Temperature



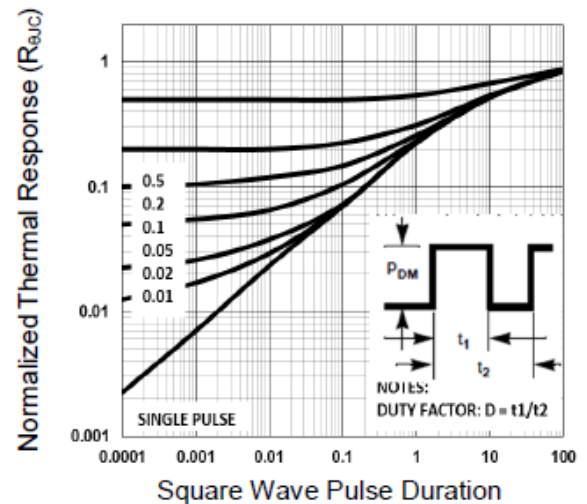
Threshold Voltage vs. Junction Temperature



Maximum Safe Operating Area

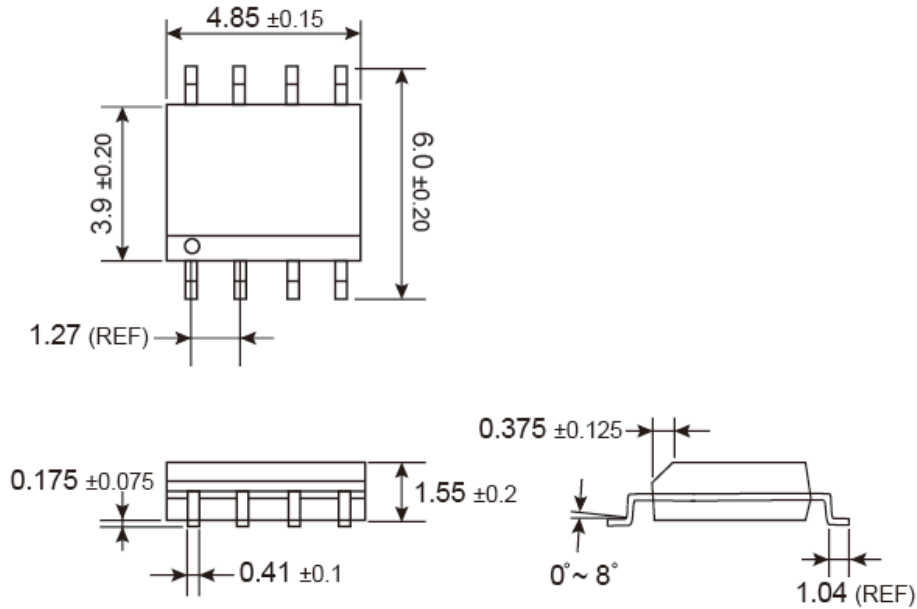


Normalized Thermal Transient Impedance Curve



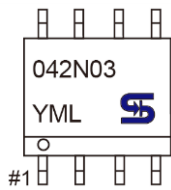


SOP-8 Mechanical Drawing



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

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