

TSM180N03CS

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

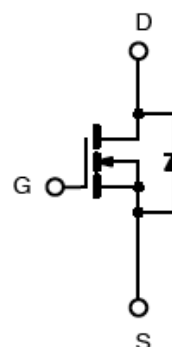
Parameter	Value	Unit
V_{DS}	30	V
$R_{DS(on)}$ (max)	$V_{GS} = 10V$	18
	$V_{GS} = 4.5V$	28
Q_g	4.1	nC

Ordering Information

Part No.	Package	Packing
TSM180N03CS RLG	SOP-8	2.5kpcs / 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 (Tc=25°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	Tc=25°C	9
		Tc=100°C	5.7
Pulsed Drain Current ^(Note 1)	I_{DM}	36	A
Single Pulse Avalanche Energy ^(Note 2)	E_{AS}	32	mJ
Power Dissipation @ T _C = 25°C	P_D	2.5	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	$R_{\theta JA}$	50	°C/W

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

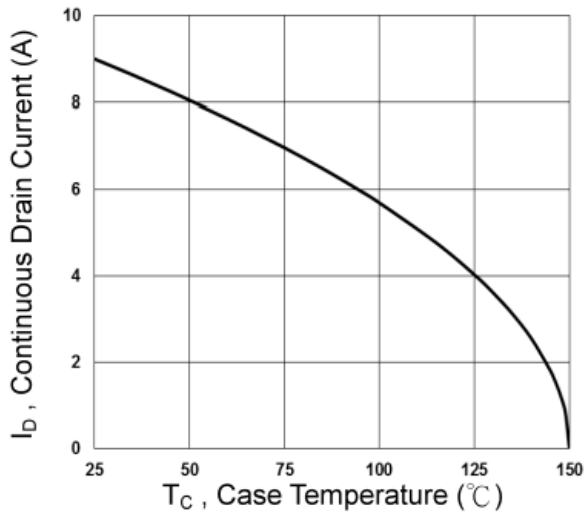
Parameter	Conditions	Symbol	Min	Typ	Max	Unit
Static						
Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = 250\mu A$	BV_{DSS}	30	--	--	V
Drain-Source On-State Resistance	$V_{GS} = 10V, I_D = 8A$	$R_{DS(ON)}$	--	16	18	mΩ
	$V_{GS} = 4.5V, I_D = 5A$		--	23	28	
Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\mu A$	$V_{GS(TH)}$	1.2	1.6	2	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)	$V_{DS} = 10V, I_D = 5A$	g_{fs}	--	4	--	S
Dynamic						
Total Gate Charge ^(Note 3,4)	$V_{DS} = 15V, I_D = 8A,$ $V_{GS} = 4.5V$	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)	$V_{DD} = 15V, I_D = 1A,$ $V_{GS} = 10V, R_G = 6\Omega$	$t_{d(on)}$	--	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	--	--	9	A
Maximum Pulse Drain-Source Diode Forward Current		I_{SM}	--	--	36	A
Diode-Source Forward Voltage	$V_{GS} = 0V, I_S = 1A$	V_{SD}	--	--	1	V

Note:

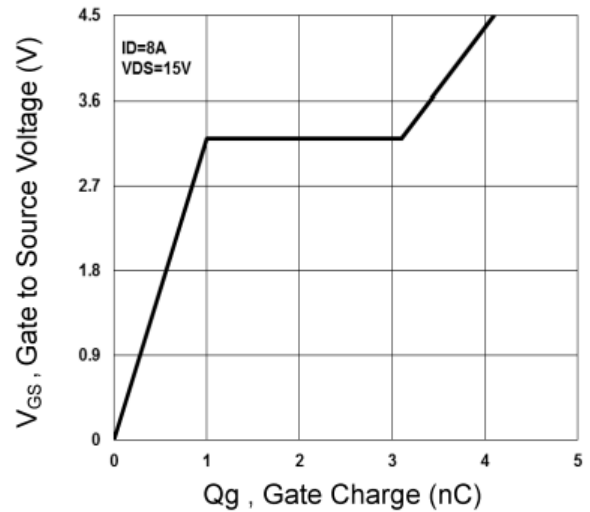
- Pulse width limited by safe operating area
- $L=1\text{mH}, I_{AS}=8A, V_{DD}=25V, R_G=25\Omega$, Starting $T_J=25^\circ\text{C}$
- Pulse test: pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$
- Switching time is essentially independent of operating temperature.

Electrical Characteristics Curve

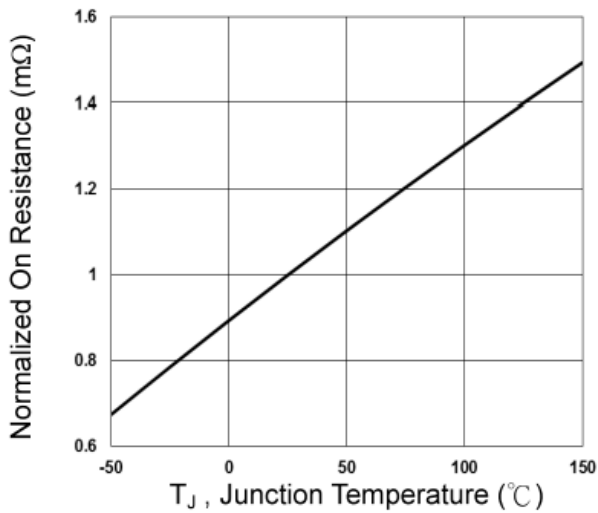
Continuous Drain Current vs. T_C



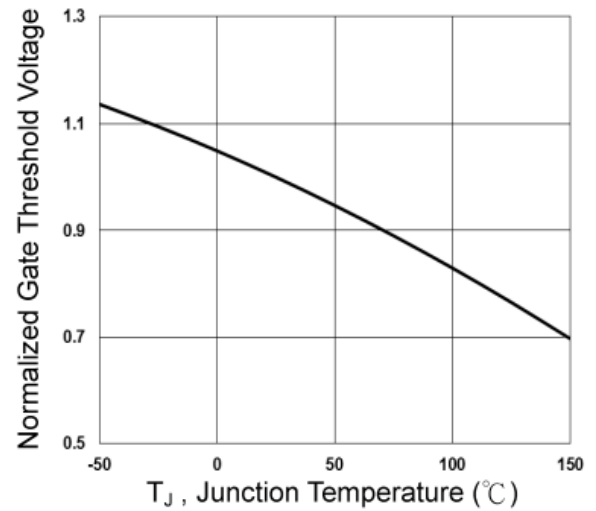
Gate Charge



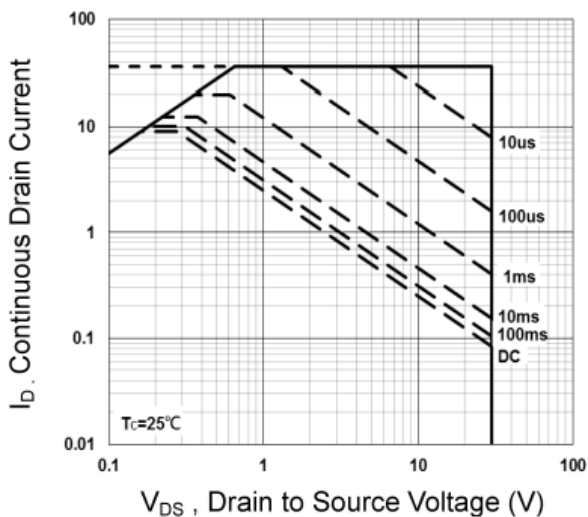
On-Resistance vs. Junction Temperature



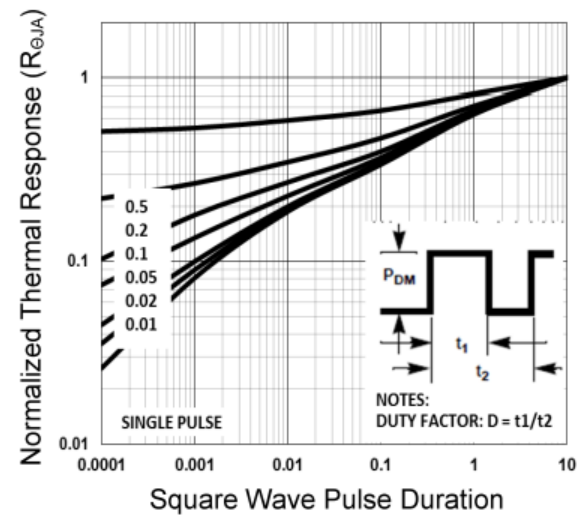
Threshold Voltage vs. Junction Temperature



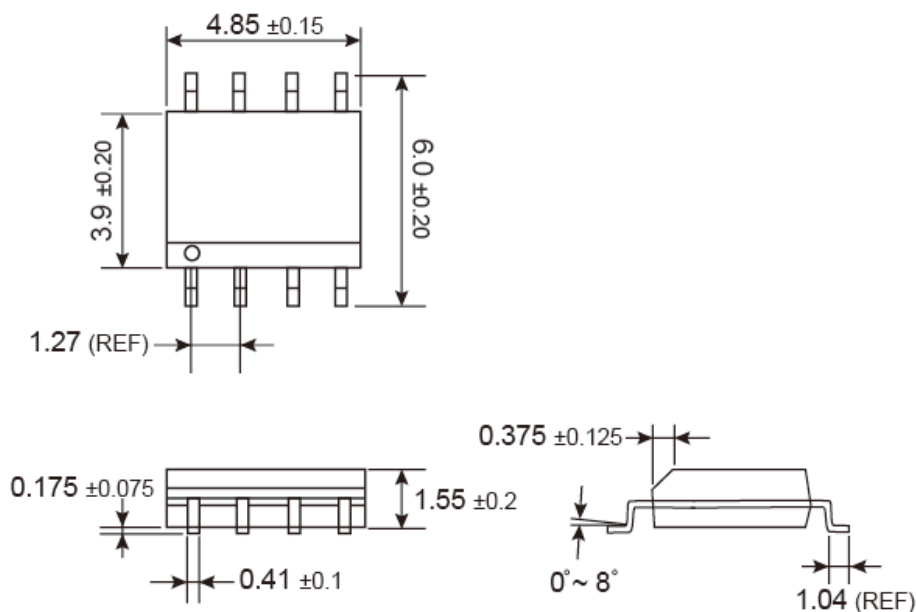
Maximum Safe Operating Area



Normalized Thermal Transient Impedance Curve

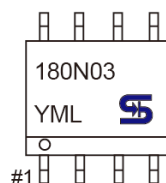


SOP-8 Mechanical Drawing



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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