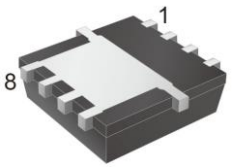
TSM180N03PQ33

30V N-Channel Power MOSFET

PDFN33



Pin Definition:

1. Source 8. Drain
2. Source 7. Drain
3. Source 6. Drain
4. Gate 5. Drain

Note:

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

Key Parameter Performance

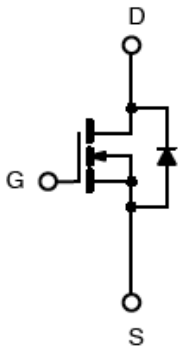
Parameter		Value	Unit
V_{DS}		30	V
$R_{DS(on)}$ (max)	V_{GS} = 10V	18	mΩ
	V_{GS} = 4.5V	28	
Q_g		4.1	nC

Ordering Information

Part No.	Package	Packing
TSM180N03PQ33 RGG	PDFN33	5Kpcs / 13” Reel

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

Block Diagram



N-Channel MOSFET

Absolute Maximum Ratings (T_C = 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	T_C=25°C	I_D	25	A
	T_C=100°C		16	A
Pulsed Drain Current (Note 1)		I_{DM}	100	A
Single Pulse Avalanche Energy (Note 2)		E_{AS}	32	mJ
Power Dissipation @ T_C = 25°C		P_D	21	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	$R_{\Theta JA}$	62	°C/W
Thermal Resistance - Junction to Case	$R_{\Theta JC}$	6	°C/W

TSM180N03PQ33

30V 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}	30	--	--	V
Drain-Source On-State Resistance	V_{GS} = 10V, I_D = 12A	$R_{DS(ON)}$	--	14	18	mΩ
	V_{GS} = 4.5V, I_D = 8A		--	20	28	
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}	--	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_G = 6Ω	$t_{d(on)}$	--	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	--	--	25	A
Maximum Pulse Drain-Source Diode Forward Current		I_{SM}	--	--	100	A
Diode-Source Forward Voltage	V_{GS} = 0V, I_S = 1A	V_{SD}	--	--	1	V

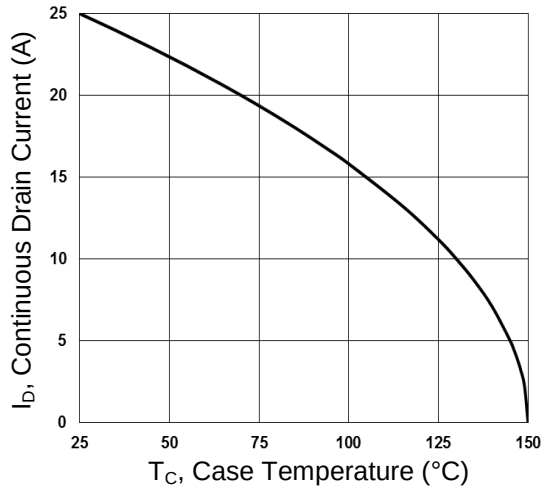
Note:

1. Pulse width limited by safe operating area
2. L = 1mH, I_{AS} = 8A, 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.

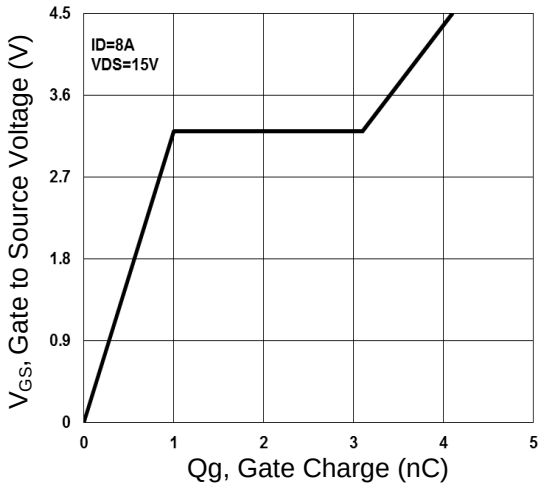
Pb-Free RoHS COMPLIANT

Electrical Characteristics Curve

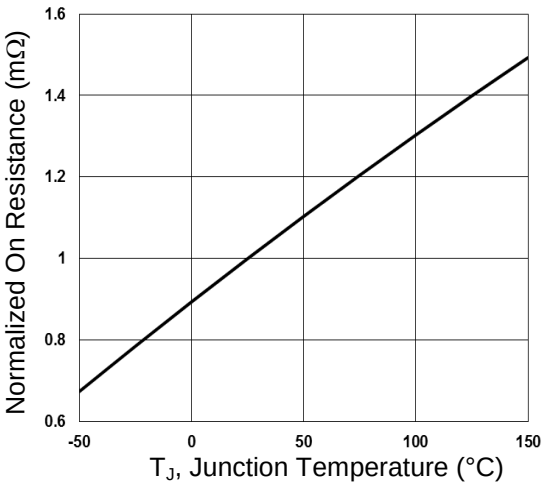
Continuous Drain Current vs. T_C



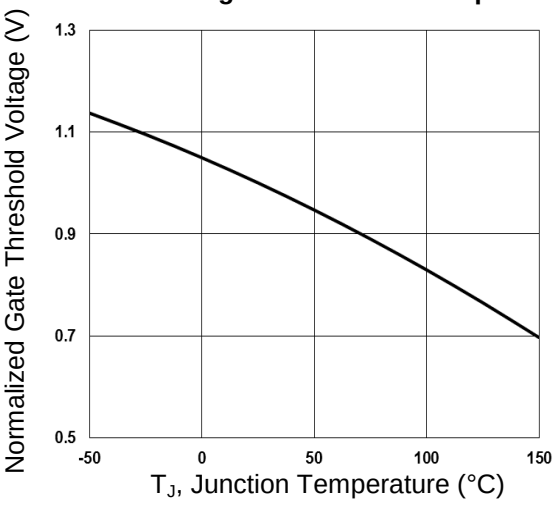
Gate Charge



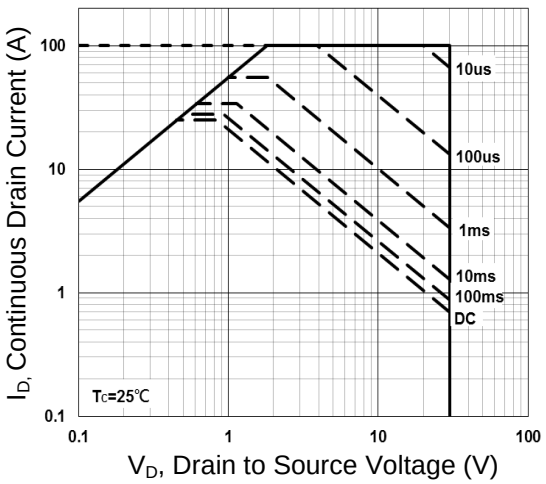
On-Resistance vs. Junction Temperature



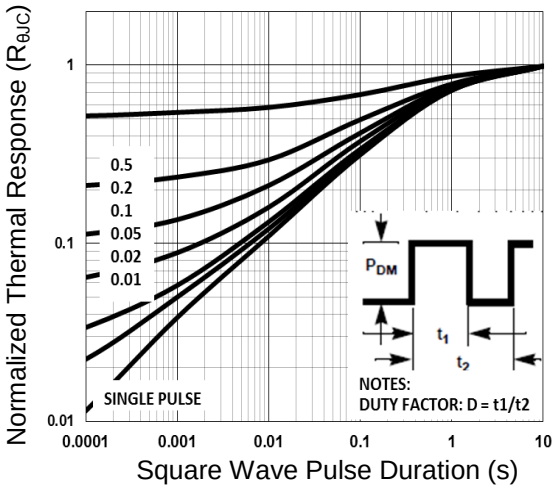
Threshold Voltage vs. Junction Temperature



Maximum Safe Operating Area



Normalized Thermal Transient Impedance Curve



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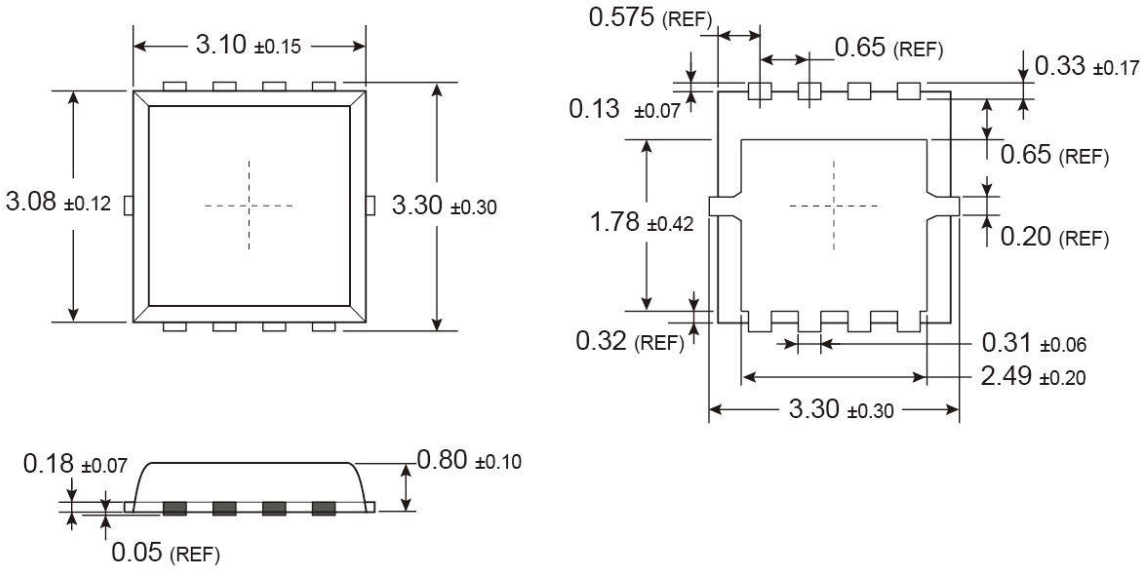
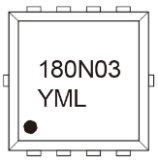
PDFN33 Mechanical Drawing



Unit: Millimeters

Marking Diagram



Y = Year Code

M = Month Code for Halogen Free Product
(**O**=Jan, **P**=Feb, **Q**=Mar, **R**=Apl, **S**=May, **T**=Jun, **U**=Jul, **V**=Aug, **W**=Sep, **X**=Oct, **Y**=Nov, **Z**=Dec)

L = Lot Code

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