

N-Channel Trench MOSFET, 100V, 150A, 4.2mΩ

General Description

The VAM1980X utilizes the advanced Trench technology and low resistance package to achieve extremely low on-resistance device which makes the system design an efficient and reliable solution for use in a wide variety of applications.

Features

- 100V, 150A, $R_{DS(on)}=4.2m\Omega@V_{GS}=10V$
- High Efficiency
- Improved dv/dt, di/dt capability
- 100% EAS Guaranteed
- Green Device

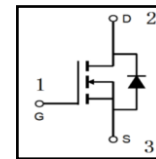
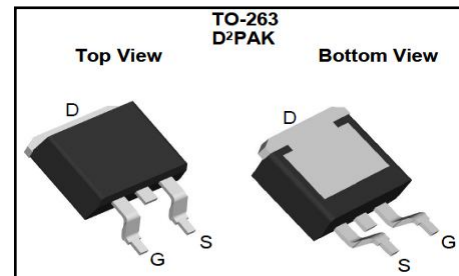
Application

Networking, Load Switch

LED lighting, Quick Charger

Product Summary

$V_{DS}@T_{j,max}$	100 V
$R_{DS(on)}@V_{GS}=10V$	4.2 mΩ
I_D Continuous Current	150 A
$V_{(GS)th}$	1.8 V
$Q_{g,typ}$	110 nC



Absolute Maximum Ratings

Parameter	Symbol	Value	Unit	Condition
Drain-Source Voltage	V_{DS}	100	V	
Continuous drain current ⁽¹⁾	I_D	150 95	A	$T_C=25\text{ }^\circ\text{C}$ $T_C=100\text{ }^\circ\text{C}$
Gate-Source Voltage	V_{GS}	+20/-12	V	Static
Pulsed drain current ⁽²⁾	I_{DM}	600	A	$T_C=25\text{ }^\circ\text{C}$
Avalanche energy, single pulse	E_{AS}	378	mJ	$I_D=87A$; $V_{DD}=25V$; see Figure 7
Avalanche current, single pulse	I_{AS}	87	A	$T_C=25\text{ }^\circ\text{C}$
Power dissipation	P_{diss}	275	W	$T_C=25\text{ }^\circ\text{C}$
Power dissipation-Derate above 25 °C	P_{derate}	2.22	W/ °C	$T_C=25\text{ }^\circ\text{C}$
Continuous diode forward current	I_S	150	A	$T_C=25\text{ }^\circ\text{C}$
Diode pulse current ⁽²⁾	$I_{S,pulse}$	300	A	$T_C=25\text{ }^\circ\text{C}$

(1) Limited by $T_{j,max}$.

(2) Pulse width T_P limited by $T_{j,max}$



Thermal characteristics

Symbol	Parameter	Min	Typ	Max	Unit
R_{thJC}	Thermal resistance, junction-case	---	---	0.45	°C/W
R_{thJA}	Thermal resistance, junction-ambient,	---	---	62	°C/W
T_{sold}	Soldering temperature	---	---	260	°C

Package and Ordering Information

Device	Package
VAM1980X	TO263



Electrical Characteristics ($T_j=25\text{ }^\circ\text{C}$, unless otherwise specified)

Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
Static Characteristic						
Drain-Source breakdown Voltage	$V_{(BR)DSS}$	100	---	---	V	$V_{GS}=0V, I_D=0.25mA$
Gate Threshold Voltage	$V_{(GS)th}$	1.2	1.8	2.5	V	$V_{DS}=V_{GS}, I_D=0.25mA$
Drain-Source on resistance	$R_{(DS)on}$	---	3.5	4.2	m Ω	$V_{GS}=10V, I_D=20A, T_j=25^\circ\text{C}$
		---	4.5	6	m Ω	$V_{GS}=4.5V, I_D=15A, T_j=25^\circ\text{C}$
Zero gate voltage drain current	I_{DSS}	---	---	1	μA	$V_{DS}=100V, V_{GS}=0V, T_j=25^\circ\text{C}$
		---	---	10	μA	$V_{DS}=80V, V_{GS}=0V, T_j=85^\circ\text{C}$
Gate-Source leakage current	I_{GSS}	---	---	100	nA	$V_{GS}=20V, V_{DS}=0V$
Dynamic Characteristic						
Input Capacitance	C_{iss}	---	6590	9900	pF	$V_{GS}=0V, V_{DS}=25V, f=1MHz$
Output Capacitance	C_{oss}	---	1650	2500	pF	$V_{GS}=0V, V_{DS}=25V, f=1MHz$
Reverse Transfer Capacitance	C_{rss}	---	78	156	pF	$V_{GS}=0V, V_{DS}=25V, f=1MHz$
Turn-on delay time	$T_{d(on)}$	---	23	46	nS	$V_{DD}=50V, V_{GS}=10V, I_D=1A, R_G=6\Omega;$ See Figure 8
Rise time	T_r	---	32	64	nS	
Turn-off delay time	$T_{d(off)}$	---	157	320	nS	
Fall time	T_f	---	115	230	nS	
Gate Charge Characteristic						
Gate to source charge	Q_{gs}	---	11.5	18	nC	$V_{DD}=80V, I_D=10A, V_{GS}=10V$
Gate to drain charge	Q_{gd}	---	28	42	nC	
Gate charge total	Q_g	---	110	165	nC	
Reverse diode characteristic						
Diode forward voltage	V_{FD}	---	0.7	1	V	$V_{GS}=0V, I_F=1A, T_j=25^\circ\text{C}$
Continuous Source Current	I_{csc}	---	---	150	A	$V_G=V_D=0V, \text{Force current}$
Pulsed Source Current	I_{sm}	---	---	300	A	

Electrical Characteristic Diagrams

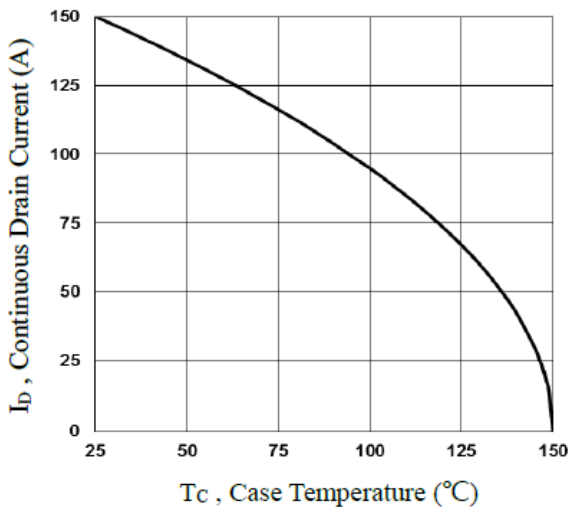


Figure 1 Continuous Drain Current vs. Tc

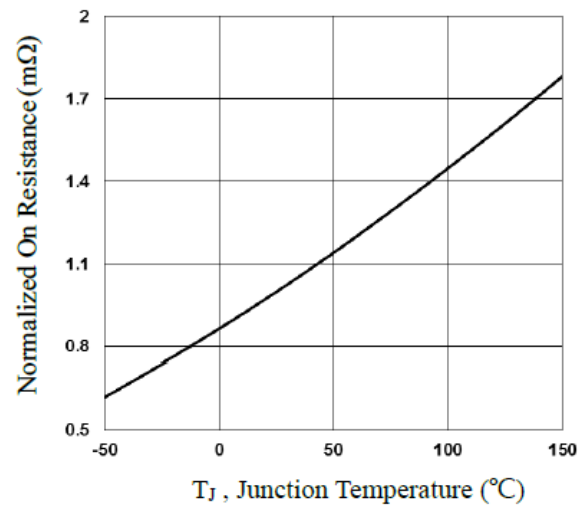


Figure 2 Normalized $R_{DS(on)}$ vs. T_j

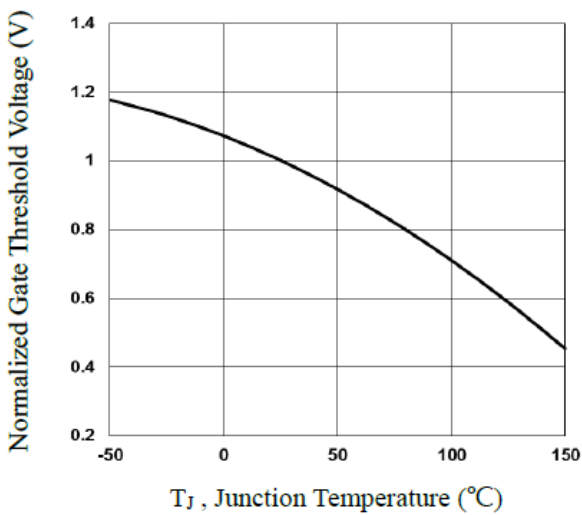


Figure 3 Normalized V_{th} vs. T_j

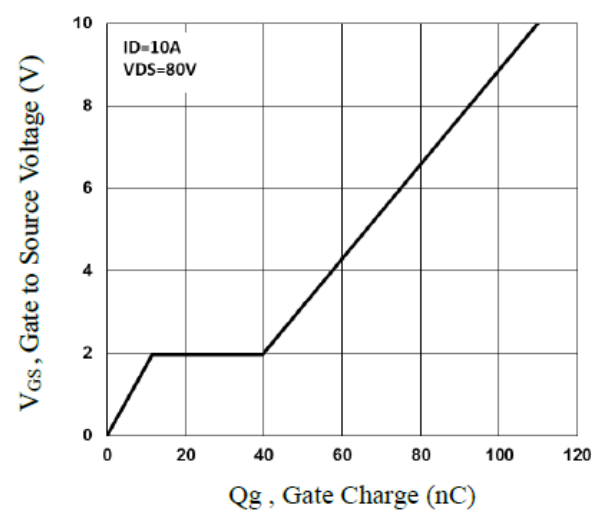


Figure 4 Gate Charge Waveform

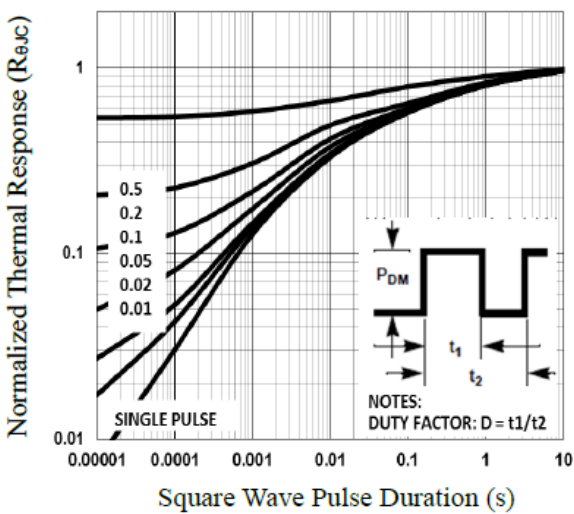


Figure 5 Normalized Transient Impedance

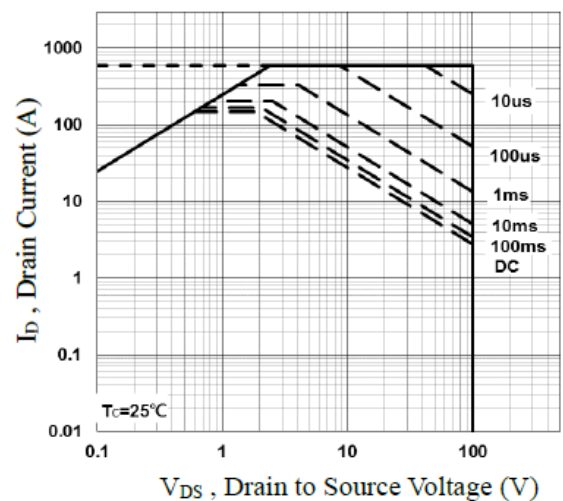


Figure 6 Safe Operating Region

Parameter Test Circuits

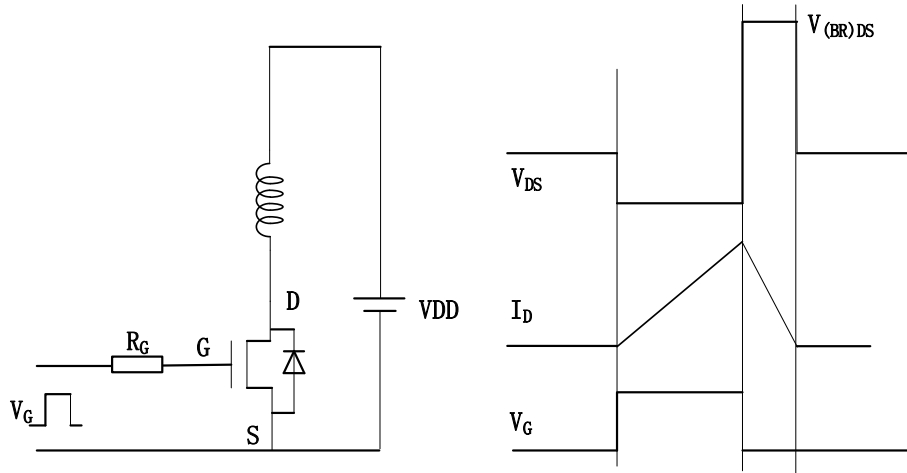


Figure 7 Unclamped Inductive Switching (UIS) Test circuit and waveforms

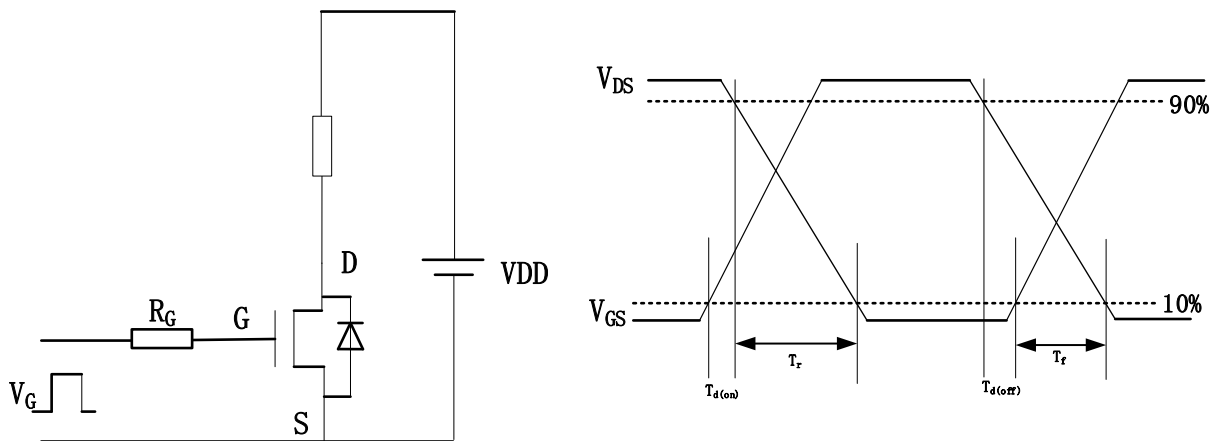


Figure 8 Resistive Switching time Test circuit and waveforms

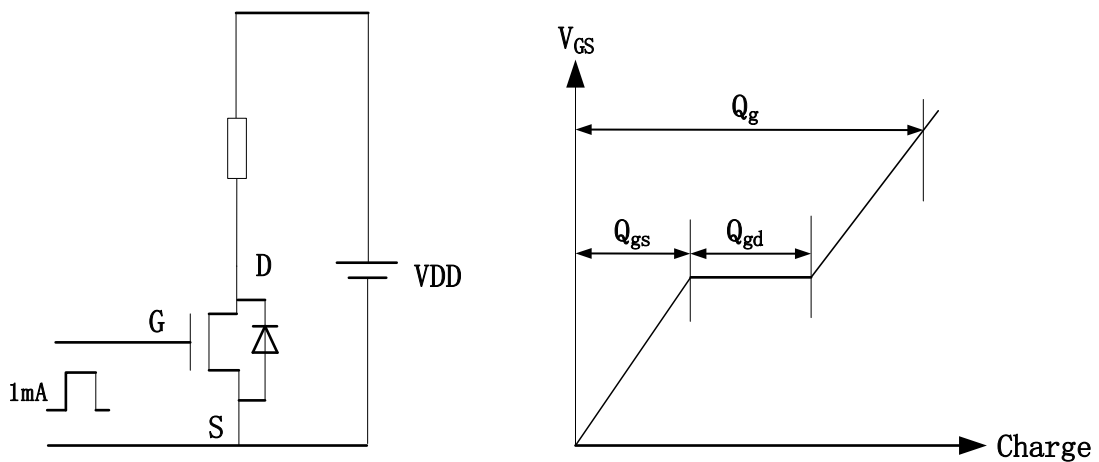


Figure 9 Gate charge Test circuit and waveforms



Package Information

