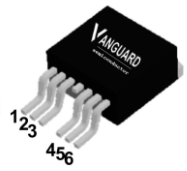
V_{DS}	40	V
$R_{DS(on),TYP}$@ V_{GS}=10 V	1.3	mΩ
$R_{DS(on),TYP}$@ V_{GS}=4.5V	1.8	mΩ
I_D	320	A

Features

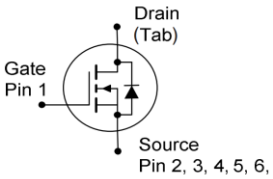
- N-Channel，5V Logic Level Control
- Enhancement mode
- Ultra Low On-Resistance
- 100% Avalanche Tested
- Pb-free lead plating; RoHS compliant

TO-263-6L



Pb-Free RoHS HF Halogen-Free

Part ID	Package Type	Marking	Tape and reel information
VS4603DM6	TO-263-6L	4603DM	800pcs/Reel



Maximum ratings, at T_A=25 °C, unless otherwise specified

Symbol	Parameter		Rating	Unit
$V_{(BR)DSS}$	Drain-Source breakdown voltage		40	V
V_{GS}	Gate-Source voltage		±20	V
I_S	Diode continuous forward current	T_C=25°C	320	A
I_D	Continuous drain current @V_{GS}=10V	T_C=25°C	320	A
		T_C=100°C	226	A
I_{DM}	Pulse drain current tested ①	T_C=25°C	1280	A
I_{DSM}	Continuous drain current @VGS=10V	T_A=25°C	27	A
		T_A=70°C	22	A
EAS	Avalanche energy, single pulsed ②		587	mJ
P_D	Maximum power dissipation	T_C=25°C	273	W
P_{DSM}	Maximum power dissipation ③	T_A=25°C	2	W
T_{STG}, T_J	Storage and junction temperature range		-55 to 175	°C

Thermal Characteristics

Symbol	Parameter	Typical	Unit
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	0.55	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	62.5	°C/W

Typical Characteristics

Symbol	Parameter	Condition	Min.	Typ.	Max.	Unit
Static Electrical Characteristics @ T_j = 25°C (unless otherwise stated)						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=250μA	40	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=40V,V_{GS}=0V	--	--	1	μA
	Zero Gate Voltage Drain Current(T_j=125℃)	V_{DS}=40V,V_{GS}=0V	--	--	100	μA
I_{GSS}	Gate-Body Leakage Current	V_{GS}=±20V,V_{DS}=0V	--	--	±100	nA
$V_{GS(TH)}$	Gate Threshold Voltage	V_{DS}=V_{GS},I_D=250μA	1.3	1.7	2.4	V
$R_{DS(ON)}$	Drain-Source On-State Resistance ④	V_{GS}=10V, I_D=60A	--	1.3	1.8	mΩ
$R_{DS(ON)}$	Drain-Source On-State Resistance ④	V_{GS}=4.5V, I_D=40A	--	1.8	2.5	mΩ
Dynamic Electrical Characteristics @ T_j= 25°C (unless otherwise stated)						
C_{iss}	Input Capacitance	V_{DS}=20V,V_{GS}=0V, f=1MHz	11900	13210	14500	pF
C_{oss}	Output Capacitance		870	1085	1300	pF
C_{rss}	Reverse Transfer Capacitance		725	925	1125	pF
R_g	Gate Resistance	f=1MHz	--	2	--	Ω
Q_g	Total Gate Charge	V_{DS}=20V,I_D=60A, V_{GS}=10V	--	109	--	nC
Q_{gs}	Gate-Source Charge		--	30.5	--	nC
Q_{gd}	Gate-Drain Charge		--	42	--	nC
Switching Characteristics						
$t_{d(on)}$	Turn-on Delay Time	V_{DD}=20V, I_D=60A, R_G=3Ω, V_{GS}=10V	--	30	--	ns
t_r	Turn-on Rise Time		--	24	--	ns
$t_{d(off)}$	Turn-Off Delay Time		--	45.5	--	ns
t_f	Turn-Off Fall Time		--	16.5	--	ns
Source- Drain Diode Characteristics@ T_j = 25°C (unless otherwise stated)						
V_{SD}	Forward on voltage	I_{SD}=40A,V_{GS}=0V	--	0.8	1.2	V
t_{rr}	Reverse Recovery Time	T_j=25℃,I_{sd}=60A, V_{GS}=0V di/dt=500A/μs	--	29	--	ns
Q_{rr}	Reverse Recovery Charge		--	179	--	nC

NOTE:

① Repetitive rating; pulse width limited by max junction temperature.

② Limited by T_{Jmax}, starting T_J = 25°C, L = 0.5mH,R_G = 25Ω, I_{AS} = 38A, V_{GS} =10V. Part not recommended for use above this value

③ The power dissipation P_{DSM} is based on $R_{\theta JA}$ and the maximum allowed junction temperature of 150°C.

④ Pulse width ≤ 300μs; duty cycle≤ 2%.

Typical Characteristics

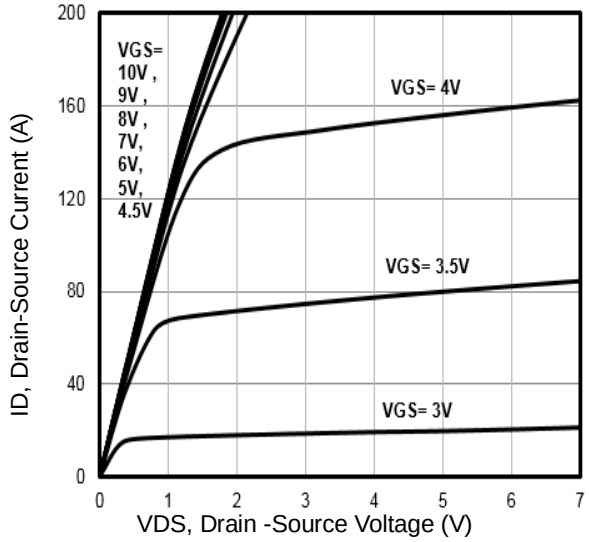


Fig1. Typical Output Characteristics

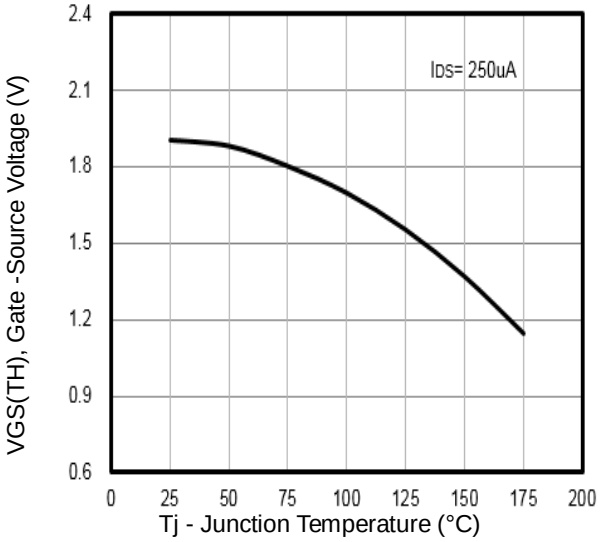


Fig2. $V_{GS(TH)}$ Gate -Source Voltage Vs. Tj

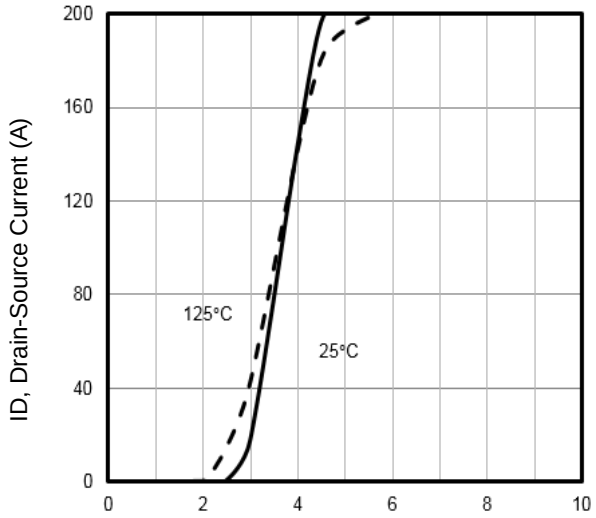


Fig3. Typical Transfer Characteristics

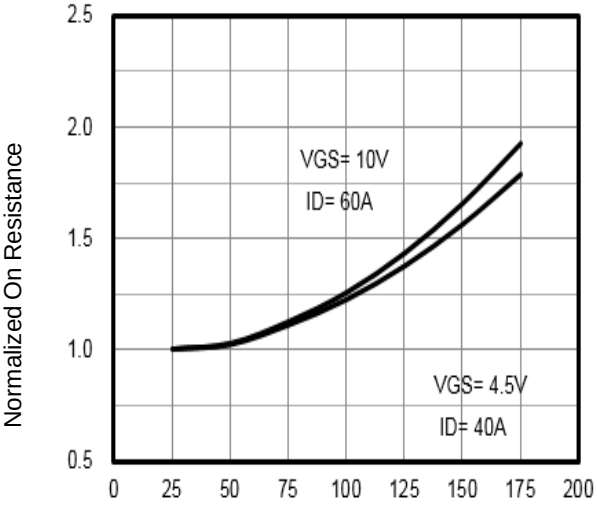


Fig4. Normalized On-Resistance Vs. Temperature

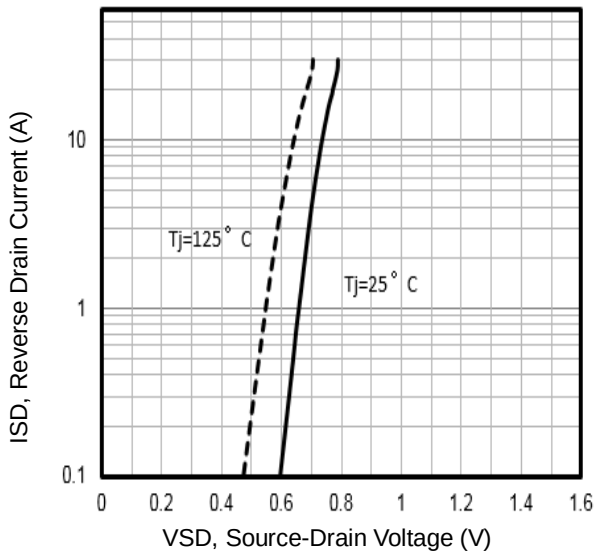


Fig5. Typical Source-Drain Diode Forward Voltage

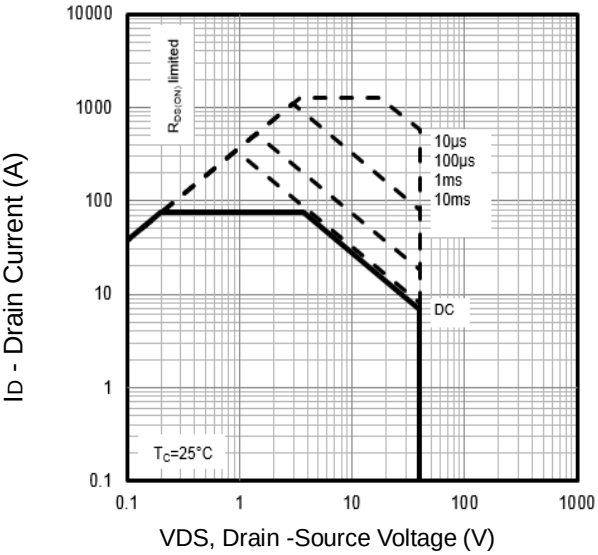


Fig6. Maximum Safe Operating Area

Typical Characteristics

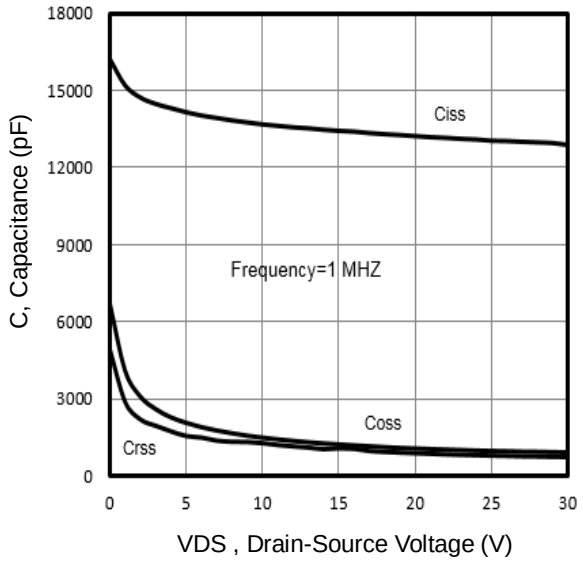


Fig7. Typical Capacitance Vs.Drain-Source Voltage

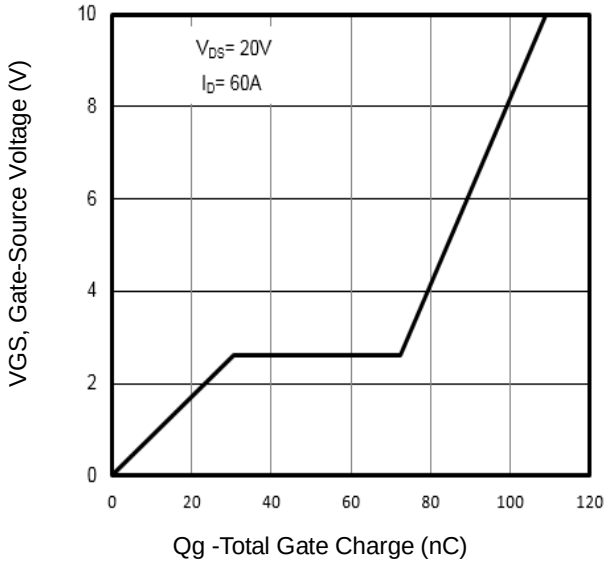


Fig8. Typical Gate Charge Vs.Gate-Source Voltage

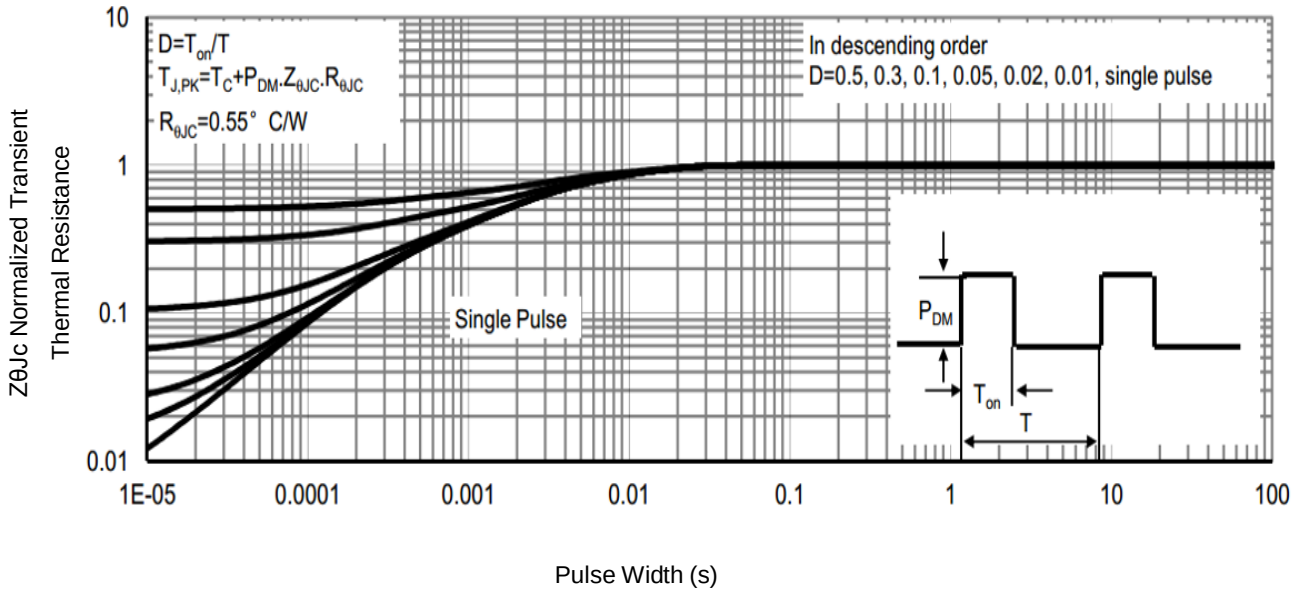


Fig9 . Normalized Maximum Transient Thermal Impedance

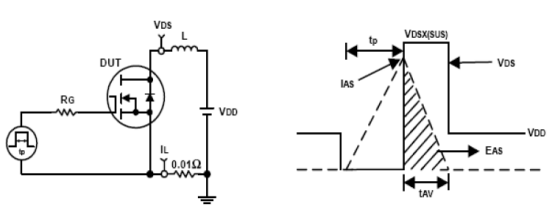


Fig10. Unclamped Inductive Test Circuit and waveforms

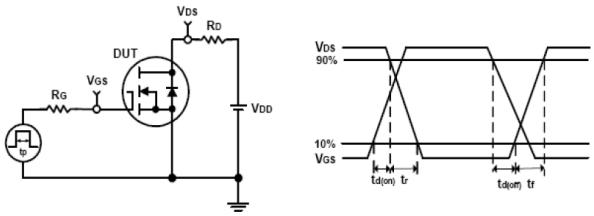
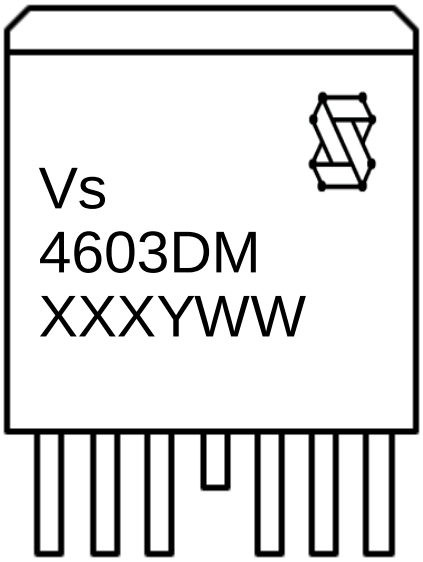


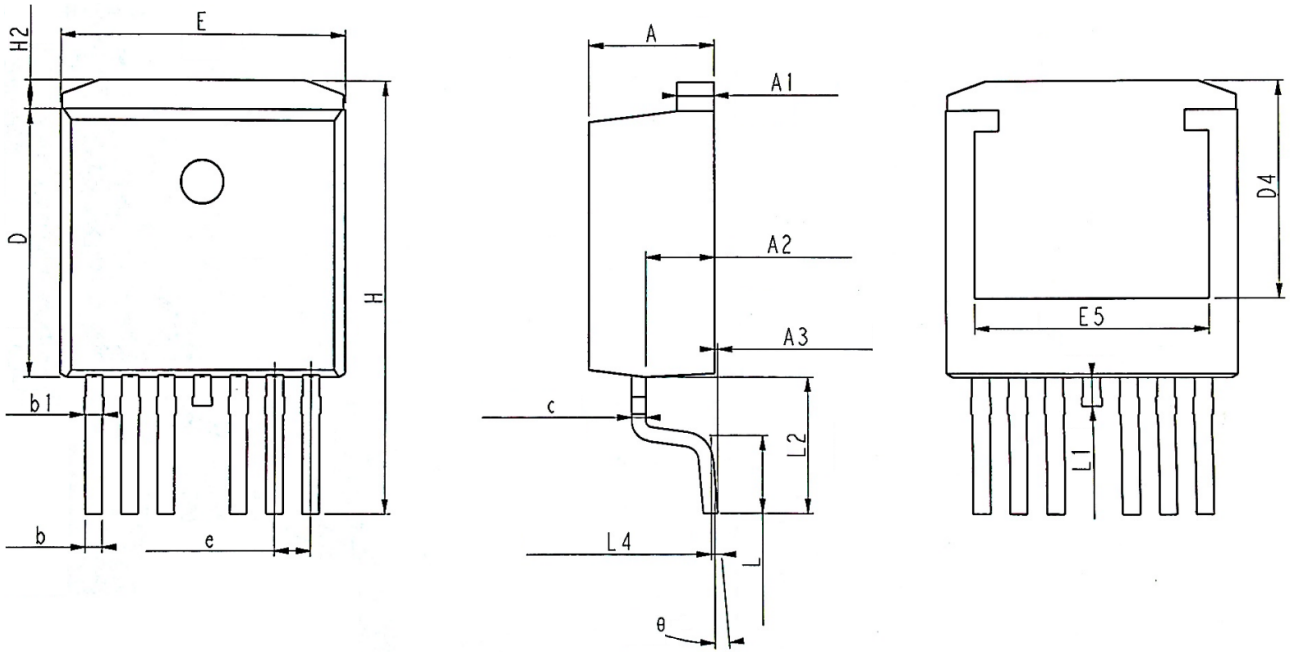
Fig11. Switching Time Test Circuit and waveforms

Marking Information



1st line: Vanguard Code（Vs）， Vanguard Logo
2nd line: Part Number（4603DM）
3rd line: Date code （XXXYWW）
XXX: Wafer Lot Number
Y: Year Code， e.g. E means 2017
WW: Week Code

TO-263-6L Package Outline Data



Symbol	Dimensions (unit: mm)		
	Min	Typ	Max
A	4.25	4.40	4.55
A1	1.20	1.30	1.40
A2	2.25	2.40	2.55
A3	0.01	0.13	0.25
b	0.50	0.60	0.70
b1	0.58	0.68	0.84
c	0.40	0.50	0.60
D	9.05	9.25	9.45
D4	6.90		
e	1.27 BSC		
E	9.80	10.00	10.20
E5	7.25		
H	14.65	15.00	15.35
H2	0.80	1.00	1.20
L1	0.85	1.00	1.15
L2	4.20	4.70	5.20
L4	0.25 BSC		
θ	2 °	5 °	8 °

Notes:

1. Dimension "D" & "E" do NOT include mold flash, mold flash shall not exceed 0.127mm per side.

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