Vanguard Semiconductor

VS6018BTD

65V/95A N-Channel Advanced Power MOSFET

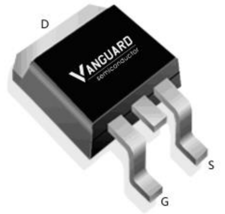
Features

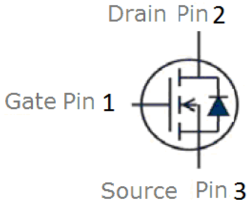
- N-Channel，5V Logic Level Control
- Enhancement mode
- Very low on-resistance $R_{DS(on)}$ @ V_{GS}=4.5V
- 100% Avalanche test
- Pb-free lead plating; RoHS compliant

Pb-Free RoHS HF Halogen-Free

V_{DS}	65	V
$R_{DS(on),TYP}$@ V_{GS}=10V	6.3	mΩ
$R_{DS(on),TYP}$@ V_{GS}=4.5V	7.6	mΩ
I_D	95	A

TO-263





Part ID	Package Type	Marking	Tape and reel information
VS6018BTD	TO-263	6018BTD	1000PCS/Reel

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

Symbol	Parameter		Rating	Unit
$V_{(BR)DSS}$	Drain-Source breakdown voltage		65	V
V_{GS}	Gate-Source voltage		±20	V
I_S	Diode continuous forward current	T_C=25°C	95	A
I_D	Continuous drain current @V_{GS}=10V	T_C=25°C	95	A
		T_C=100°C	67	A
I_{DM}	Pulse drain current tested ①	T_C=25°C	380	A
I_{DSM}	Continuous drain current @VGS=10V	T_A=25°C	13	A
		T_A=70°C	10	A
EAS	Avalanche energy, single pulsed ②		87	mJ
P_D	Maximum power dissipation	T_C=25°C	115	W
P_{DSM}	Maximum power dissipation ③	T_A=25°C	2	W
MSL			Level 3	
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	1.3	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	62.5	°C/W

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	65	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=65V,V_{GS}=0V	--	--	1	μA
	Zero Gate Voltage Drain Current(T_j=125℃)	V_{DS}=65V,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=40A	--	6.3	9	mΩ
$R_{DS(ON)}$	Drain-Source On-State Resistance ④	V_{GS}=4.5V, I_D=20A	--	7.6	11	mΩ
Dynamic Electrical Characteristics @ *T* j = 25°C (unless otherwise stated)						
C_{iss}	Input Capacitance	V_{DS}=30V,V_{GS}=0V, f=1MHz	4000	5080	6100	pF
C_{oss}	Output Capacitance		150	250	350	pF
C_{rss}	Reverse Transfer Capacitance		120	205	280	pF
R_g	Gate Resistance	f=1MHz	--	2.2	--	Ω
Q_g	Total Gate Charge	V_{DS}=30V,I_D=40A, V_{GS}=10V	--	82	--	nC
Q_{gs}	Gate-Source Charge		--	17	--	nC
Q_{gd}	Gate-Drain Charge		--	16	--	nC
Switching Characteristics						
$t_{d(on)}$	Turn-on Delay Time	V_{DD}=30V, I_D=40A, R_G=3Ω, V_{GS}=10V	--	15.5	--	nS
t_r	Turn-on Rise Time		--	6.4	--	nS
$t_{d(off)}$	Turn-Off Delay Time		--	53	--	nS
t_f	Turn-Off Fall Time		--	9	--	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}=40A, V_{GS}=0V di/dt=500A/μs	--	20	--	nS
Q_{rr}	Reverse Recovery Charge			56		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} = 15A, 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

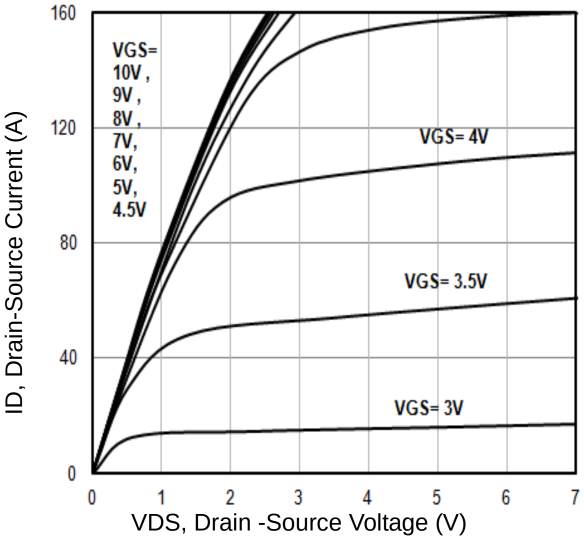


Fig1. Typical Output Characteristics

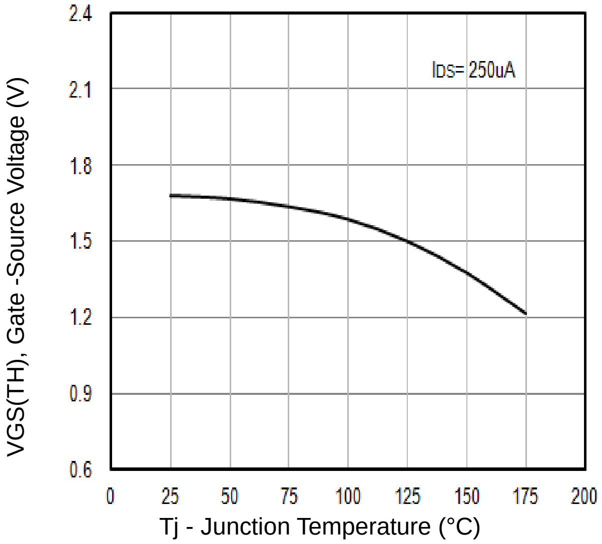


Fig2. $V_{GS(TH)}$ Gate -Source Voltage Vs. Tj

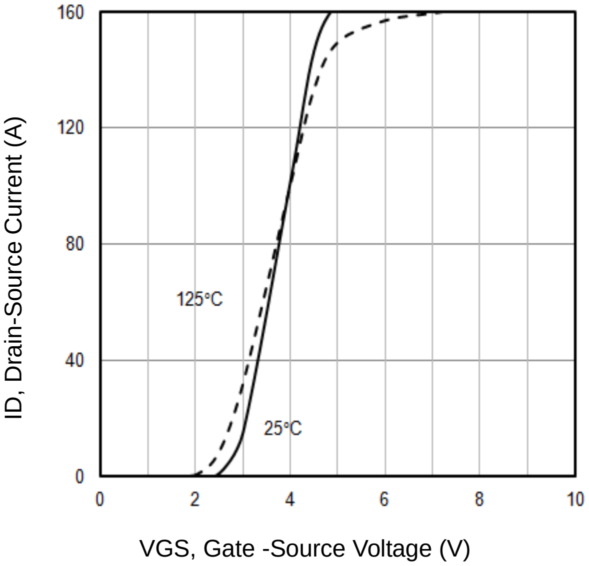


Fig3. Typical Transfer Characteristics

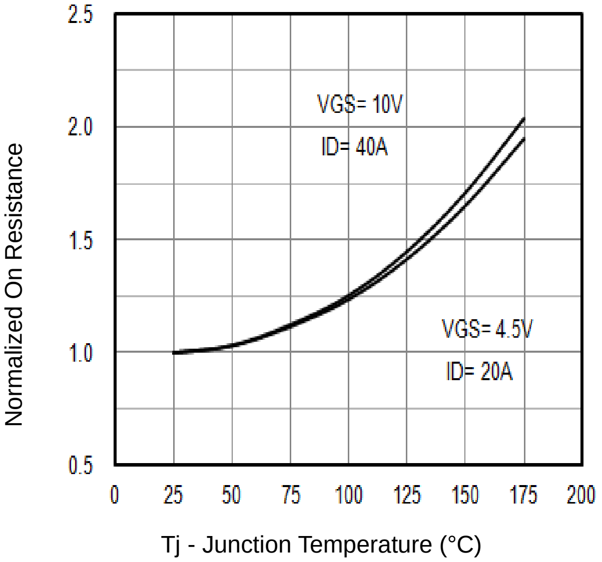


Fig4. Normalized On-Resistance Vs. Temperature

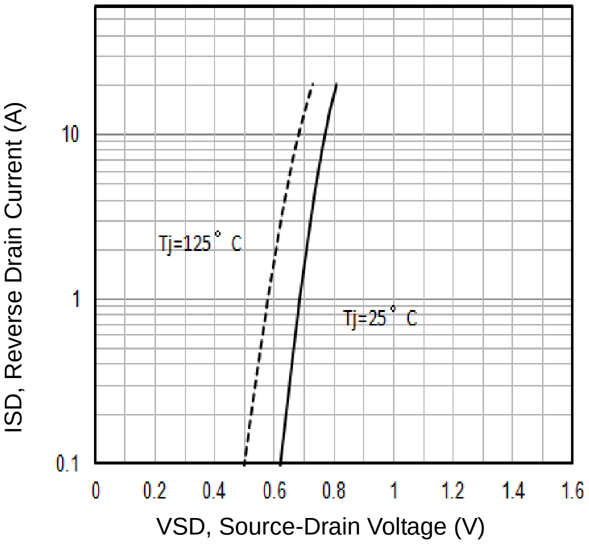


Fig5. Typical Source-Drain Diode Forward Voltage

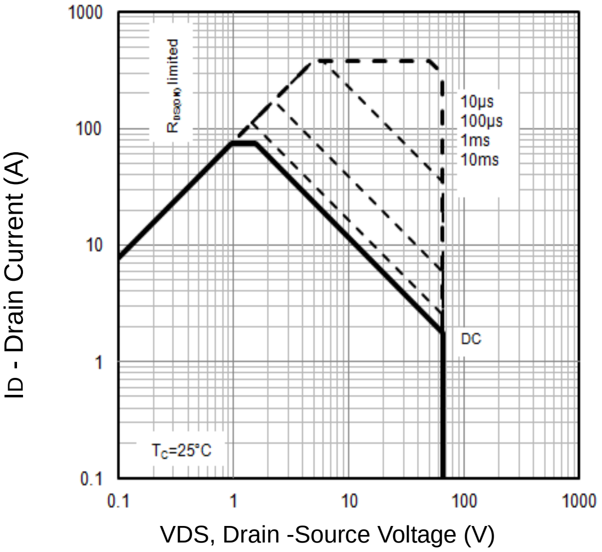


Fig6. Maximum Safe Operating Area

Typical Characteristics

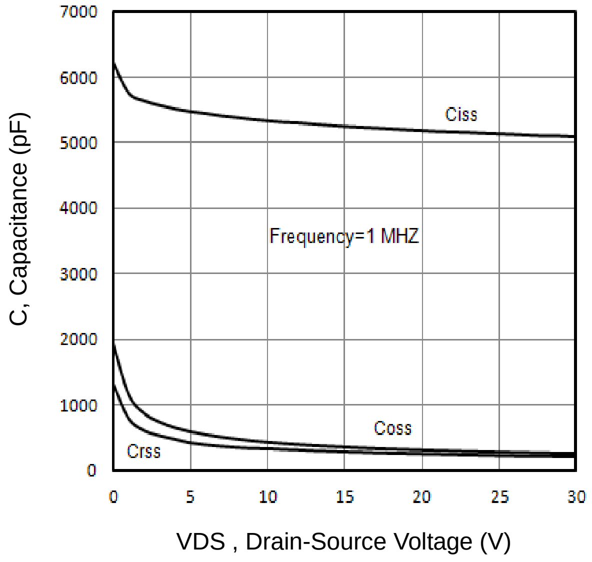


Fig7. Typical Capacitance Vs.Drain-Source Voltage

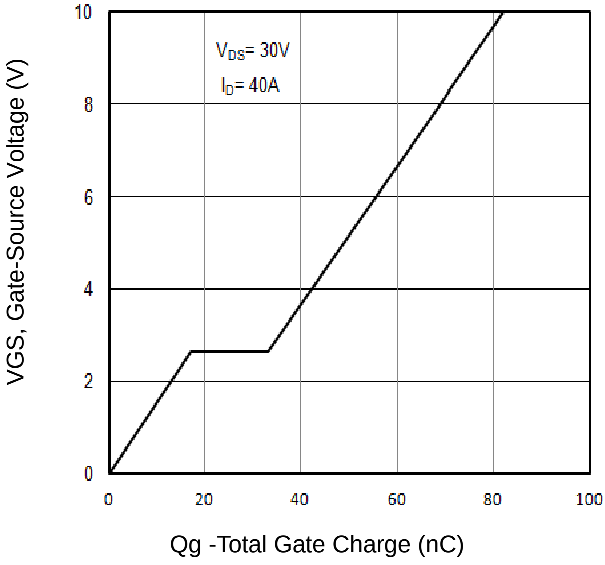


Fig8. Typical Gate Charge Vs.Gate-Source Voltage

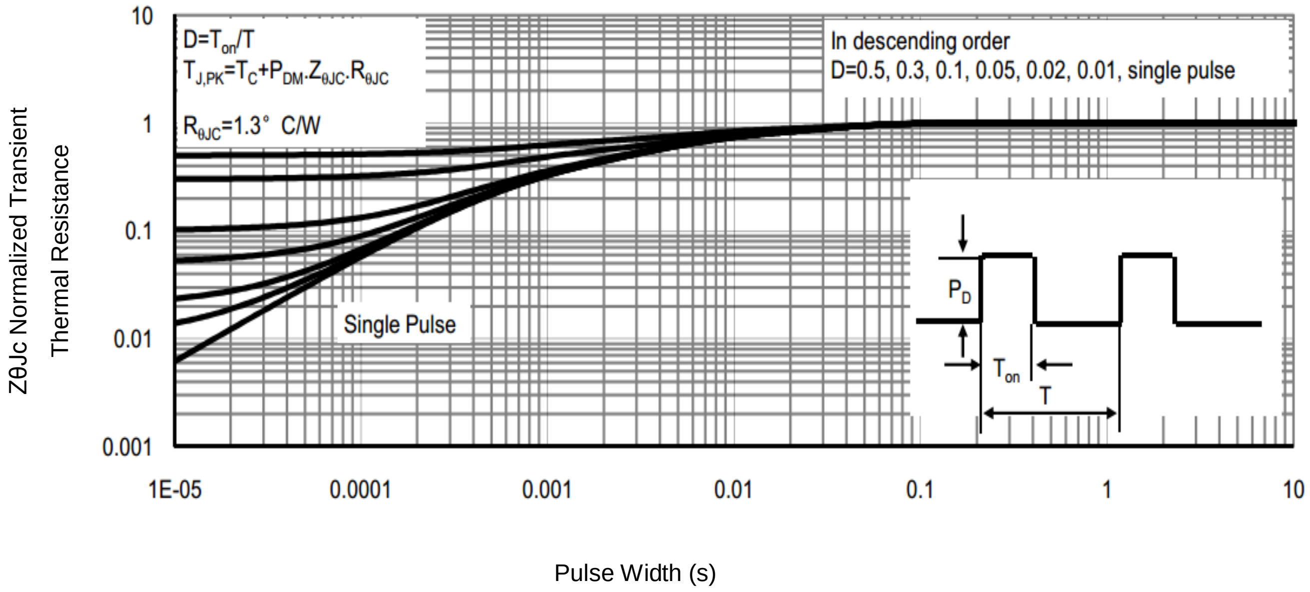


Fig9 . Normalized Maximum Transient Thermal Impedance

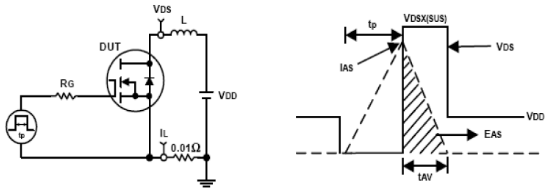


Fig10. Unclamped Inductive Test Circuit and waveforms

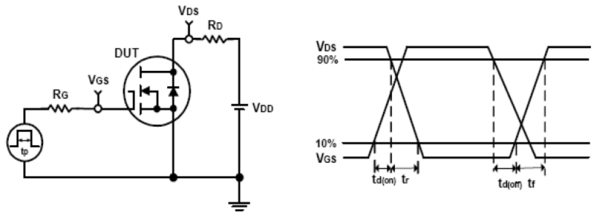
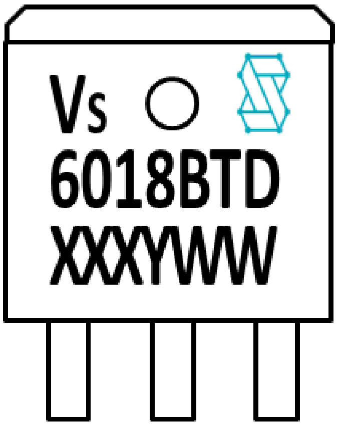


Fig11. Switching Time Test Circuit and waveforms

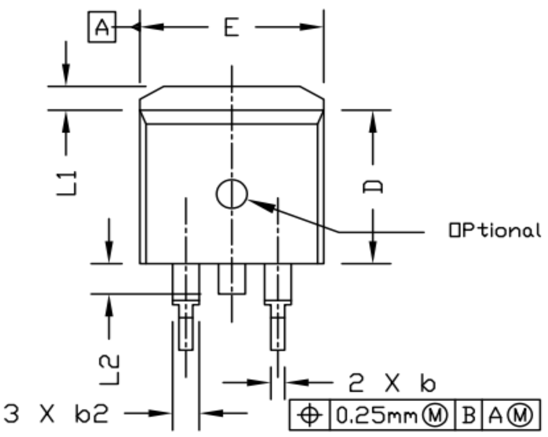
Marking Information

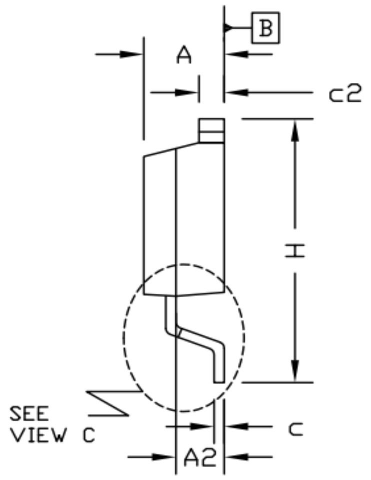


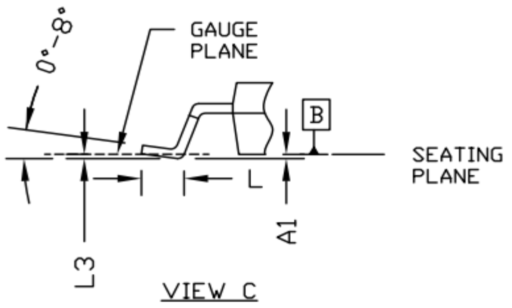
1st line： Company Code（Vs）， Company Logo
2nd line： Part Number（6018BTD）
3rd line： Date code （XXXYWW）

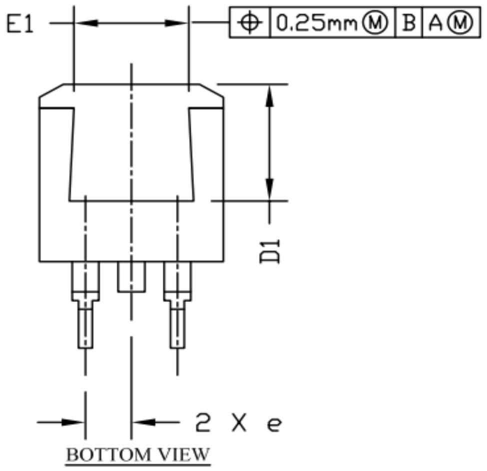
XXX： Wafer Lot Number
Y： Year Code， e.g. E means 2017
WW： Week Code

TO-263 Package Outline Data









Symbol	Dimensions (unit: mm)		
	Min	Typ	Max
A	4.400	4.570	4.700
A1	0.000	0.100	0.200
A2	2.300	2.400	2.500
b	0.700	0.800	0.900
b2	1.200	1.270	1.360
c	0.381	0.500	0.737
c2	1.220	1.300	1.350
D	8.600	9.200	9.300
D1	6.860		
e	2.540 BSC		
E	9.780	9.880	10.260
E1	6.225		
H	14.700	15.100	15.500
L	2.000	2.550	2.750
L1	1.000	1.200	1.400
L2	1.300	1.600	1.700
L3	0.255 BSC		

Notes:

1. Refer to JEDEC TO-263 variation AB
2. Dimension "D" & "E" do NOT include mold flash, mold flash shall not exceed 0.127mm per side.

Customer Service

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