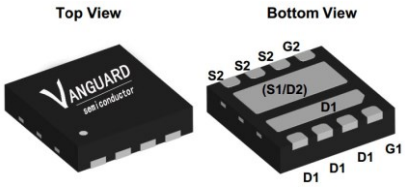
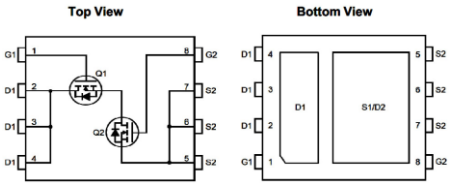
Features

- Dual N-Channel
- High Current Capability
- Low on-resistance $R_{DS(on)}$ @ V_{GS}=4.5 V
- Low Gate Charge
- Pb-free lead plating; RoHS compliant

V_{DS}	30	V
$R_{DS(on),TYP}$@ V_{GS}=10 V	14	mΩ
$R_{DS(on),TYP}$@ V_{GS}=4.5 V	22	mΩ
I_D	25	A

DFN3x3





Pb-Free RoHS Halogen-Free

Part ID	Package Type	Marking	Tape and reel information
VS3640DB	DFN3x3	3640DB	5000pcs/Reel

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

Symbol	Parameter		Rating	Unit
$V_{(BR)DSS}$	Drain-Source breakdown voltage		30	V
V_{GS}	Gate-Source voltage		±20	V
I_S	Diode continuous forward current	T_C =25°C	25	A
I_D	Continuous drain current @V_{GS}=10V ①	T_C =25°C	25	A
		T_C =100°C	16	A
I_{DM}	Pulse drain current tested ②	T_C =25°C	100	A
I_{DSM}	Continuous drain current @VGS=10V	T_A =25°C	11	A
		T_A =70°C	9	A
P_D	Maximum power dissipation	T_C =25°C	14	W
P_{DSM}	Maximum power dissipation ③	T_A =25°C	2.8	W
T_{STG}, T_J	Storage and Junction Temperature Range		-55 to 150	°C

Thermal Characteristics

Symbol	Parameter	Typical	Unit
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	9	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	45	°C/W

Typical Electrical 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	30	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current(T_j=25℃)	V_{DS}=30V,V_{GS}=0V	--	--	1	μA
	Zero Gate Voltage Drain Current(T_j=125℃)	V_{DS}=30V,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	1.9	2.5	V
$R_{DS(ON)}$	Drain-Source On-State Resistance ④	V_{GS}=10V, I_D=10A	--	14	20	mΩ
$R_{DS(ON)}$	Drain-Source On-State Resistance ④	V_{GS}=4.5V, I_D=6A	--	22	31	mΩ
Dynamic Electrical Characteristics @ T_J = 25°C (unless otherwise stated)						
C_{iss}	Input Capacitance	V_{DS}=15V,V_{GS}=0V, f=1MHz	360	460	560	pF
C_{oss}	Output Capacitance		--	75	130	pF
C_{rss}	Reverse Transfer Capacitance		--	60	110	pF
R_g	Gate Resistance	f=1MHz	--	4.7	--	Ω
Q_g	Total Gate Charge	V_{DS}=15V,I_D=10A, V_{GS}=10V	--	11.3	--	nC
Q_{gs}	Gate-Source Charge		--	3	--	nC
Q_{gd}	Gate-Drain Charge		--	4.3	--	nC
Switching Characteristics						
$t_{d(on)}$	Turn-on Delay Time	V_{DD}=15V, I_D=10A, R_G=3Ω, V_{GS}=10V	--	7	--	ns
t_r	Turn-on Rise Time		--	10	--	ns
$t_{d(off)}$	Turn-Off Delay Time		--	22	--	ns
t_f	Turn-Off Fall Time		--	7	--	ns
Source- Drain Diode Characteristics@ T_J = 25°C (unless otherwise stated)						
V_{SD}	Forward on voltage	I_{SD}=10A,V_{GS}=0V	--	0.9	1.2	V
t_{rr}	Reverse Recovery Time	T_j=25℃,I_{sd}=10A, V_{GS}=0V di/dt=500A/μs	--	9.5	--	ns
Q_{rr}	Reverse Recovery Charge		--	11.8	--	nC

NOTE: ① The maximum current rating is limited by package

② Repetitive rating; pulse width limited by max junction temperature.

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

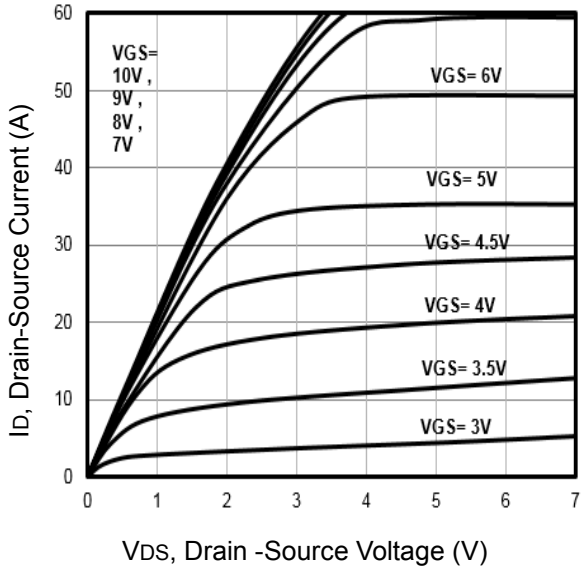


Fig1. Typical Output Characteristics

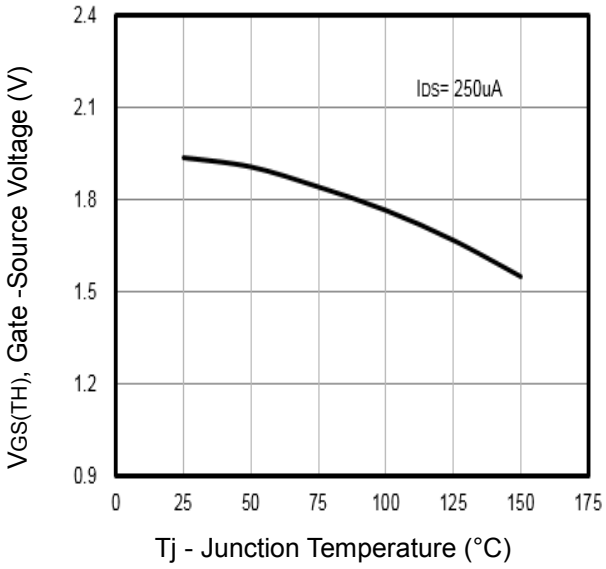


Fig2. Threshold Voltage Vs. Temperature

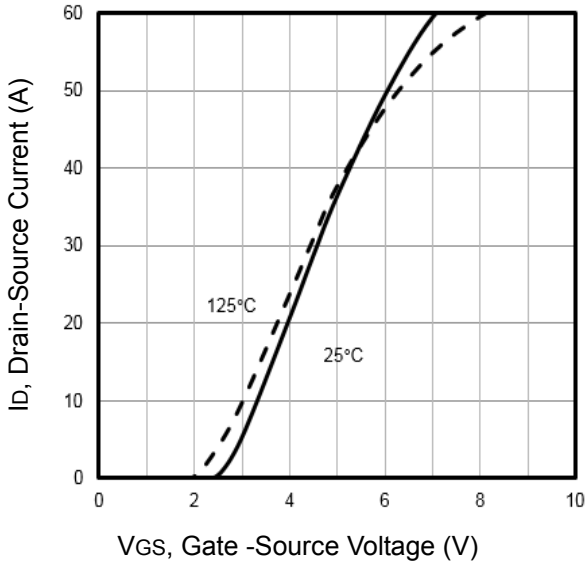


Fig3. Typical Transfer Characteristics

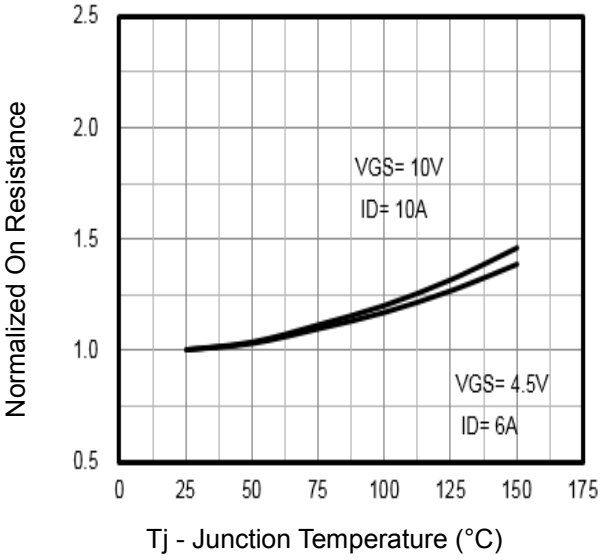


Fig4. Normalized On-Resistance Vs. Temperature

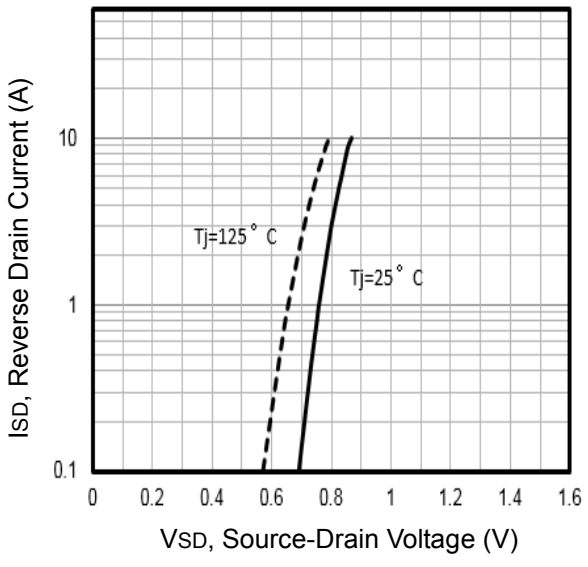


Fig5. Typical Source-Drain Diode Forward Voltage

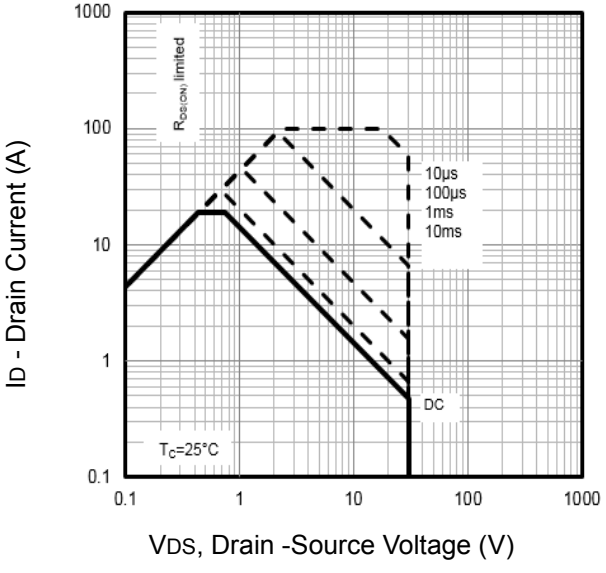


Fig6. Maximum Safe Operating Area

Typical Characteristics

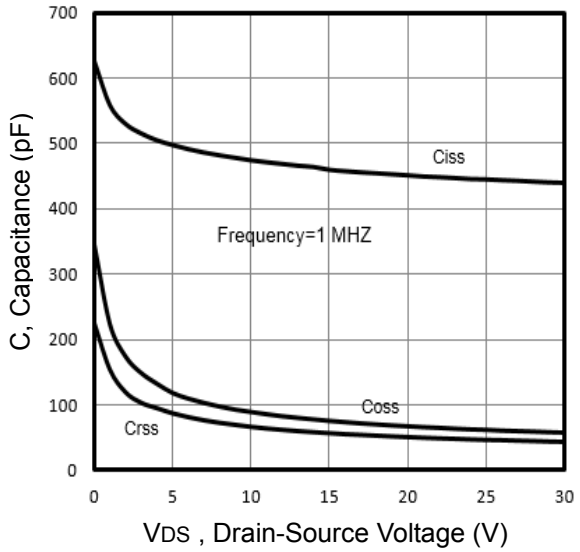


Fig7. Typical Capacitance Vs.Drain-Source Voltage

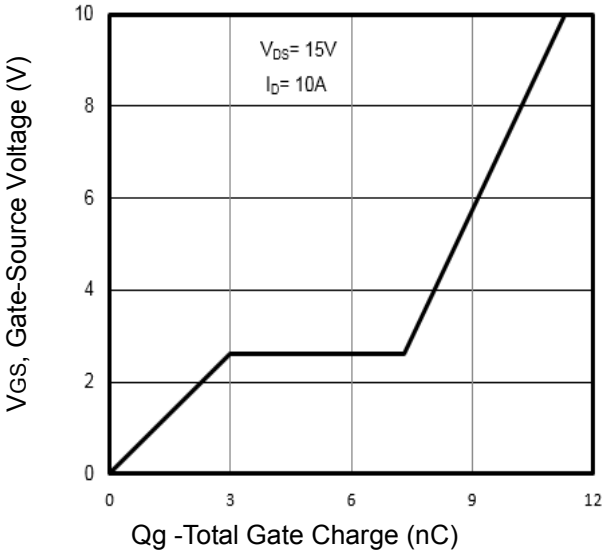


Fig8. Typical Gate Charge Vs.Gate-Source Voltage

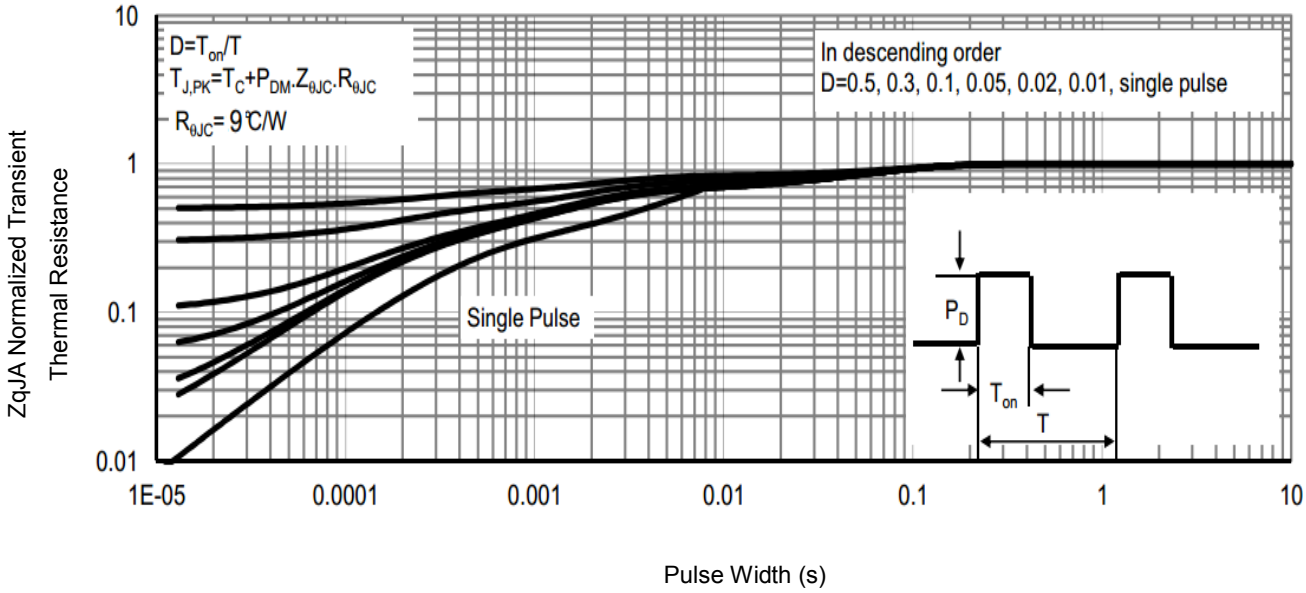


Fig9. Normalized Maximum Transient Thermal Impedance

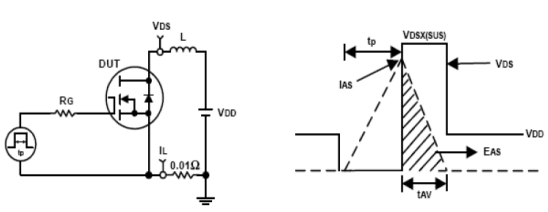


Fig10. Unclamped Inductive Test Circuit and waveforms

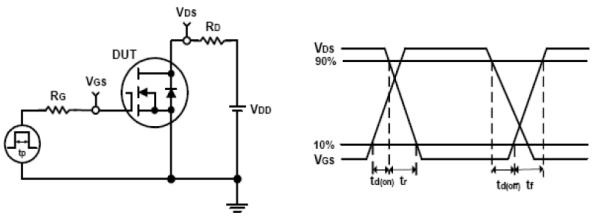
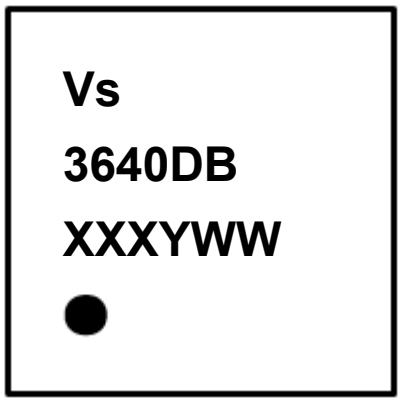


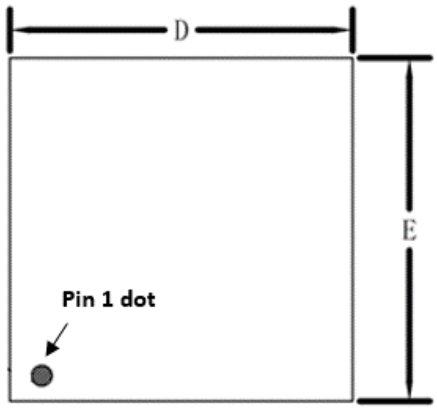
Fig11. Switching Time Test Circuit and waveforms

Marking Information

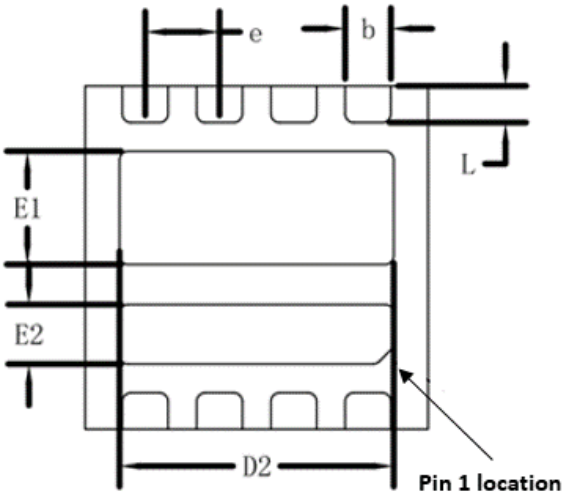


1st line：Vanguard Code（Vs）
2nd line：Part Number（3640DB）
3rd line：Date code （XXXYWW）
XXX：Wafer Lot Number
Y：Year Code，e.g. E means 2017
WW：Week Code

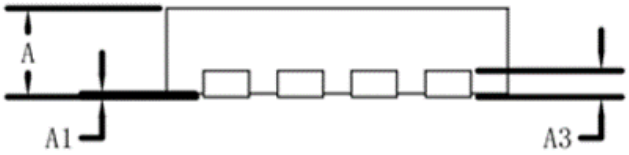
DFN3x3 Dual Package Outline Data



TOP VIEW



BOTTOM VIEW



SIDE VIEW

Symbol	Dimensions (unit: mm)		
	Min	Typ	Max
A	0.70	0.75	0.80
A1	0.00	--	0.05
A3	0.20 REF		
D	2.90	3.00	3.10
E	2.90	3.00	3.10
D2	2.30	2.40	2.50
E2	0.42	0.52	0.62
E1	0.89	0.99	1.09
b	0.35	0.40	0.45
L	0.27	0.32	0.37
e	0.65 BSC		

Customer Service

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