

Features

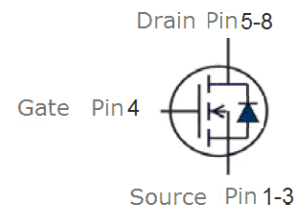
- N-Channel, 5V Logic Level Control
- Enhancement mode
- Very low on-resistance $R_{DS(on)}$ @ $V_{GS}=4.5\text{ V}$
- Fast Switching
- 100% Avalanche Tested
- Pb-free lead plating; RoHS compliant


Halogen-Free

Part ID	Package Type	Marking	Tape and reel information
VS3698AE	PDFN3333	3698AE	5000pcs/Reel

V_{DS}	30	V
$R_{DS(on),TYP} @ V_{GS}=10\text{ V}$	3.0	mΩ
$R_{DS(on),TYP} @ V_{GS}=4.5\text{ V}$	4.4	mΩ
I_D	76	A

PDFN3333



Absolute aximum ratings, at $T_J=25\text{ °C}$, unless otherwise specified

Symbol	Parameter		Rating	Unit
V _{(BR)DSS}	Drain-Source breakdown voltage		30	V
I _S	Diode continuous forward current	T _C =25°C	76	A
I _D	Continuous drain current@VGS=10V	T _C =25°C	76	A
		T _C =100°C	49	A
I _{DM}	Pulse drain current tested ①	T _C =25°C	300	A
P _D	Maximum power dissipation	T _C =25°C	36.5	W
V _{GS}	Gate-Source voltage		±20	V
T _{STG} T _J	Storage and operating temperature range		-55 to 150	°C

Thermal Characteristics

Symbol	Parameter	Typical	Unit
$R_{\theta JC}$	Thermal Resistance-Junction to Case	3.4	°C/W
$R_{\theta JA}$	Thermal Resistance Junction-Ambient	40	°C/W

Drain-Source Avalanche Ratings

EAS	Avalanche Energy, Single Pulsed ②	256	mJ
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Symbol	Parameter	Condition	Min.	Typ.	Max.	Unit
Static Electrical Characteristics @ $T_j=25^{\circ}\text{C}$ (unless otherwise stated)						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	30	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current(	$V_{DS}=30V, V_{GS}=0V$	--	--	1	μA
	Zero Gate Voltage Drain Current($T_j=125^{\circ}\text{C}$)	$V_{DS}=30V, V_{GS}=0V$	--	--	100	μA
I_{GSS}	Gate-Body Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	--	--	± 100	nA
$V_{GS(TH)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	1.0	1.8	2.5	V
$R_{DS(ON)}$	Drain-Source On-State Resistance③	$V_{GS}=10V, I_D=15A$	--	3.0	4.5	m Ω
$R_{DS(ON)}$	Drain-Source On-State Resistance③	$V_{GS}=4.5V, I_D=10A$	--	4.4	6.0	m Ω
Dynamic Electrical Characteristics @ $T_j=25^{\circ}\text{C}$ (unless otherwise stated)						
C_{iss}	Input Capacitance	$V_{DS}=15V, V_{GS}=0V,$ $f=1\text{MHz}$	--	2530	--	pF
C_{oss}	Output Capacitance		--	380	--	pF
C_{rss}	Reverse Transfer Capacitance		--	295	--	pF
R_g	Gate Resistance	$f=1\text{MHz}$		0.95		Ω
Q_g	Total Gate Charge	$V_{DS}=15V, I_D=20A,$ $V_{GS}=10V$	--	54	--	nC
Q_{gs}	Gate-Source Charge		--	6	--	nC
Q_{gd}	Gate-Drain Charge		--	14	--	nC
Switching Characteristics						
$t_{d(on)}$	Turn-on Delay Time	$V_{DD}=15V,$ $I_D=10A,$ $R_G=3.5\Omega,$ $V_{GS}=10V$	--	8	--	nS
t_r	Turn-on Rise Time		--	5	--	nS
$t_{d(off)}$	Turn-Off Delay Time		--	27	--	nS
t_f	Turn-Off Fall Time		--	11	--	nS
Source- Drain Diode Characteristics@ $T_j=25^{\circ}\text{C}$ (unless otherwise stated)						
V_{SD}	Forward on voltage	$I_{SD}=20A, V_{GS}=0V$	--	0.81	1.2	V
t_{rr}	Reverse Recovery Time	$T_j=25^{\circ}\text{C}, I_{sd}=20A,$ $di/dt=500A/\mu s$	--	43	--	nS
Q_{rr}	Reverse Recovery Charge			37		nC

NOTE:

- ① Repetitive rating; pulse width limited by max. junction temperature.
- ② Limited by T_{jmax} , starting $T_j = 25^\circ\text{C}$, $L = 0.5\text{mH}$, $R_G = 25\Omega$, $I_{AS} = 32A$, $V_{GS} = 10V$. Part not recommended for use above this value
- ③ Pulse width $\leq 300\mu s$; duty cycle $\leq 2\%$.

Typical Characteristics

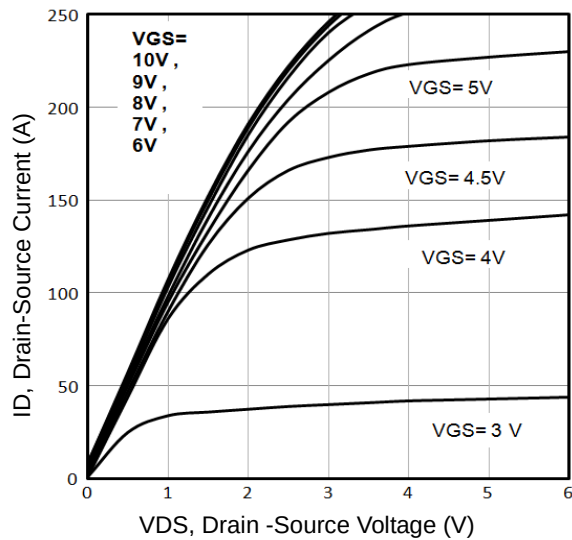


Fig1. Typical Output Characteristics

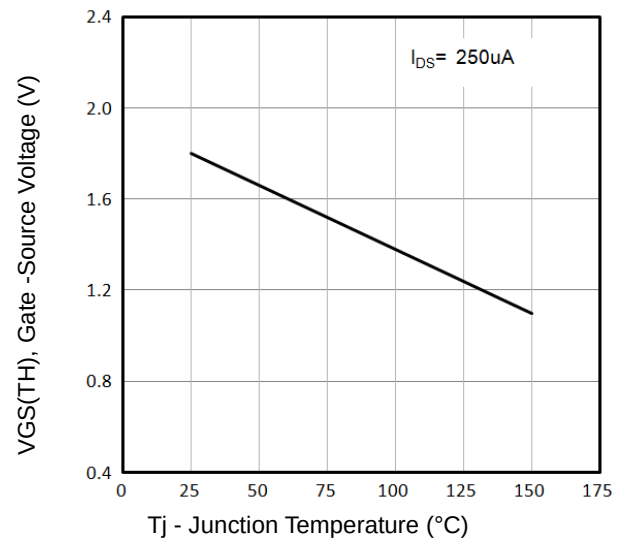


Fig2. $V_{GS(TH)}$ Gate-Source Voltage Vs. T_j

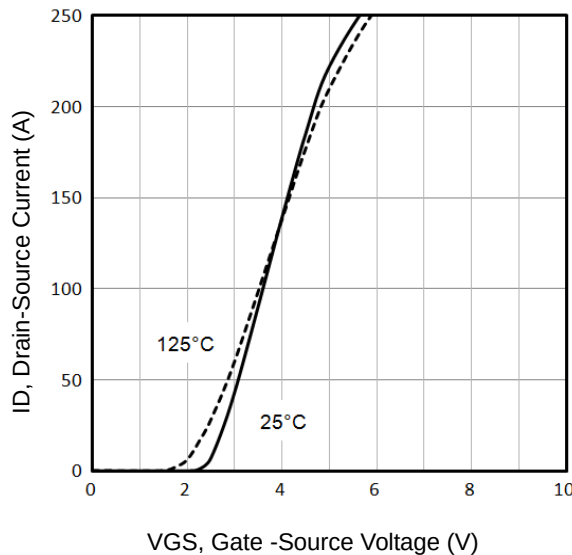


Fig3. Typical Transfer Characteristics

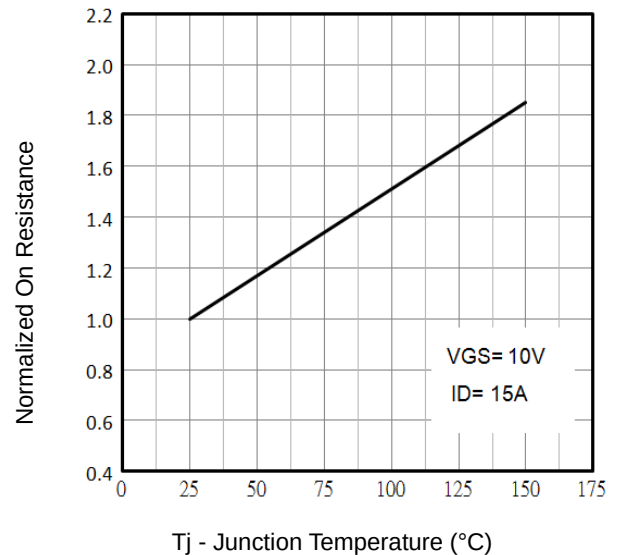


Fig4. Normalized On-Resistance Vs. T_j

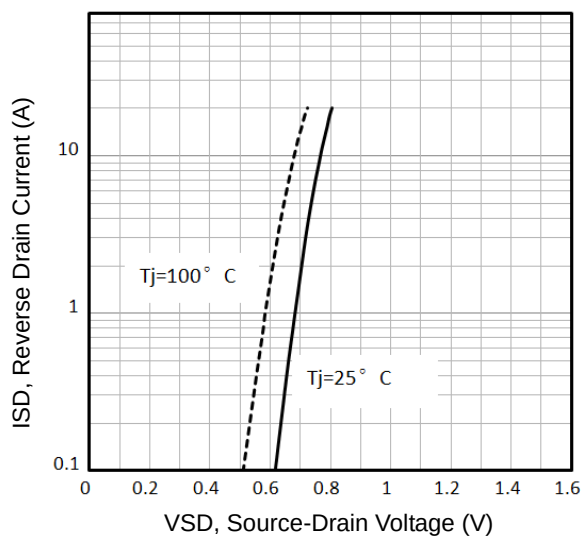


Fig5. Typical Source-Drain Diode Forward Voltage

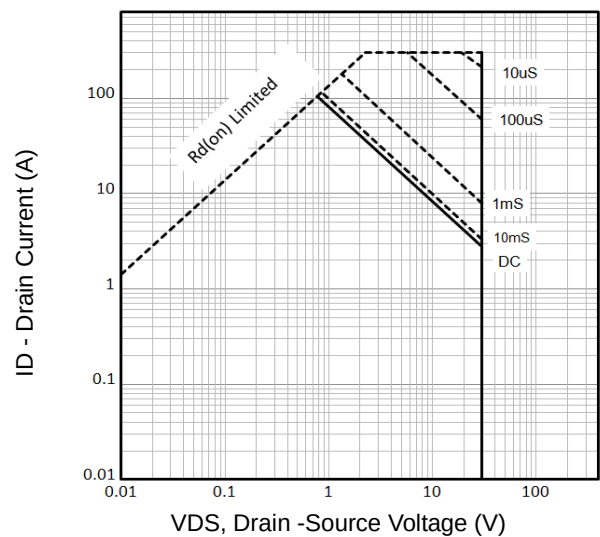


Fig6. Maximum Safe Operating Area

Typical Characteristics

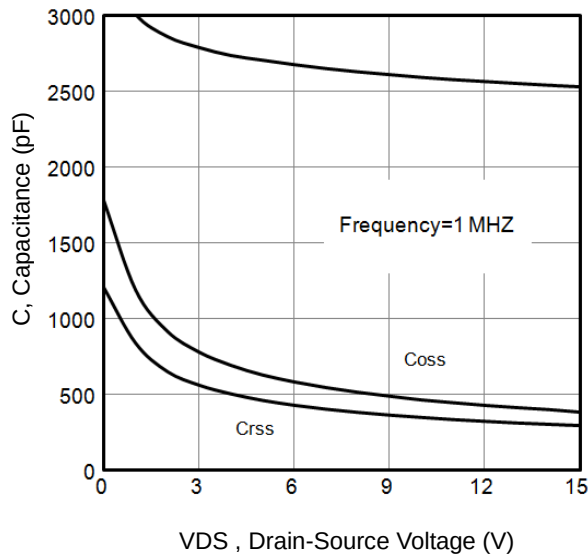


Fig7. Typical Capacitance Vs.Drain-Source Voltage

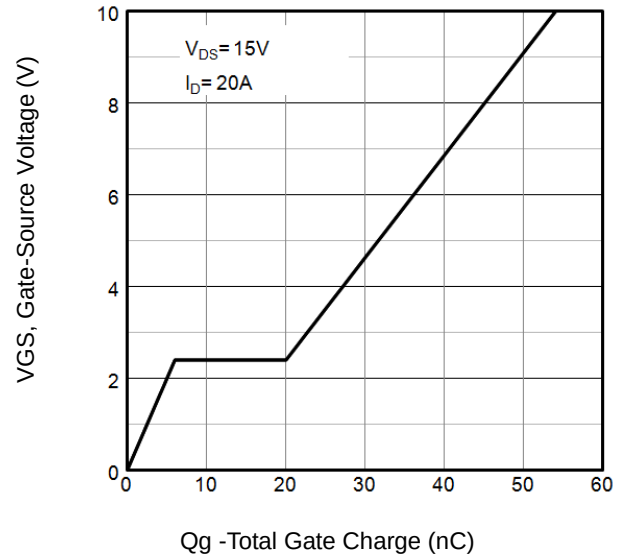


Fig8. Typical Gate Charge Vs.Gate-Source Voltage

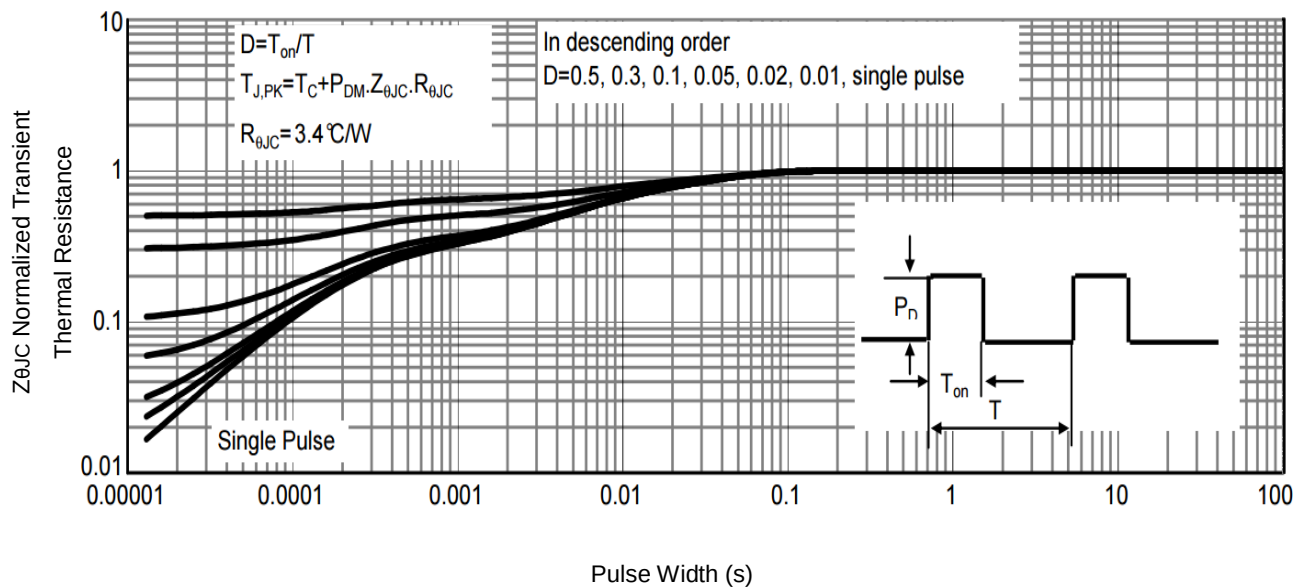


Fig9 . Normalized Maximum Transient Thermal Impedance

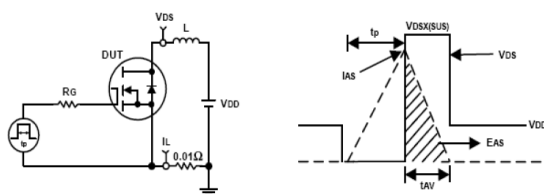


Fig10. Unclamped Inductive Test Circuit and waveforms

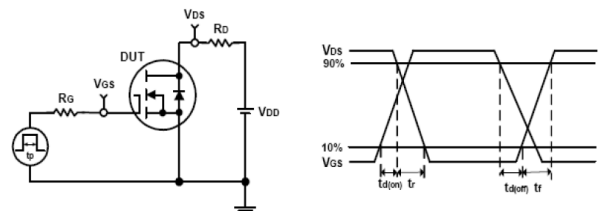
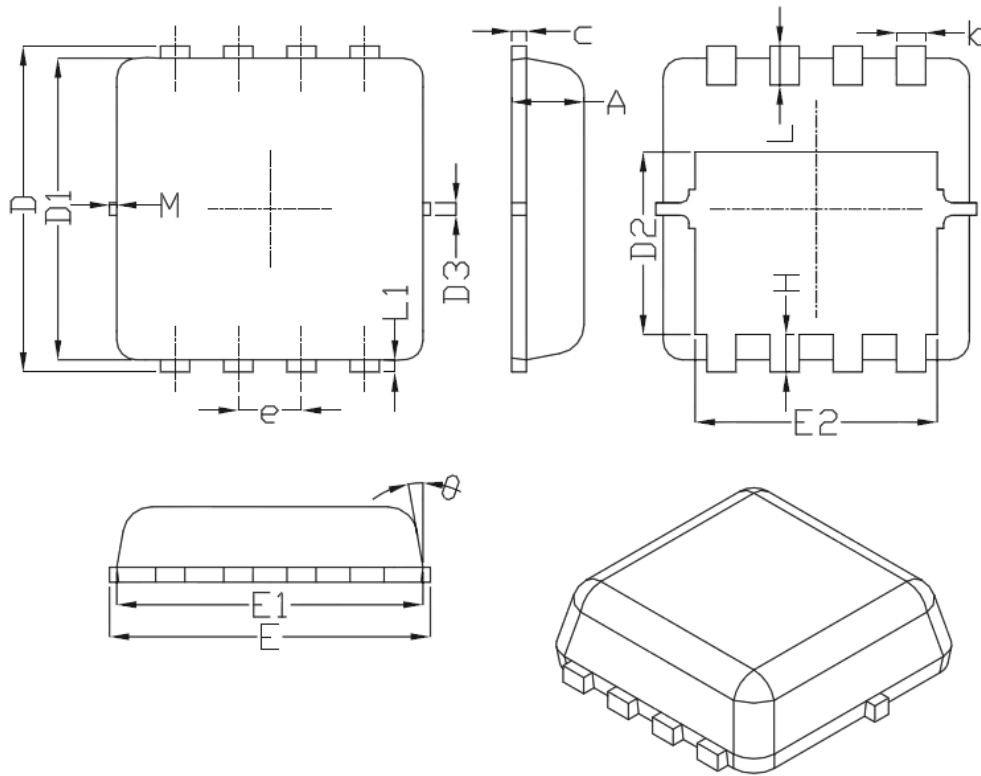


Fig11. Switching Time Test Circuit and waveforms

PDFN3333 Package Outline Data



DIMENSIONS (unit : mm)

Symbol	Min	Typ	Max	Symbol	Min	Typ	Max
A	0.70	0.75	0.80	b	0.25	0.30	0.35
C	0.10	0.15	0.25	D	3.25	3.35	3.45
D1	3.00	3.10	3.20	D2	1.78	1.88	1.98
D3	--	0.13	--	E	3.20	3.30	3.40
E1	3.00	3.15	3.20	E2	2.39	2.49	2.59
e	0.65BSC			H	0.30	0.39	0.50
L	0.30	0.40	0.50	L1	--	0.13	--
θ	--	10°	12°	M	*	*	0.15
*Not specified							

Customer Service

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