Single N-Channel, 30V, 40A, Power MOSFET

Features

- ✧ High density cell design for Low $R_{DS(on)}$
- ✧ Green device available
- ✧ Small package : DFN3.3x3.3
- ✧ Low gate charge

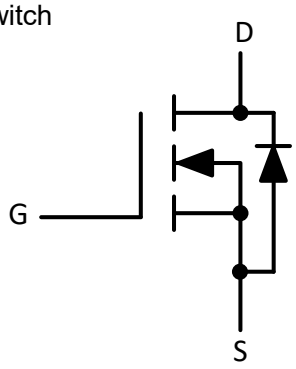
V_{DS} (V)	Typical $R_{DS(on)}$ (mΩ)
30	3.7 @ V_{GS}=4.5V
	2.3 @ V_{GS}=10V

Applications

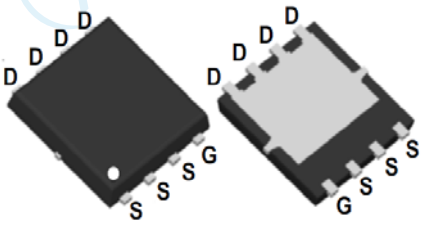
- ✧ High current load applications
- ✧ Load switch for portable devices
- ✧ Battery Switch

Mechanical Data

- ✧ UL Flame Rating : UL94V-0
- ✧ RoHS/WEEE Compliant



Circuit Diagram



DFN3.3x3.3

Absolute Maximum Rating at T_A = 25 °C, unless otherwise specified

Parameter		Symbol	Value	Units
Drain-Source Voltage		V_{DS}	30	V
Gate-Source Voltage		V_{GS}	+20/-13	V
Continuous Drain Current@ 10V	T_C=25 ℃	I_D	40	A
	T_C=100℃		40	
Power Dissipation	T_C=25 ℃	P_D	26	W
Thermal Resistance from Junction to Ambient		$R_{\theta JA}$	30	℃/W
Junction Temperature		T_J	150	℃
Storage Temperature		T_{STG}	-55~ +150	℃

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Electrical Characteristics at T_A = 25 °C, unless otherwise specified

Symbol	Parameter	Conditions	Min	Typ	Max	Units
STATIC PARAMETERS						
BV_{DSS}	Drain-Source Breakdown Voltage	I_D=250μA, V_{GS}=0V	30			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=30V, V_{GS}=0V			1	μA
		T_J=55°C			5	
I_{GSS}	Gate-Body leakage current	V_{DS}=0V, V_{GS}=+20/-13V			±100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=250μA	1.3	1.6	2.1	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=10V, I_D=20A		2.3	2.8	mΩ
		T_J=125°		3.2		
		V_{GS}=4.5V, I_D=20A		3.7	4.8	
g_{FS}	Forward Transconductance	V_{DS}=5V, I_D=20A		93		S
V_{SD}	Diode Forward Voltage	I_S=1A, V_{GS}=0V		0.7		V
I_S	Maximum Body-Diode Continuous Current				37	A
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=15V, f=1MHz		2076		pF
C_{oss}	Output Capacitance			936		pF
C_{rss}	Reverse Transfer Capacitance			84		pF
R_g	Gate resistance	f=1MHz		1.5		Ω
SWITCHING PARAMETERS						
Q_g(10V)	Total Gate Charge	V_{GS}=10V, V_{DS}=15V, I_D=20A		35.8		nC
Q_g(4.5V)	Total Gate Charge			17.5		nC
Q_{gs}	Gate Source Charge			9.8		nC
Q_{gd}	Gate Drain Charge			6.24		nC
$t_{D(on)}$	Turn-On Delay Time	V_{GS}=10V, V_{DS}=15V, R_L=0.75Ω, R_{GEN}=3Ω		11.4		ns
t_r	Turn-On Rise Time			15		ns
$t_{D(off)}$	Turn-Off Delay Time			26.6		ns
t_f	Turn-Off Fall Time			20		ns
t_{rr}	Body Diode Reverse Recovery Time	I_F=20A, di/dt=200A/μs		33		ns
Q_{rr}	Body Diode Reverse Recovery Charge	I_F=20A, di/dt=200A/μs		29		nC

1) $R_{\theta JA}$ is measured with the device mounted on $1in^2$ FR-4 board with 2oz. Copper, in a still air environment with T_A =25°C. The Power dissipation P_{DSM} is based on $R_{\theta JA}$ t≤ 10s and the maximum allowed junction temperature of 150°C. The value in any given application depends on the user's specific board design.
2) The power dissipation P_D is based on $T_{J(MAX)}$=150°C, using junction-to-case thermal resistance, and is more useful in setting the upper dissipation limit for cases where additional heatsinking is used.
3) Single pulse width limited by junction temperature $T_{J(MAX)}$=150°C.
4) $R_{\theta JA}$ is the sum of the thermal impedance from junction to case $R_{\theta JC}$ and case to ambient.
5) The maximum current rating is package limited.

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Typical Characteristics at T_A = 25 °C, unless otherwise specified

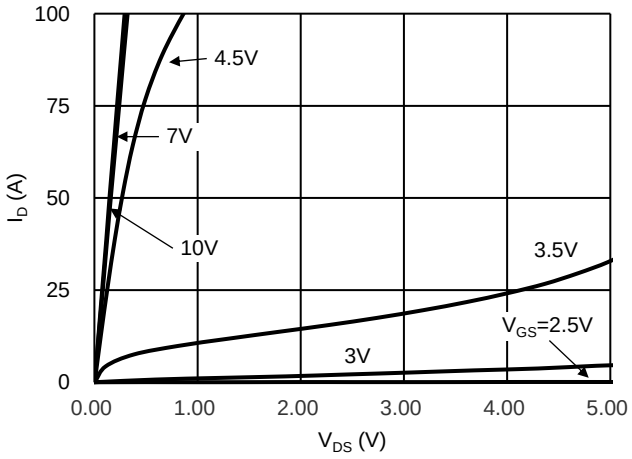

Fig 1. Typical Output Characteristics

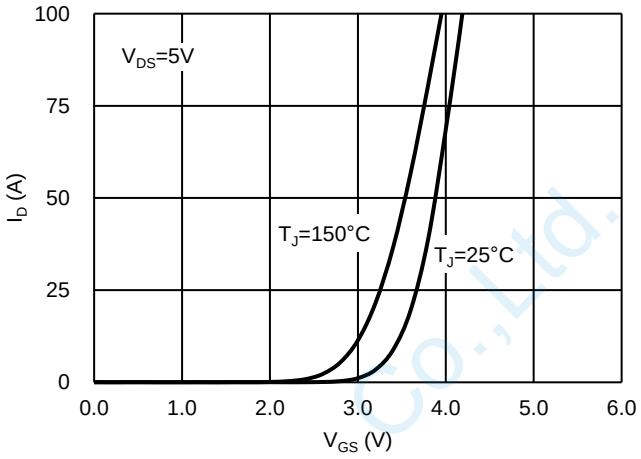

Fig 2. Typical Transfer Characteristics

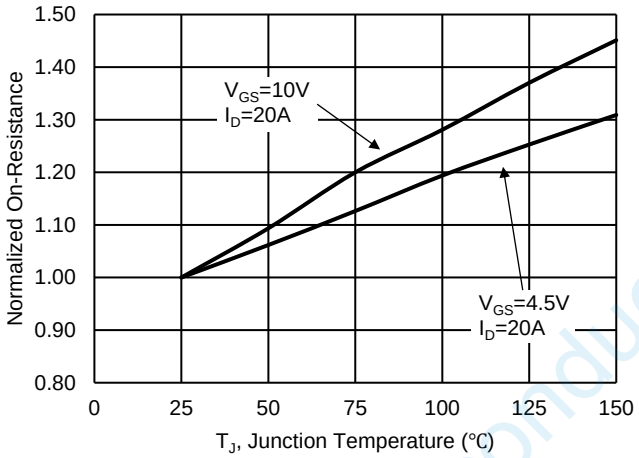

Fig 3. Normalized On-Resistance vs. Temperature

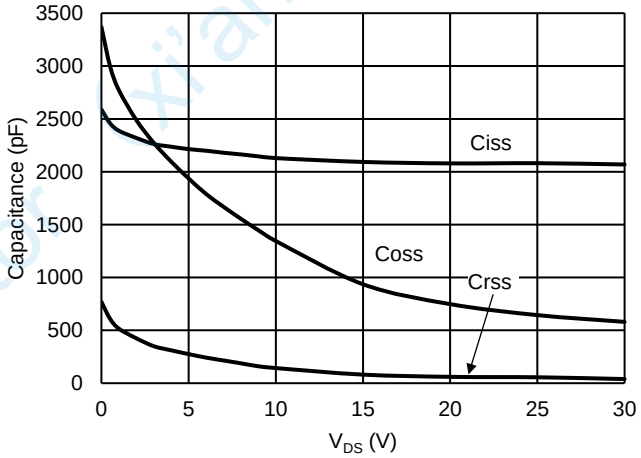

Fig 4. Typical Capacitance vs. V_{DS}

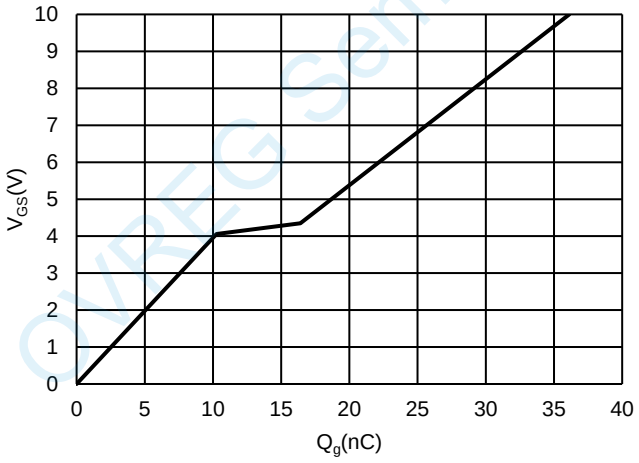

Fig 5. Typical Gate Charge vs. V_{GS}

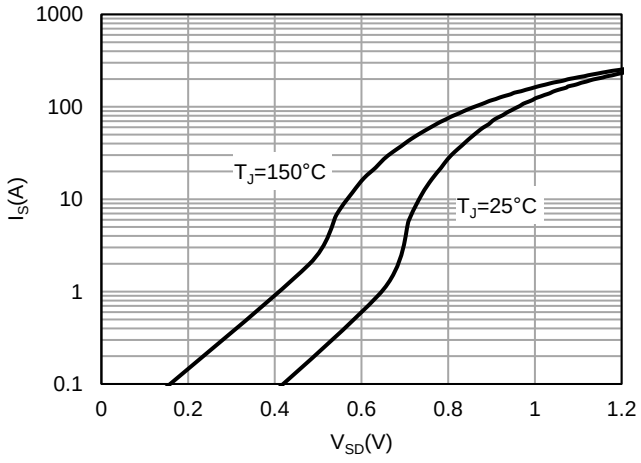

Fig 6. Typical Source-Drain Diode Forward Voltage

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Typical Characteristics at T_A = 25 °C, unless otherwise specified

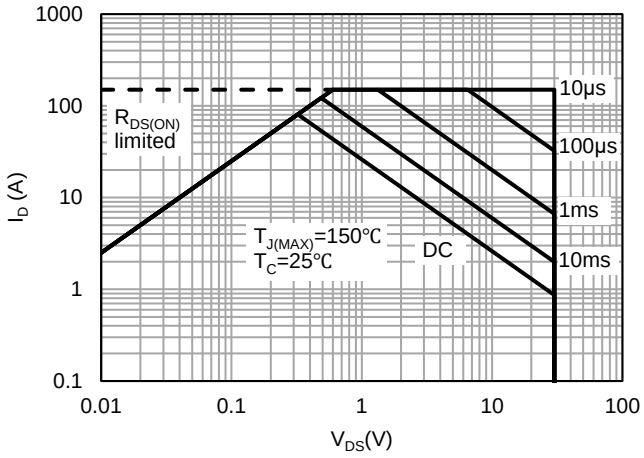

Fig 7. Maximum Safe Operating Area

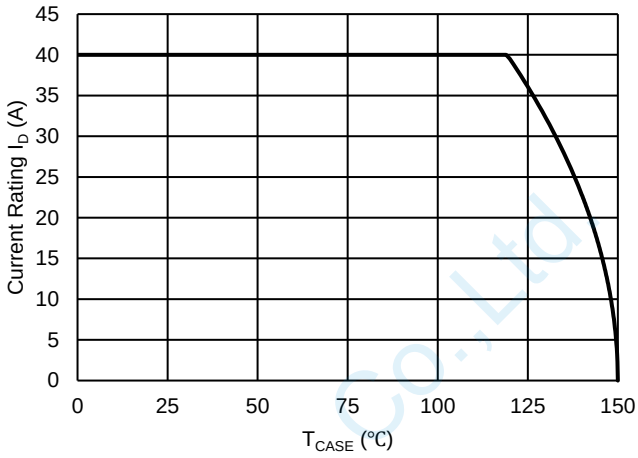

Fig 8. Maximum Drain Current vs. Case Temperature

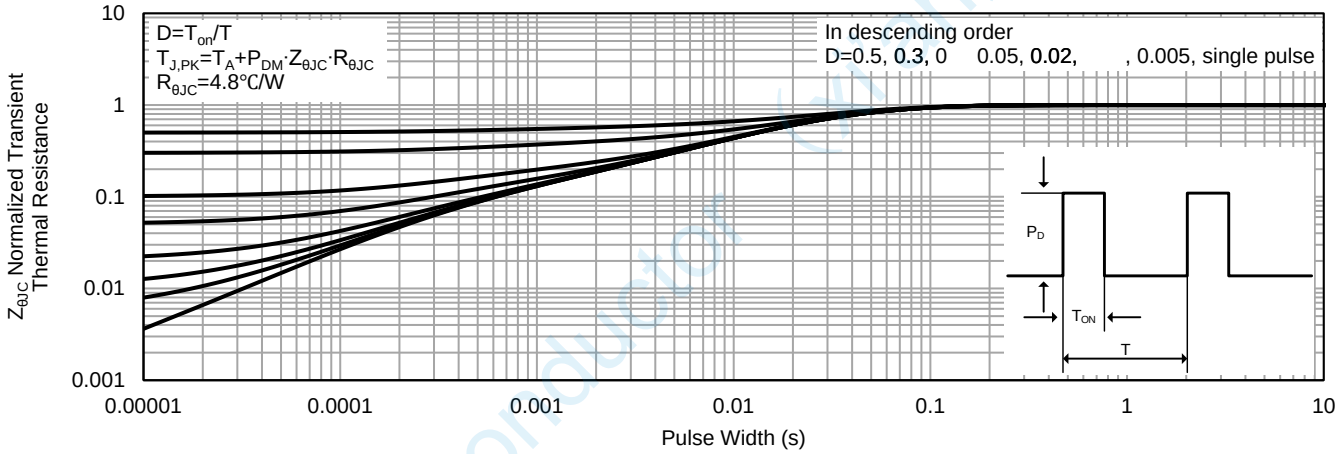

Fig 9. Normalized Maximum Transient Thermal Impedance, Junction-to-Case

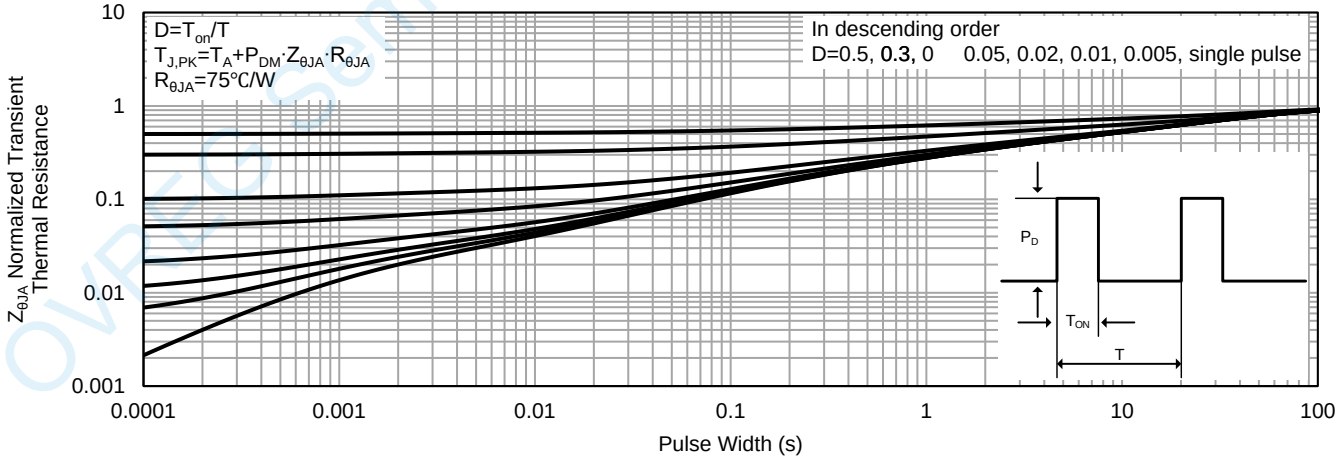

Fig 10. Normalized Maximum Transient Thermal Impedance, Junction-to-Ambient

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Typical Characteristics at T_A = 25 °C, unless otherwise specified

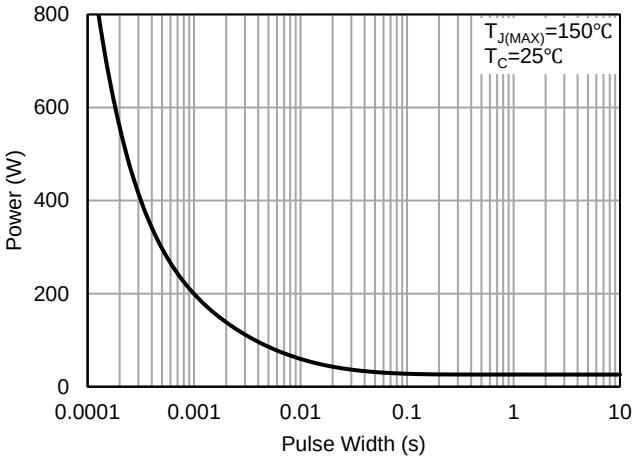

Fig 11. Single Pulse Power Rating Junction-to-Case

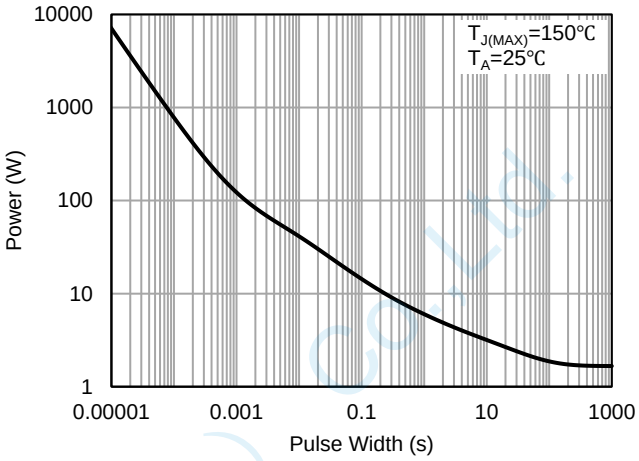

Fig 12. Single Pulse Power Rating Junction-to-Ambient

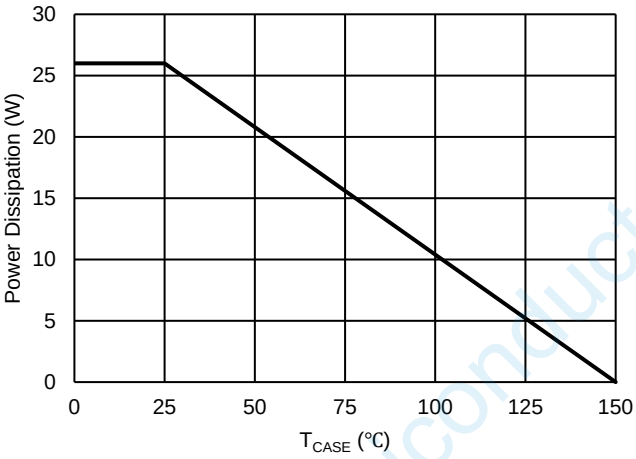

Fig 13. Maximum Power Rating vs. Temperature

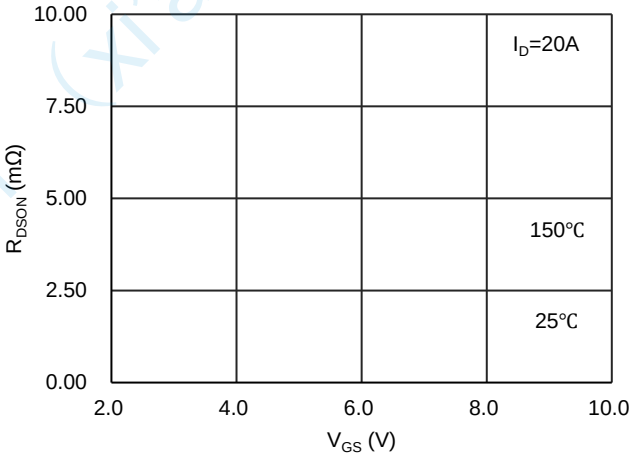

Fig 14. On-Resistance vs. V_{GS}

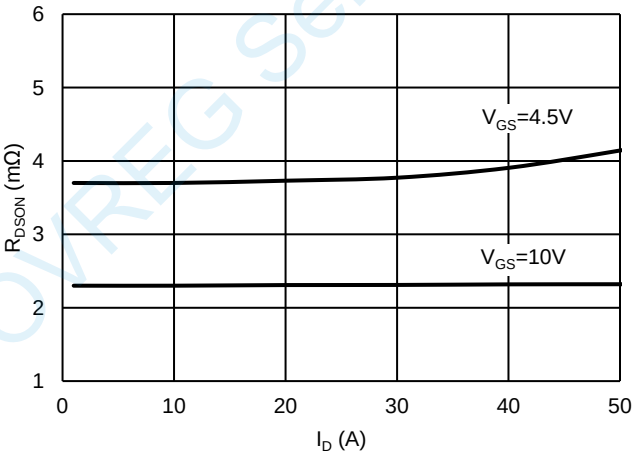

Fig 15. On-Resistance vs. Drain Current

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TEST CIRCUIT

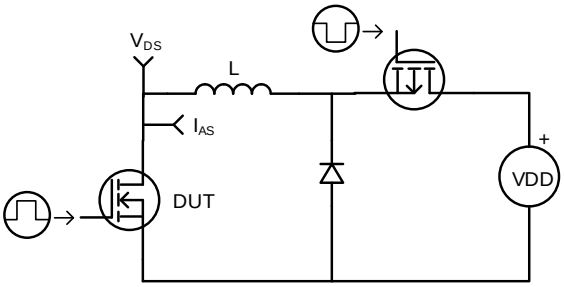

Fig16. Unclamped Inductive Test Circuit

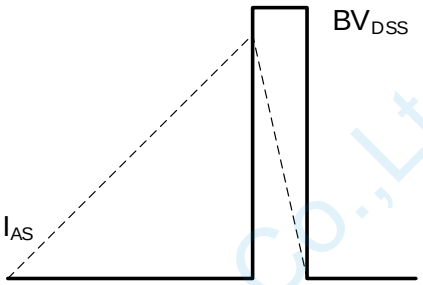

Fig17. Unclamped Inductive Waveform

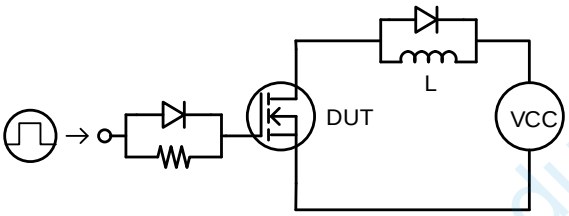

Fig18. Q_g Test Circuit

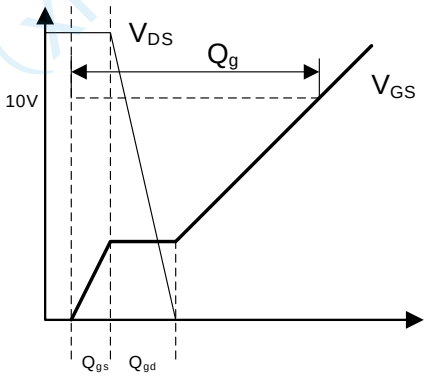

Fig19. Q_g Waveform

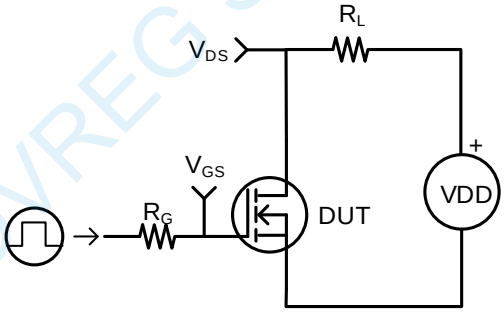

Fig20. Resistive Switching Test Circuit

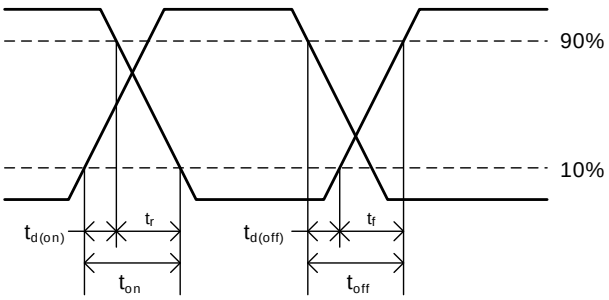

Fig21. Switching Time Waveform

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TEST CIRCUIT

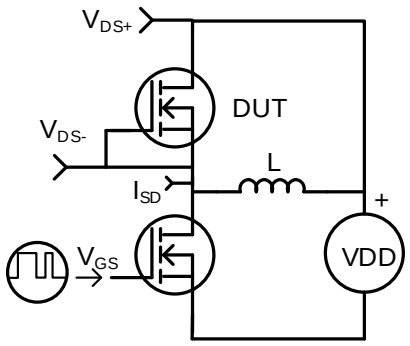

Fig22. Diode Recovery Test Circuit

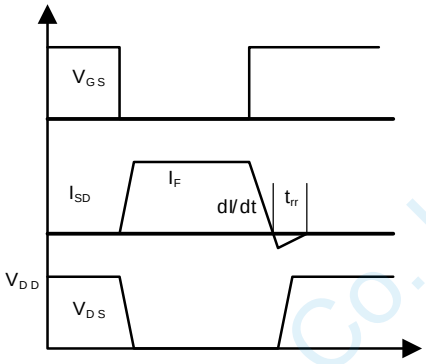

Fig23. Diode Recovery Test Waveform

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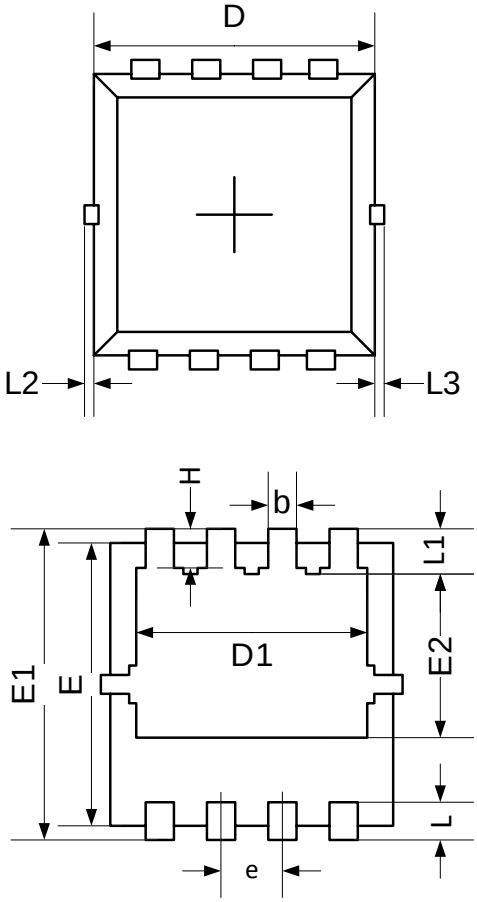
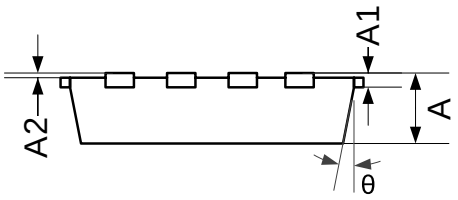
Package Information





DIM / SYMBOL	MILLIMITERS	
	MIN [mm]	MAX [mm]
A	0.650	0.850
A1	0.152 REF	
A2	0~0.05	
D	2.900	3.100
D1	2.300	2.600
E	2.900	3.100
E1	3.150	3.450
E2	1.535	1.935
b	0.200	0.400
e	0.550	0.750
L	0.300	0.500
L1	0.180	0.480
L2	0~0.100	
L3	0~0.100	
H	0.315	0.515
θ	9º	13º

OVREG Semiconductor (xi'an) Co.,Ltd.

Ordering Information

Part number	Material	Type	Reel size	MOQ
OVM30N02D3	GREEN	T/R	13 inch	5k/reel