VIS30024

30V N-Channel Power Trench MOSFET

General Description

- Trench Power MOSFET Technology
- Low $R_{DS(ON)}$
- Optimized for High Reliable Switch Application
- High Current Capability
- RoHS and Halogen-Free Compliant

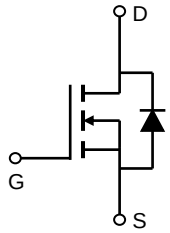
Applications

- Motor Drive
- Load Switch
- Battery Protection
- General DC/DC Converters

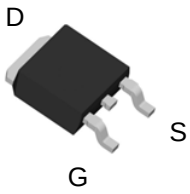
Product Summary

V_{DS}		30V
I_D	(at V_{GS}=10V)	146A
$R_{DS(ON)}$	(at V_{GS}=10V, typ)	2.4mΩ
$R_{DS(ON)}$	(at V_{GS}=4.5V, typ)	2.8mΩ

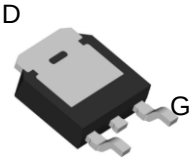
100% UIS Tested
100% R_G Tested



TOP VIEW



BOTTOM VIEW



Orderable Part Number	Package Type	Form	Minimum Order Quantity
VIS30024	TO-252	Tape & Reel	3000

Absolute Maximum Ratings T_A=25°C unless otherwise noted

Parameter		Symbol	Maximum	Units
Drain-Source Voltage		V_{DS}	30	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current (5)	T_C=25°C	I_D	146	A
	T_C=100°C		93	
Pulsed Drain Current (3)		I_{DM}	280	
Continuous Drain Current	T_A=25°C	I_{DSM}	38	A
	T_A=70°C		30	
Avalanche Current (3)		I_{AS}	65	A
Avalanche energy	L=0.1mH (3)	E_{AS}	211	mJ
Power Dissipation (2)	T_C=25°C	P_D	96	W
	T_C=100°C		38	
Power Dissipation (1)	T_A=25°C	P_{DSM}	6.2	W
	T_A=70°C		4	
Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150	°C

Thermal Characteristics

Parameter		Symbol	Typ	Max	Units
Maximum Junction-to-Ambient (1)	t ≤ 10s	$R_{\theta JA}$	15	20	°C/W
Maximum Junction-to-Ambient (1,4)	Steady-State		40	50	°C/W
Maximum Junction-to-Case	Steady-State	$R_{\theta JC}$	1.3	1.6	°C/W

Electrical Characteristics (T_J=25°C unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
STATIC PARAMETERS						
BV_{DSS}	Drain-Source Breakdown Voltage	I_D=250mA, 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}=±20V			±100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=$V_{GS,}$ I_D=250mA	1.4	1.8	2.2	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=10V, I_D=20A		2.4	2.9	mΩ
		T_J=125°C		3.3		
		V_{GS}=4.5V, I_D=20A		2.8	3.4	mΩ
g_{FS}	Forward Transconductance	V_{DS}=5V, I_D=20A		120		S
V_{SD}	Diode Forward Voltage	I_S=1A, V_{GS}=0V		0.69		V
I_S	Maximum Body-Diode Continuous Current				140	A
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=15V, f=1MHz		6335		pF
C_{oss}	Output Capacitance			756		pF
C_{rss}	Reverse Transfer Capacitance			367		pF
R_g	Gate resistance	f=1MHz		0.8		Ω
SWITCHING PARAMETERS						
Q_g(10V)	Total Gate Charge	V_{GS}=10V, V_{DS}=15V, I_D=20A		104		nC
Q_g(4.5V)	Total Gate Charge			51		nC
Q_{gs}	Gate Source Charge			15		nC
Q_{gd}	Gate Drain Charge			18		nC
$t_{D(on)}$	Turn-On DelayTime	V_{GS}=10V, V_{DS}=15V, R_L=0.75W, R_{GEN}=3W		8.6		ns
t_r	Turn-On Rise Time			9.6		ns
$t_{D(off)}$	Turn-Off DelayTime			58.4		ns
t_f	Turn-Off Fall Time			22.8		ns
t_{rr}	Body Diode Reverse Recovery Time	I_F=20A, di/dt=500A/ms		29.3		ns
Q_{rr}	Body Diode Reverse Recovery Charge	I_F=20A, di/dt=500A/ms		20.5		nC

1) $R_{\theta JA}$ is measured with the device mounted on i in^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.