2.4mΩ, 40V, N-Channel Power MOSFET SRT04N024LD56TR-GS

General Description

The Sanrise SRT04N024LD56TR-GS is a low voltage power MOSFET, fabricated using advanced split gate trench technology. The resulting device has extremely low on resistance, low gate charge and fast switching time, making it especially suitable for applications which require superior power density and synchronous rectification.

The SRT04N024LD56TR-GS break down voltage is 40V and it has a high rugged avalanche characteristics.

The SRT04N024LD56TR-GS is available in PDFN5*6 package.

Symbol

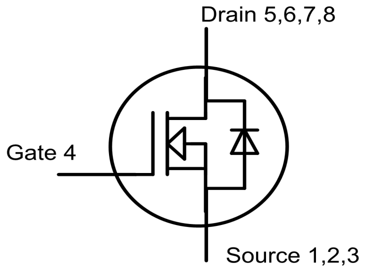
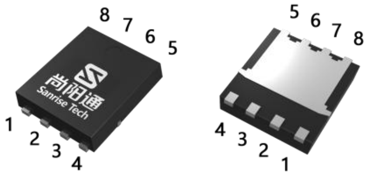


Figure 1 Symbol of SRT04N024LD56TR-GS

Features

- ■ Ultra Low $R_{DS(ON)\_TYP}$ = 2.1mΩ@V_{GS} = 10V.
- ■ Ultra Low Gate Charge, Qg=40nC typ.
- ■ Fast switching capability
- ■ Robust design with better EAS performance
- ■ EMI Improved
- ■ Non-automotive Qualified

Package Type



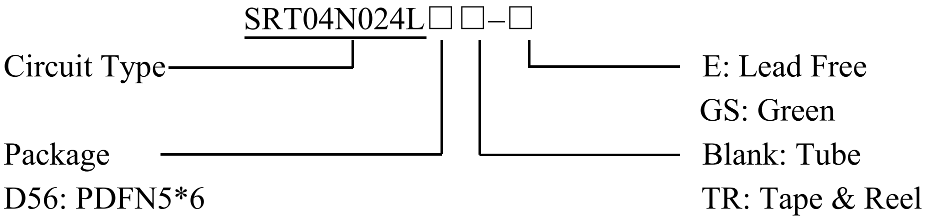
PDFN5*6

Figure 2 Package Type of SRT04N024LD56TR-GS

Application

- ■ Server/Telecom
- ■ High Power Supply
- ■ E-Tools
- ■ Motor Driver
- ■ BMS

Ordering Information



Package	Part Number	Marking ID	Packing Type
PDFN5*6	SRT04N024LD56TR-GS	SRT04N024LD56GS	Tape & Reel

Absolute Maximum Ratings

Parameter		Symbol	Rating	Unit
Drain-Source Voltage		V_{DSS}	40	V
Gate-Source Voltage		V_{GSS}	±20	V
Continuous Drain Current, Silicon	T_C=25ºC	I_D	132	A
	T_C=100ºC		59	
Continuous Drain Current, Silicon	T_C=25ºC		132	
Pulsed Drain Current (Note 2)		I_{DM}	528	A
Avalanche Energy, Single Pulse (Note 3)		E_{AS}	64	mJ
Avalanche Destructive Energy, Single Pulse (Note 4)		E_{AS_Limit}	400	mJ
Avalanche Energy, Repetitive (Note 2)		E_{AR}	0.2	mJ
Avalanche Current, Repetitive (Note 2)		I_{AR}	20.0	A
Continuous Diode Forward Current		I_S	80	A
Diode Pulse Current		$I_{S.PULSE}$	240	A
Max Power Dissipation		P_D	78.1	W
Operating Junction Temperature		T_J	150	ºC
Storage Temperature		T_{STG}	-55 to 150	ºC
Lead Temperature (Soldering, 10 sec)		T_{LEAD}	260	ºC

Note:

1. Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.
2. Repetitive Rating: Pulse width limited by maximum junction temperature
3. I_{AS}= 16.0A, V_{DD}= 20V, R_G= 25Ω, Starting T_J= 25°C
4. I_{AS_Limit}= 40A, V_{DD}= 20V, R_G= 25Ω, Starting T_J= 25°C

Thermal Resistance

Parameter		Symbol	Min	Typ	Max	Unit
Thermal Resistance，Junction-to-Case	PDFN5*6	R_{thJC}			1.6	ºC/W
Thermal Resistance，Junction-to-Ambient	PDFN5*6	R_{thJA}			50	

Electrical Characteristics

T_J = 25℃, unless otherwise specified.

Parameter		Symbol	Test Conditions	Min	Typ	Max	Unit
Statistic Characteristics							
Drain-Source Breakdown Voltage		BV_{DSS}	V_{GS}=0V, I_D=250uA	40			V
Zero Gate Voltage Drain Current		I_{DSS}	V_{DS}=40V, V_{GS}=0V			1	uA
Gate-Body Leakage Current	Forward	I_{GSSF}	V_{GS}=20V, V_{DS}=0V			200	nA
	Reverse	I_{GSSR}	V_{GS}=-20V, V_{DS}=0V			-200	
Gate Threshold Voltage		$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=0.25mA	1.2	1.8	2.4	V
Static Drain-Source On-Resistance		$R_{DS(ON)}$	V_{GS}=10V, I_D=35A		2.1	2.4	mΩ
			V_{GS}=4.5V, I_D=15A		4.2	6.5	
Gate Resistance		R_G	f=1MHz, Open Drain		1.4		Ω
Dynamic Characteristics							
Input Capacitance		C_{ISS}	V_{DS}=20V, V_{GS}=0V, f=1MHz		2.8		nF
Output Capacitance		C_{OSS}			762		pF
Reverse Transfer Capacitance		C_{RSS}			48		pF
Effective output capacitance, energy related [NOTE5]		$C_{O(er)}$	V_{GS}=0V, V_{DS}=0…20V		1.2		nF
Effective output capacitance, time related [NOTE6]		$C_{O(tr)}$			1.5		
Turn-on Delay Time		$t_{d(on)}$	V_{DD}=20V, I_D=35A R_G=1.6Ω, V_{GS}=10V		9		ns
Rise Time		t_r			31		
Turn-off Delay Time		$t_{d(off)}$			34		
Fall Time		t_f			7		
Gate Charge Characteristics							
Gate to Source Charge		Q_{gs}	V_{DD}=20V, I_D=35A V_{GS}=0 to 10V		6.1		nC
Gate to Drain Charge		Q_{gd}			4.7		
Gate Charge Total		Q_g			40		
Gate Plateau Voltage		$V_{plateau}$			2.4		V
Gate Charge Total, sync FET		Q_g	V_{DD}=0.1V, V_{GS}=0 to 10V		38		nC
Reverse Diode Characteristics							
Drain-Source Diode Forward Voltage		V_{SD}	V_{GS}=0V, I_{SD}=35A		0.84	1.0	V
Reverse Recovery Time		t_{rr}	V_R=20V, I_F=35A dI_F/dt=100A/us		52		ns
Reverse Recovery Charge		Q_{rr}			91		nC
Peak Reverse Recovery Current		I_{rrm}			3.5		A

Note:

5. $C_{O(er)}$ is a fixed capacitance that gives the same stored energy as C_{OSS} while V_{DS} is rising from 0 to 32V
6. $C_{O\ (tr)}$ is a fixed capacitance that gives the same charging time as C_{OSS} while V_{DS} is rising from 0 to 32 V

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