LSR24N03T5 N-Channel Enhancement Mode MOSFET

Features

- Advanced Trench MOS technology
- Extremely Low On-Resistance RDS(on)
- Low Gate Charge
- Halogen-Free & Lead-Free
- 100% EAS Test
- 100% Rg Test

Applications

- Motor Control and Drivers
- BMS
- DC-DC converters

Pin Configuration

LSR24N03T5(TO-220)

Pin	Description
1	Gate
2	Drain
3	Source

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Marking Information

Part Marking	Part Number	LFC code
24N03 YWWXXX	24N03	YWWXXX

Absolute Maximum Ratings

(T_A=25ºC Unless otherwise noted)

Symbol	Parameter		Typical	Unit
V_{DSS}	Drain-Source Voltage		30	V
V_{GSS}	Gate-Source Voltage		±20	V
I_D	Continuous Drain Current	T_C=25ºC	105	A
		T_C=100ºC	82	
I_{DM}	Pulsed Drain Current[1]		400	A
I_{AS}	Avalanche Current		68	A
E_{AS}	Single Pulse Avalanche Energy[2]		231	mJ
P_D	Power Dissipation(T_C=25ºC)		176	W
T_J	Operating Junction Temperature Range		-50 to +175	ºC
T_{STG}	Storage Temperature Range		-50 to +175	ºC
$R_{\theta JC}$	Thermal Resistance-Junction to Case[3]		0.7	ºC/W
$R_{\theta JA}$	Thermal Resistance-Junction to Ambient[3]		54	ºC/W

Note:
1. Pulse Test: Pulse Width ≦ 300us, Duty Cycle ≦ 2%.
2. Limited by $T_{J(MAX)}$, starting T_J = 25ºC, L = 0.5mH, R_g = 25Ω, I_D = 30A.
3. Device mounted on FR-4 substrate PC board, 2oz copper, with 1-inch square copper plate in still air.

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Electrical Characteristics

(T_A=25ºC Unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=250uA	30			V
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=250uA	1		2.5	V
I_{GSS}	Gate Leakage Current	V_{DS}=0V, V_{GS}=±20V			±100	nA
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=30V, V_{GS}=0V			1	uA
$R_{DS(on)}$	Drain-Source On-Resistance	V_{GS}=10V, I_D=30A		2.5	3.5	mΩ
Dynamic						
R_g	Gate Resistance	V_{DS}=0V, V_{GS}=0V, f=1MHz			2.5	Ω
g_{fs}	Forward Transconductance	V_{DS}=5V, I_D=20A		78		S
C_{iss}	Input Capacitance	V_{DS}=15V, V_{GS}=0V, f=1MHz		5001		pF
C_{oss}	Output Capacitance			648		
C_{rss}	Reverse Transfer Capacitance			498		
Q_g	Total Gate Charge	V_{DS}=15V, V_{GS}=10V, I_D=20A		48		nC
Q_{gs}	Gate-Source Charge			9		
Q_{gd}	Gate-Drain Charge			7		
$t_{d(on)}$	Turn-On Time	V_{DS}=20V, V_{GS}=10V, R_g=3.3Ω, R_L=0.75Ω		11		ns
T_r				10		
$t_{d(off)}$	Turn-Off Time			38		
T_f				11		
Body-Diode						
V_{SD}	Drain-Source Diode Forward Voltage	V_{GS}=0V, I_S=1A			1	V
t_{rr}	Body Diode Reverse Recovery Time	I_s=20A, di/dt=500A/us		5.8		nS
Q_{rr}	Body Diode Reverse Recovery Charge	I_s=20A, di/dt=500A/us		1.6		nC

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Typical Performance Characteristics

Fig.1 Typical Output Characteristics

Fig.2 Typical Transfer Characteristics

Fig.3 On-Resistance vs. Drain Current

Fig.4 On-Resistance vs. Gate-Source Voltage

Fig.5 On-Resistance vs. Junction Temperature

Fig.6 Forward Characteristics of Body Diode

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Typical Performance Characteristics

Fig.7 Capacitance Characteristics

Fig.8 Typical Gate Charge vs. Gate-Source Voltage

Fig.9 Safe Operating Area

Fig.10 Single Pulse Maximum Power Dissipation

Fig.11 Transient Thermal Impedance

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Typical Characteristics

Gate Charge Test Circuit & Waveform

Resistive Switching Test Circuit & Waveforms

Unclamped Inductive Switching Test Circuit & Waveforms

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Package Dimension(Units:mm)

TO-220

Symbol	Min	Max	Symbol	Min	Max
W	9.80	10.20	**L3**	12.88	13.28
W1	2.54 BSC		**L4**	3.10 BSC	
W2	0.70	0.90	**L5**	13.50 BSC	
W3	1.17	1.37	**T**	4.30	4.70
W4	1.17	1.62	**T1**	1.20	1.40
W5	8.00 BSC		**T2**	2.20	2.60
L	9.00	9.40	**T3**	0.45	0.60
L1	6.30	6.70	**G(Φ)**	3.50	3.70
L2	2.70	2.90			

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