

SuperMOS – SOT-89 100V BV_{DSS} , 95m Ω $R_{DS(ON)}$, N-channel MOSFET

1. Description

The ESGNF10R90 is N-Channel enhancement MOS Field Effect Transistor. Using advanced shielded gate trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. Device is suitable for use in DC-DC conversion, power switch and charging circuit. Standard Product ESGNF10R90 is Pb-free.

2. Features

- 100V, $R_{DS(ON)}=95m\Omega(TYP.) @V_{GS}=10V$
 $R_{DS(ON)}=125m\Omega(TYP.) @V_{GS}=4.5V$
- High density cell design for low $R_{DS(on)}$
- Material: Halogen free
- Reliable and rugged
- Avalanche Rated
- Low leakage current

3. Applications

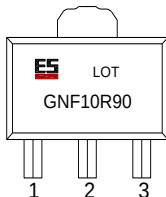
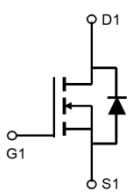
- PWM applications
- Load switch
- Power management in portable/desktop PCs
- DC/DC conversion

100% UIS TESTED

4. Ordering Information

Part Number	Package	Marking	Material	Packing	Quantity per reel	Flammability Rating	Reel Size
ESGNF10R90	SOT-89	GNF10R90/LOT	Halogen free	Tape & Reel	3,000 PCS	UL 94V-0	13 inches

5. Pin Configuration and Functions

Pin	Function	Outline	Circuit Diagram
1	Gate		
3	Source		
2	Drain		

6. Specification

Absolute Maximum Rating & Thermal Characteristics

Ratings at 25 °C ambient temperature unless otherwise specified.

Parameter		Symbol	Limit	Unit
Drain-Source Voltage		BV_{DSS}	100	V
Gate-Source Voltage		V_{GS}	± 20	V
Continuous Drain Current	$T_A=25^{\circ}\text{C}$	I_D	5	A
	$T_A=75^{\circ}\text{C}$		3.9	
Maximum Power Dissipation		P_D	5.2	W
Pulsed Drain Current		I_{DM}	20	A
Avalanche Current, Single Pulsed ^a		I_{AS}	4	A
Avalanche Energy, Single Pulsed ^a		E_{AS}	4	mJ
Operating Junction Temperature		T_J	150	$^{\circ}\text{C}$
Lead Temperature		T_L	260	$^{\circ}\text{C}$
Storage Temperature Range		T_{stg}	-55 to 150	$^{\circ}\text{C}$

Thermal resistance ratings

Single Operation				
Parameter	Symbol	Typical	Maximum	Unit
Junction-to-Ambient Thermal Resistance	$R_{\theta JA}$		18	$^{\circ}\text{C/W}$

Note:

a: $T_J=25^{\circ}\text{C}$, $V_{DD}=50\text{V}$, $V_G=10\text{V}$, $L=0.5\text{mH}$, $R_g=25\Omega$

Electrical Characteristics

At TA = 25°C unless otherwise specified

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
OFF CHARACTERISTICS						
Drain-to-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =250uA	100			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =100V, V _{GS} =0V			1	uA
Gate-to-source Leakage Current	I _{GSS}	V _{DS} =0V, V _{GS} =±20V			±100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	V _{GS(TH)}	V _{GS} =V _{DS} , I _D =250uA	1.0	1.65	2.5	V
Drain-to-source On-resistance	R _{DS(on)}	V _{GS} =10V, I _D =2.5A		95	135	mΩ
		V _{GS} =4.5V, I _D =2A		125	195	
CHARGES, CAPACITANCES AND GATE RESISTANCE						
Input Capacitance	C _{ISS}	V _{GS} =0V, f=1MHz, V _{DS} =25V		206		pF
Output Capacitance	C _{OSS}			29		
Reverse Transfer Capacitance	C _{RSS}			1.4		
Total Gate Charge	Q _{G(TOT)}	V _{GS} =10V, V _{DS} =25V, I _D =2.5A		4.2		nC
Gate-to-Source Charge	Q _{GS}			1.5		
Gate-to-Drain Charge	Q _{GD}			1.1		
SWITCHING CHARACTERISTICS						
Turn-On Delay Time	t _{d(ON)}	V _{GS} =10V, V _{DS} 25V, I _D =2.5A, R _G =2Ω		14.7		ns
Rise Time	t _r			3.5		
Turn-Off Delay Time	t _{d(OFF)}			20.9		
Fall Time	t _f			2.7		
BODY DIODE CHARACTERISTICS						
Forward Voltage	V _{SD}	V _{GS} =0V, I _S =1.0A		0.8	1.5	V

7. Typical Characteristic

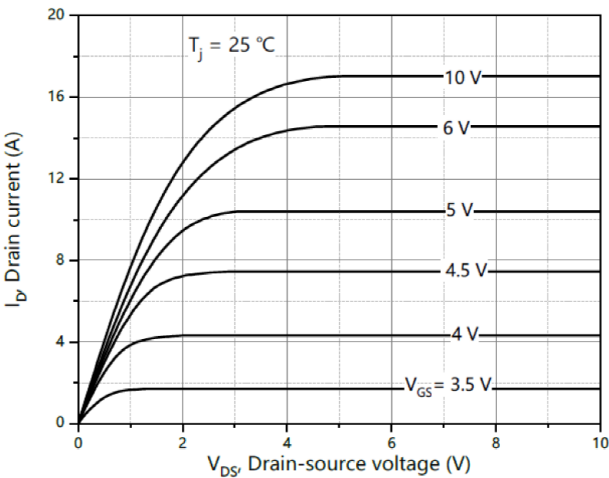


Figure1. Output Characteristics

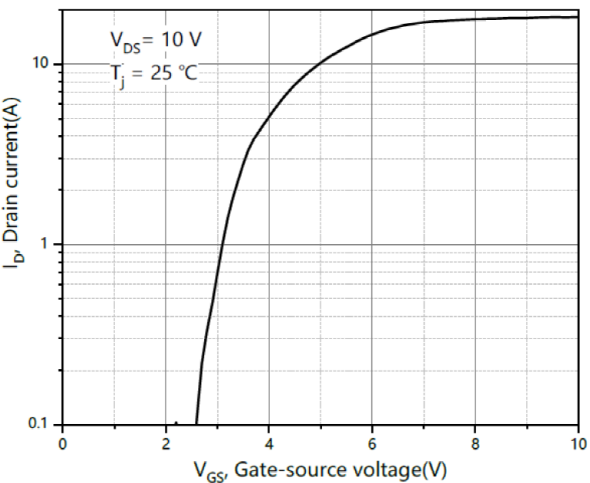


Figure2. Transfer Characteristics

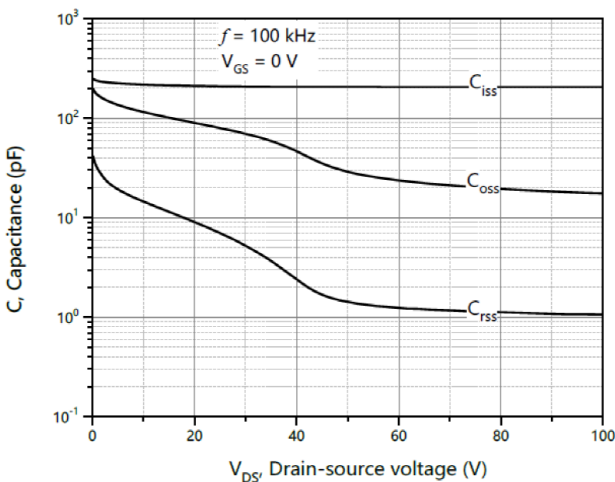


Figure3. Capacitance Characteristics

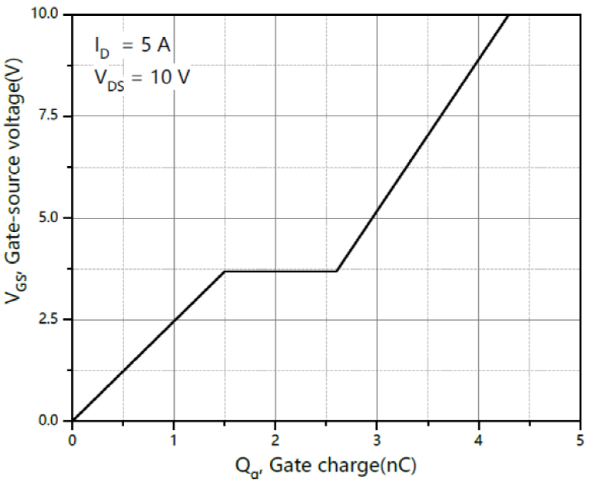


Figure4. Gate Charge

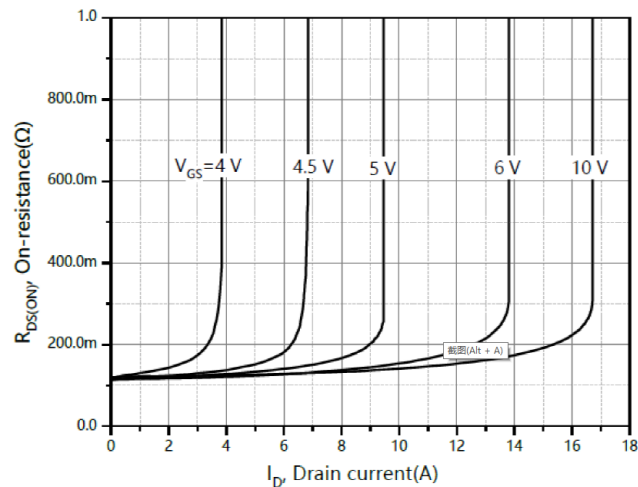


Figure5. : On-Resistance vs. Drain Current and Gate Voltage

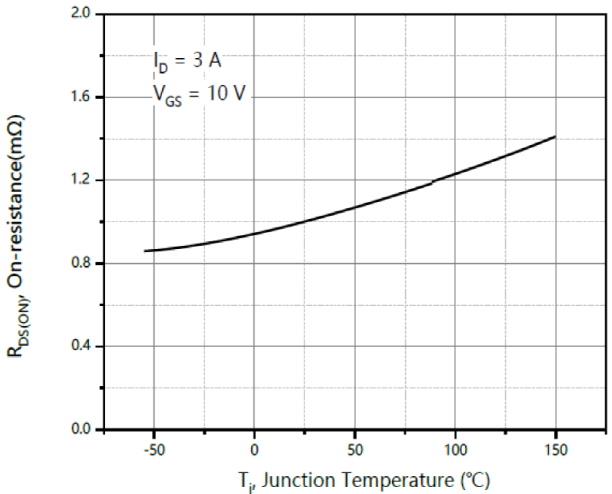
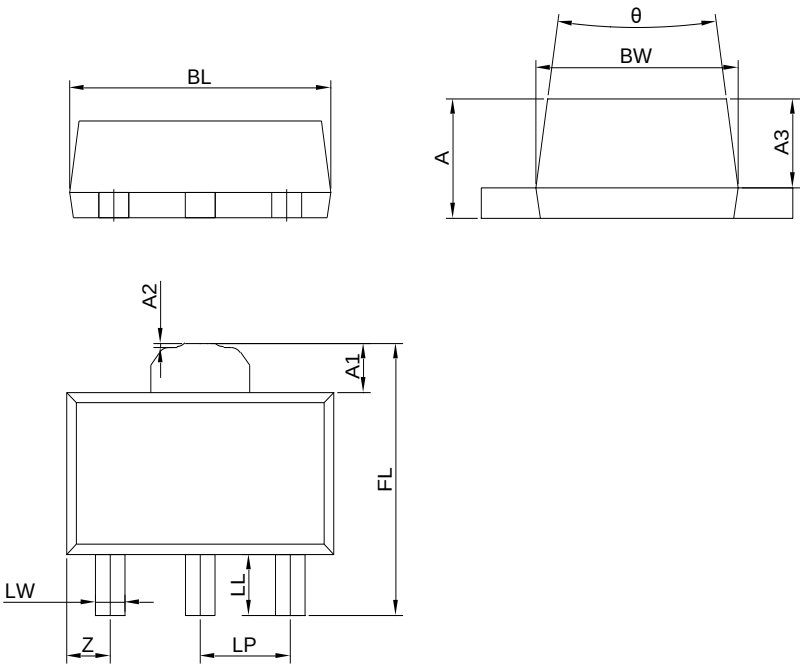


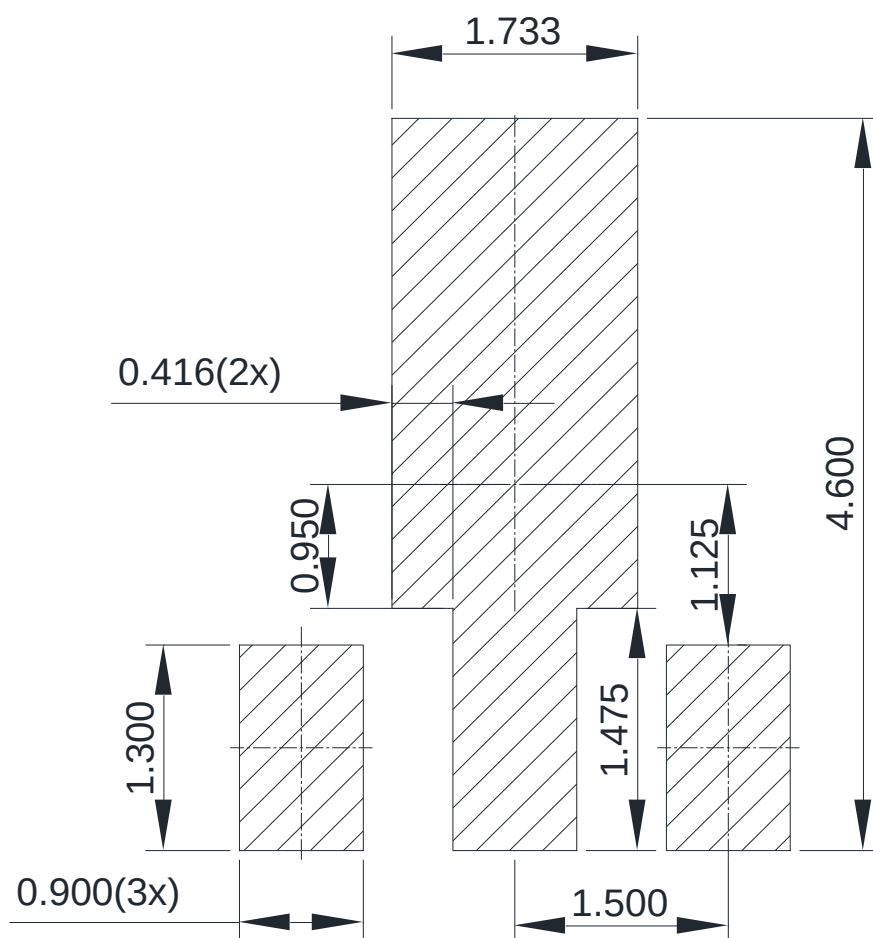
Figure6. Normalized On-Resistance

8. Dimension (SOT-89)



SYMBOL	Millimeters		SYMBOL	Millimeters	
	Max	Min		Max	Min
BL	4. 55	4. 45	A1	0. 75	0. 65
BW	2. 55	2. 35	A2	0. 05.BSC	
FL	4. 3	4. 1	A3	1. 12.BSC	
LP	1. 55	1. 45	LL	1. 00	0. 90
LW	0. 49	0. 47	θ	16° REF	
A	1. 50 REF		z	0. 75 REF	

9. Recommended Soldering Footprint



DIMENSIONS: MILLIMETERS

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