SuperMOS – SOT-23 100V BV_{DSS}, 90mΩ $R_{DS(ON)}$, N-channel MOSFET

1. Description

The ESJM10H03NSC is N-Channel enhancement MOS Field Effect Transistor. Uses advanced 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 ESJM10H03NSC is Pb-free.

2. Features

- 100V, $R_{DS(ON)}$=90mΩ(TYP.) @V_{GS}=10V
  $R_{DS(ON)}$=120mΩ(TYP.) @V_{GS}=4.5V
- Use trench MOSFET technology
- High density cell design for low $R_{DS(on)}$
- Material: Halogen free
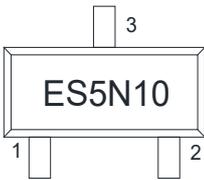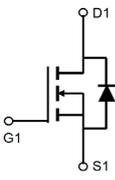- Reliable and rugged
- Avalanche Rated
- Low leakage current

3. Applications

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

4. Ordering Information

Part Number	Package	Marking	Material	Packing	Quantity per reel	Flammability Rating	Reel Size
ESJM10H03NSC	SOT-23	ES5N10	Halogen free	Tape & Reel	3,000 PCS	UL 94V-0	7 inches

5. Pin Configuration and Functions

Pin	Function	Outline	Circuit Diagram
1	Gate		
2	Source	ES5N10	
3	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°C	I_D	2.6	A
	T_A=75°C		2	
Maximum Power Dissipation		P_D	1.4	W
Pulsed Drain Current [A]		I_{DM}	10.4	A
Operating Junction Temperature		T_J	150	°C
Lead Temperature		T_L	260	°C
Storage Temperature Range		T_{stg}	-55 to 150	°C

Thermal resistance ratings

Single Operation				
Parameter	Symbol	Typical	Maximum	Unit
Junction-to-Ambient Thermal Resistance [B]	$R_{\theta JA}$		90	°C/W

Note:

A. Pulse Test: Pulse Width≤300us, Duty cycle ≤2%.

B. Device mounted on FR-4 PCB, 1 inch x 0.85inch x 0.062 inch.

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Electrical Characteristics

At TA = 25℃ 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}	$V_{DS}=0V$, $V_{GS}=\pm20V$			±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	$R_{DS(on)}$	$V_{GS}=10V$, $I_D=2.5A$		90	135	mΩ
		$V_{GS}=4.5V$, $I_D=2A$		120	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

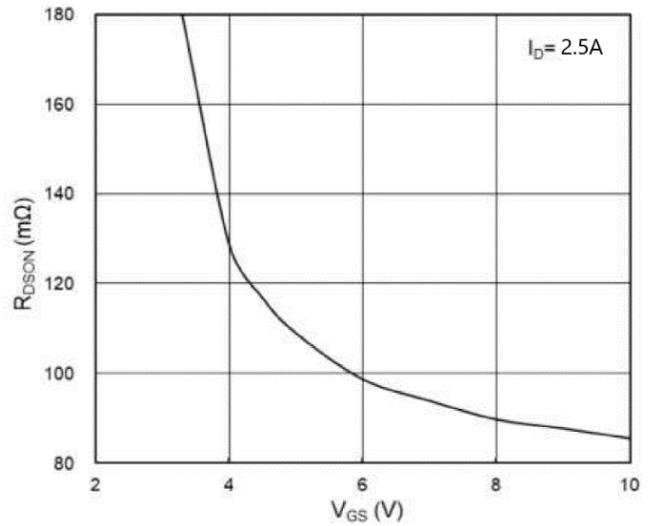## 7. Typical Characteristic
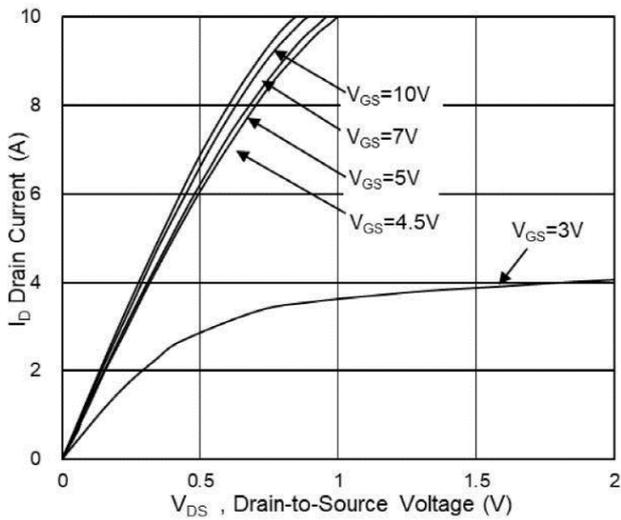
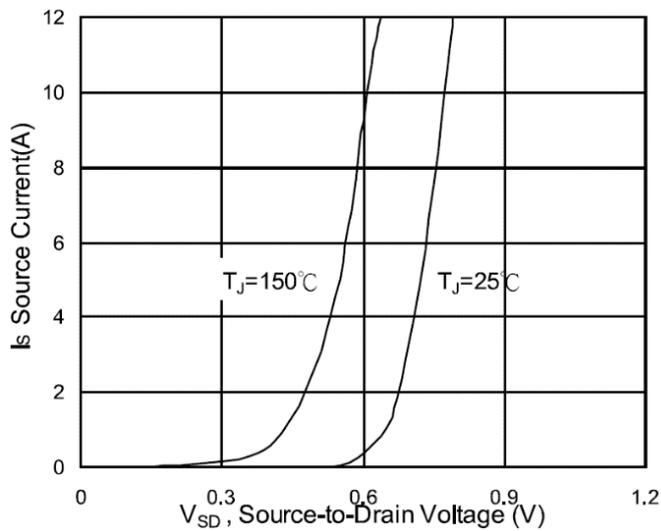Fig.1 Typical Output Characteristics

Fig.2 On-Resistance vs G-S Voltage

Fig.3 Source Drain Forward Characteristics

Fig.4 Normalized R$_{DSON}$ vs T$_J$
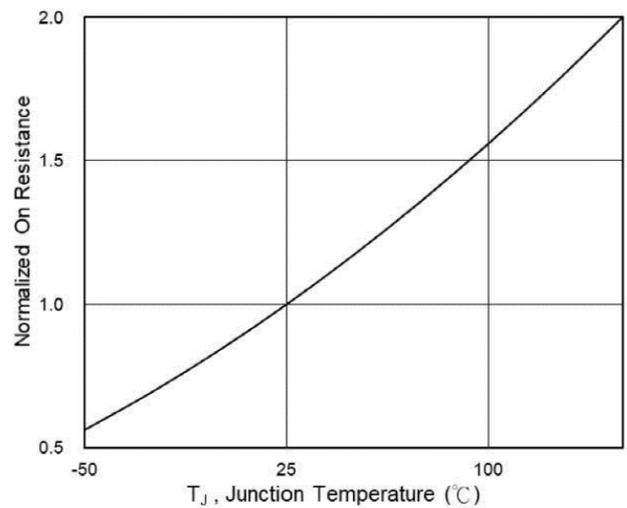
8. Dimension (SOT-23)

POD(Z)
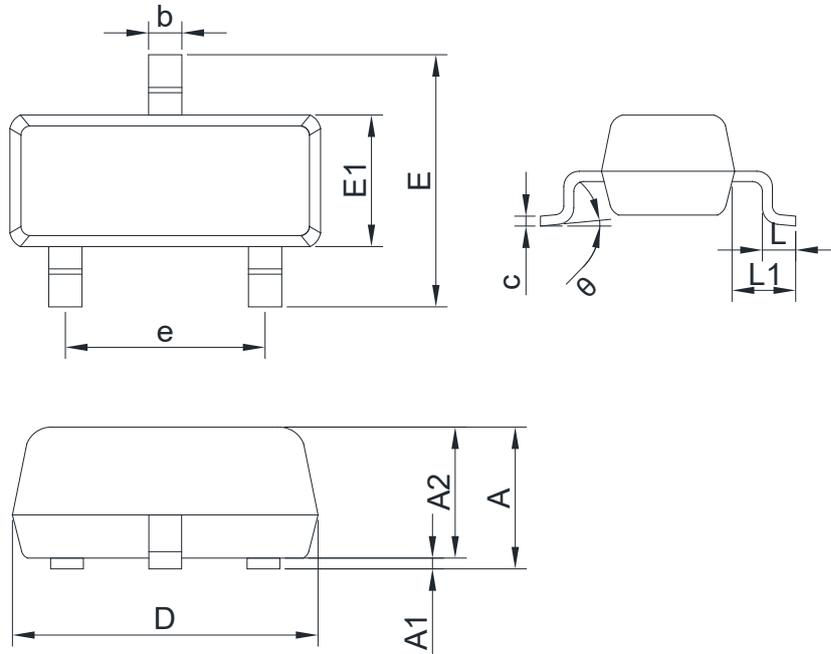
COMMON DIMENSIONS CUNITS MEASURE=MILLIMETER					
SYMBOL	MIN	MAX	SYMBOL	MIN	MAX
A	0.90	1.20	E	2.25	2.55
A1	0.00	0.10	E1	1.20	1.40
A2	0.90	1.10	e	1.80	2.00
b	0.30	0.50	L	0.30	0.50
c	0.07	0.18	L1	0.475	0.625
D	2.80	3.04	θ	0°	8°

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9. Recommended Soldering Footprint

DIMENSIONS: MILLIMETERS

(Dimensions shown: 2.40, 0.80, 0.95, 0.80)
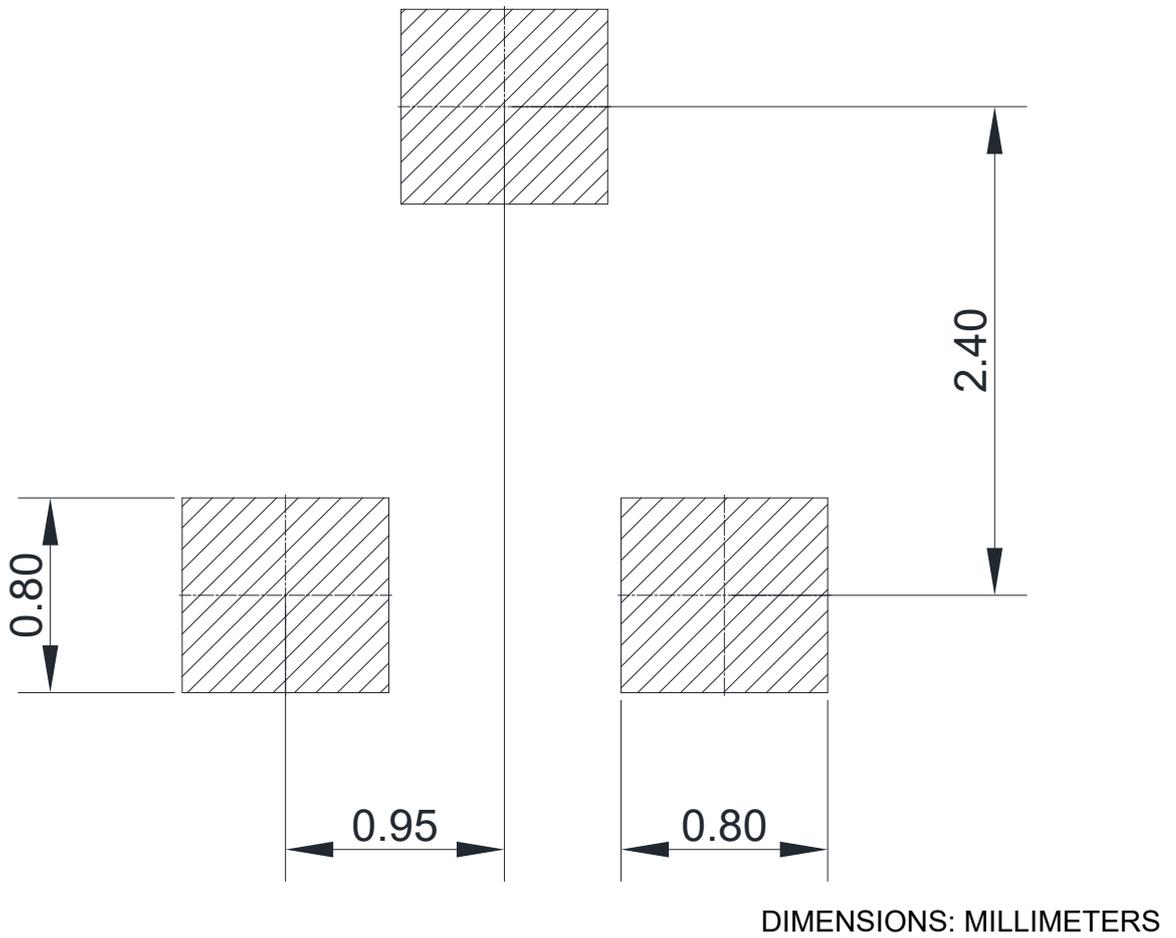
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