

SuperMOS – SOP8 30V BV_{DSS} , $5m\Omega R_{DS(on)}$, N-channel MOSFET

1. Description

The ES4576 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 ES4576 is Pb-free.

2. Features

- 30V, $R_{DS(ON)}=5.0m\Omega(Typ.) @V_{GS}=10V$
 $R_{DS(ON)}=7.5m\Omega(Typ.) @V_{GS}=4.5V$
- 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

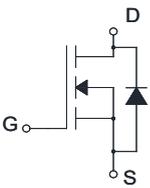
- PWM applications
- Load switch
- Power management in portable/desktop PCs
- DC/DC conversion

100% UIS TESTED!

4. Ordering Information

Part Number	Package	Marking	Material	Packing	Quantity per reel	Flammability Rating	Reel Size
ES4576	SOP8	ES4576/lot	Halogen free	Tape & Reel	3,000 PCS	UL 94V-0	13 inches

5. Pin Configuration and Functions

Pin	Function	Outline	Circuit Diagram
4	Gate	<p>Note b</p> 	
1/2/3	Source		
5/6/7/8	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}	30	V
Gate-Source Voltage		V_{GS}	± 20	V
Continuous Drain Current	$T_A=25^\circ\text{C}$	I_D	15	A
	$T_A=75^\circ\text{C}$		12	
Maximum Power Dissipation	$T_A=25^\circ\text{C}$	P_D	3.1	W
	$T_A=75^\circ\text{C}$		1.9	
Pulsed Drain Current		I_{DM}	60	A
Avalanche Current, Single Pulsed ^a		I_{AS}	26	A
Avalanche Energy, Single Pulsed ^a		E_{AS}	101	mJ
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	Unit
Junction-to-Ambient Thermal Resistance	$t \leq 10 \text{ s}$	$R_{\theta JA}$	40	°C/W
Junction-to-Case Thermal Resistance	Steady State	$R_{\theta JC}$	4.2	

Note:

a: $T_J=25^\circ\text{C}$, $V_{DD}=30\text{V}$, $V_G=10\text{V}$, $L=0.3\text{mH}$, $R_g=25\Omega$.

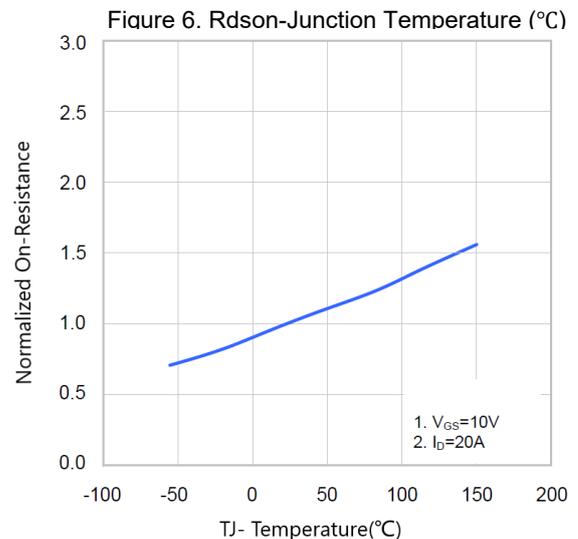
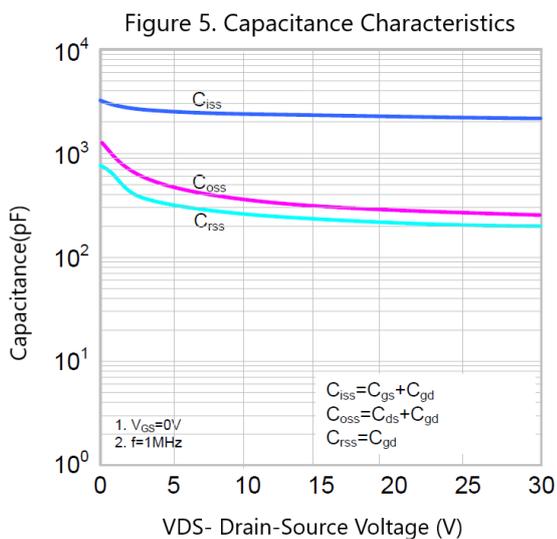
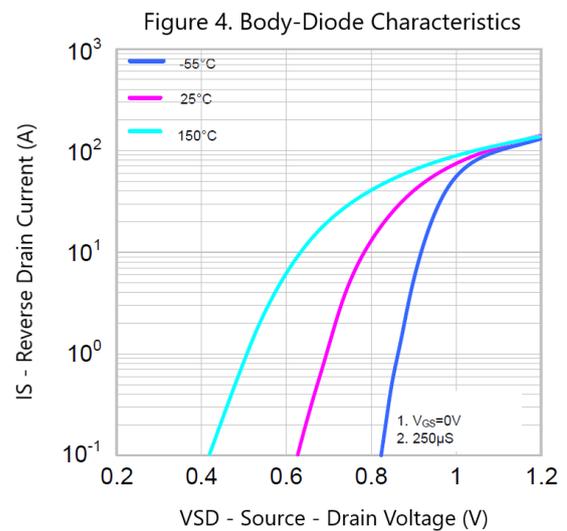
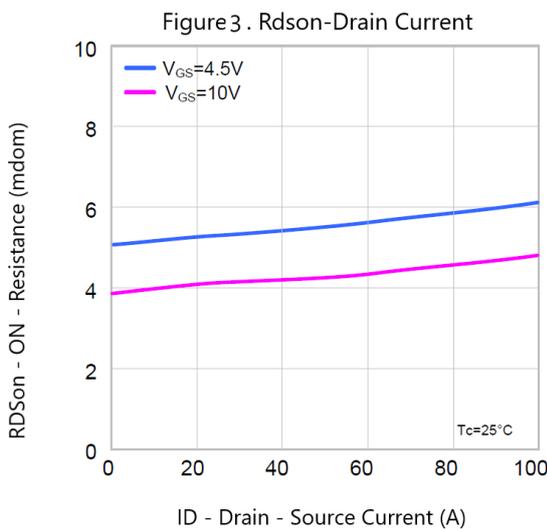
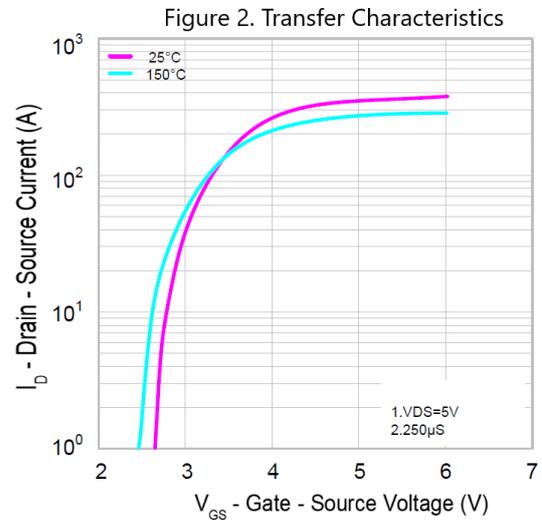
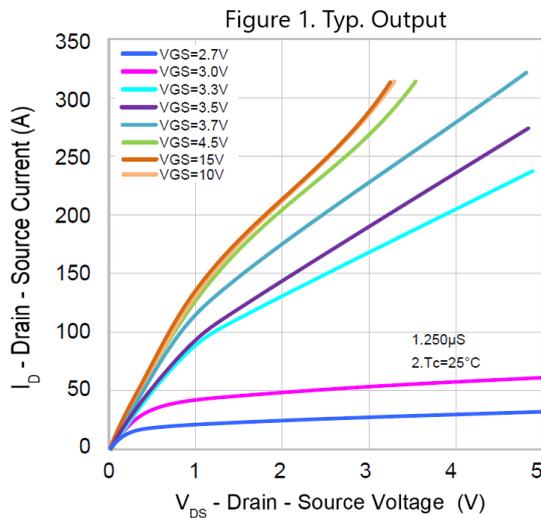
b: This diagram is only an electrical schematic, and the actual pin size is based on POD.

Electrical Characteristics

At TA = 25°C unless otherwise specified

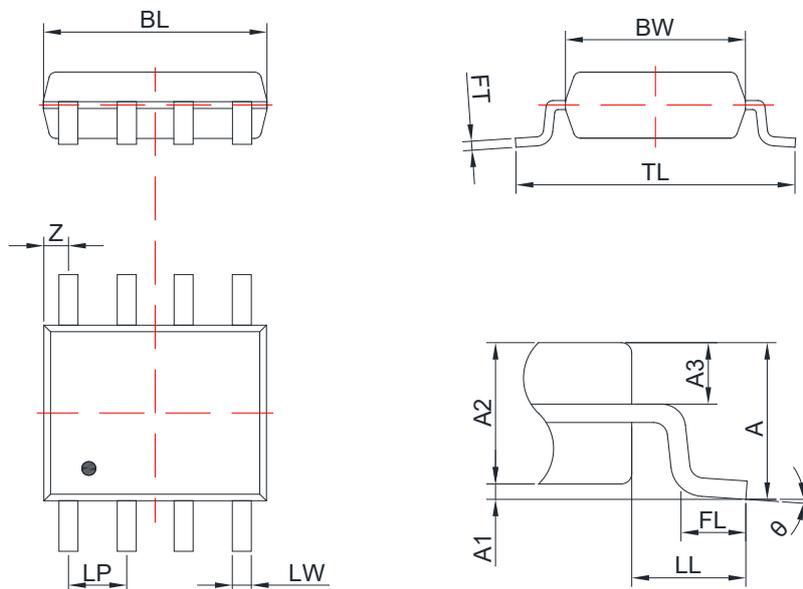
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
OFF CHARACTERISTICS						
Drain-to-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	30			V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=30V, V_{GS}=0V$			1.0	μA
Gate-to-source Leakage Current	I_{GSS}	$V_{DS}=0V, V_{GS}=\pm 20V$			± 100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS}=V_{DS}, I_D=250\mu A$	1.0	1.75	2.5	V
Drain-to-source On-resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=15A$		5.0	8.5	m Ω
		$V_{GS}=4.5V, I_D=10A$		7.5	10.5	
Forward Trans conductance	g_{FS}	$V_{DS}=5.0V, I_D=15A$			80	S
CHARGES, CAPACITANCES AND GATE RESISTANCE						
Input Capacitance	C_{ISS}	$V_{GS}=0V, f=1MHz, V_{DS}=25V$		2200		pF
Output Capacitance	C_{OSS}			275		
Reverse Transfer Capacitance	C_{RSS}			242		
Total Gate Charge	$Q_{G(TOT)}$	$V_{GS}=10V, V_{DS}=24V, I_D=15A$		48		nC
Gate-to-Source Charge	Q_{GS}			8.8		
Gate-to-Drain Charge	Q_{GD}			10.0		
SWITCHING CHARACTERISTICS						
Turn-On Delay Time	$t_{d(ON)}$	$V_{GS}=10V, V_{DS}=20V, I_D=15A, R_G=1.8\Omega$		12.5		ns
Rise Time	t_r			90		
Turn-Off Delay Time	$t_{d(OFF)}$			142		
Fall Time	t_f			85		
BODY DIODE CHARACTERISTICS						
Forward Voltage	V_{SD}	$V_{GS}=0V, I_S=1.0A$		0.75	1.5	V

7. Typical Characteristic



8. Dimension (SOP8)

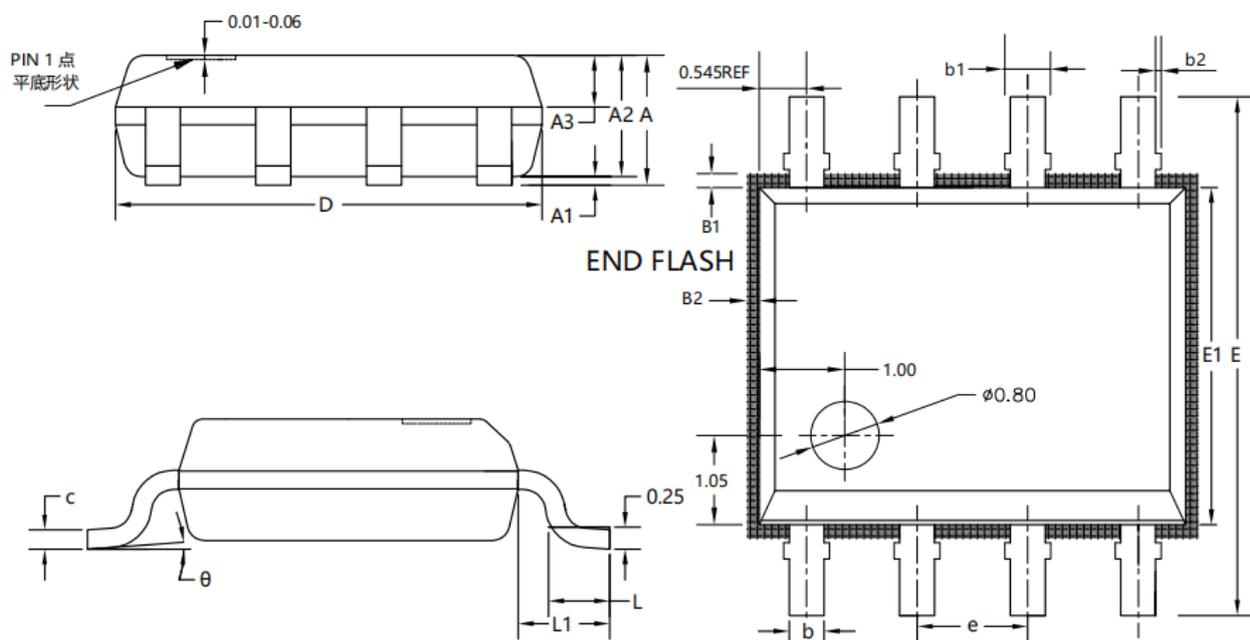
POD A(Y)



COMMON DIMENSIONS: UNITS OF MEASURE=MILLIMETER

Symbol	Dimensions		Symbol	Dimensions	
	Min.	Max.		Min.	Max.
A	1.75		FL	0.50	0.80
A1	0.05	0.15	LP	1.25	1.30
A2	1.40	1.50	LL	1.1 BSC	
A3	0.623 BSC		LW	0.38	0.43
BL	4.92	5.08	TL	5.90	6.10
BW	3.70	4.10	Z	0.54	
FT	0.20	0.21	theta	0°	8°

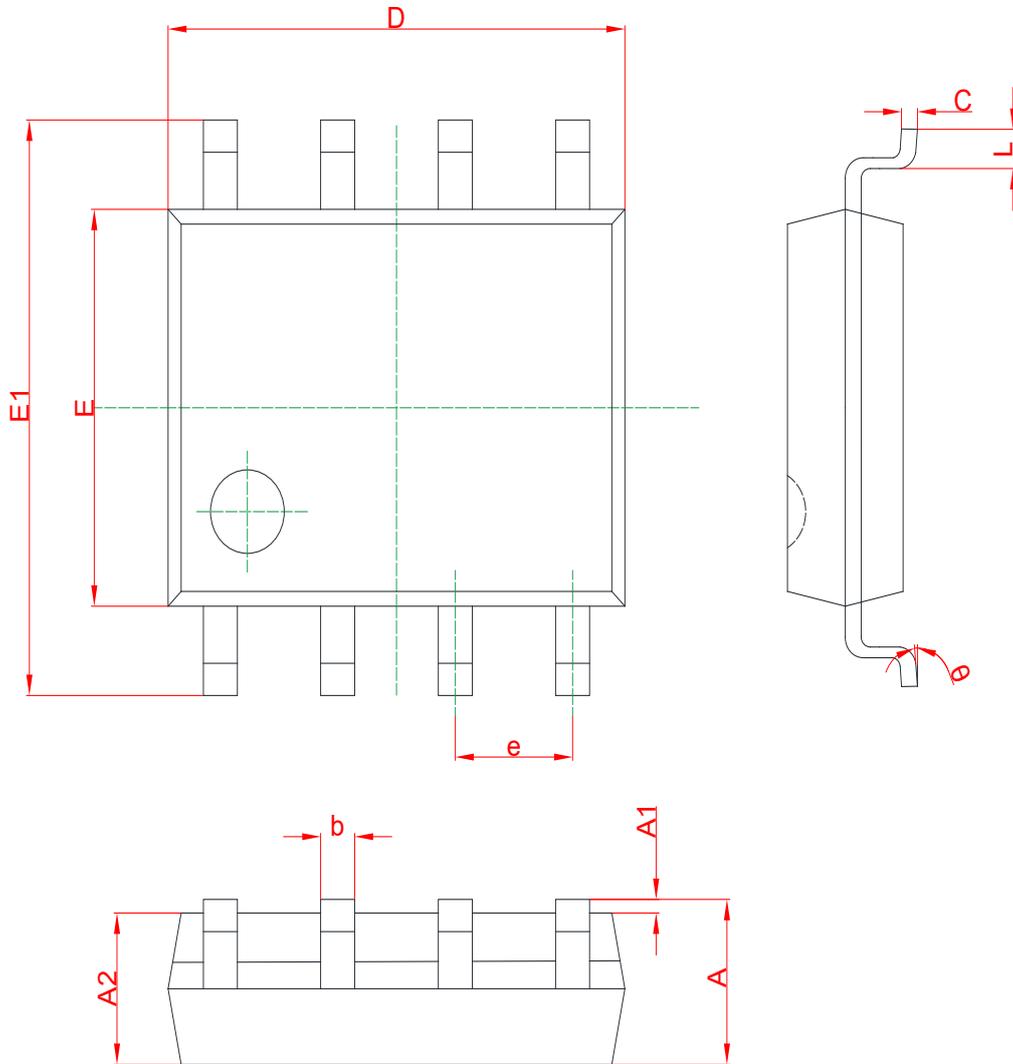
POD B(C)



COMMON DIMENSIONS: UNITS OF MEASURE=MILLIMETER

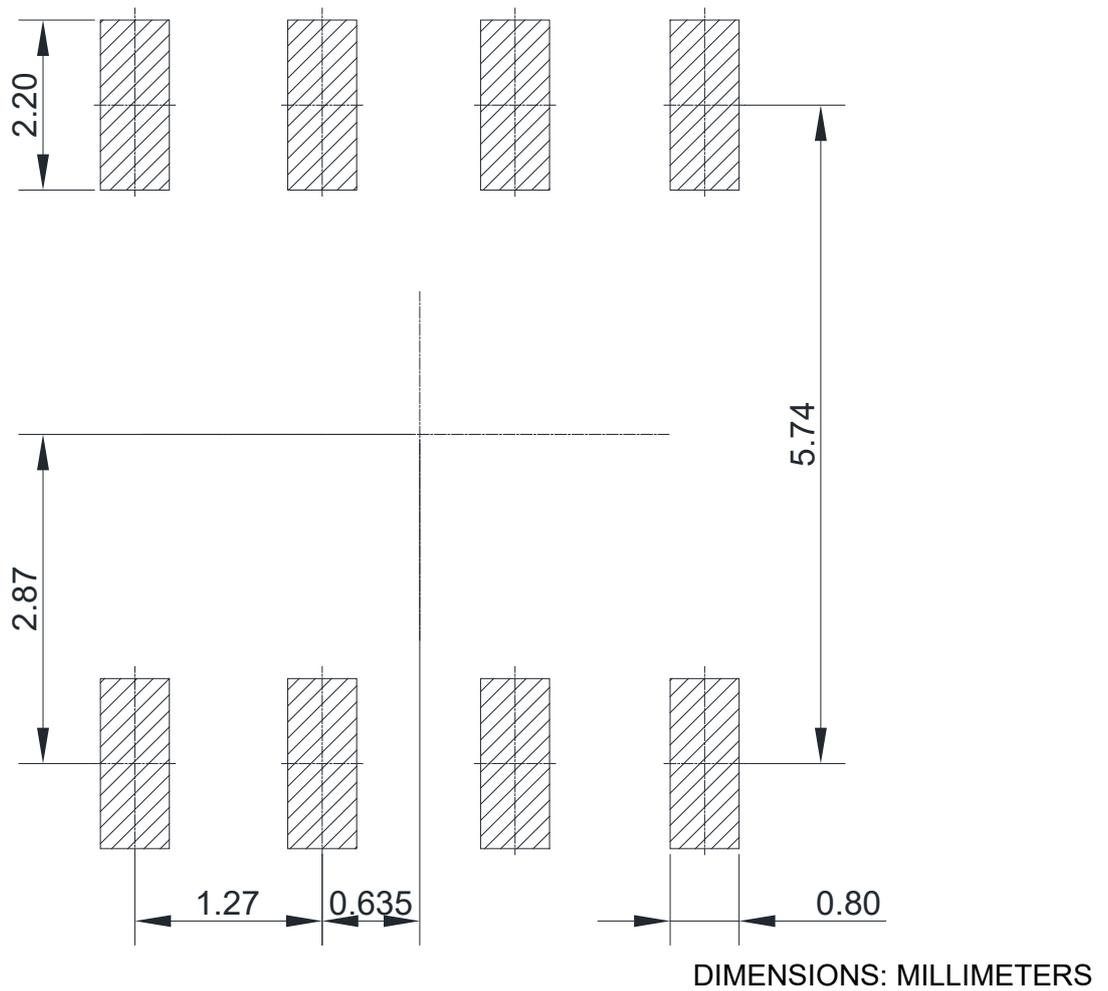
Symbol	Dimensions			Symbol	Dimensions		
	Min.	NOM.	Max.		Min.	NOM.	Max.
A	1.55	1.65	1.75	L	0.50	0.60	0.70
A1	0.06	0.11	0.16	L1	0.90	1.05	1.20
A2	1.35	1.45	1.55	θ	0°	4°	8°
A3	0.60	0.70	0.80	B1	0.14MAX		
b	0.30	0.40	0.50	B2	0.12MAX		
c	0.17	0.20	0.25	b1	0.66MAX		
D	4.80	4.90	5.00	b2	0	0.04	0.08
E	5.80	6.00	6.20	e	1.27BSC		
E1	3.80	3.90	4.00				

POD C(X)



Symbol	Dimensions		Symbol	Dimensions	
	Min.	Max.		Min.	Max.
L	0.40	0.60	e	1.27 TYP	
D	4.95	5.05	c	0.15	0.25
E	3.8	4.0	A2	1.33	1.50
E1	5.80	6.20	A1	0.04	0.20
b	0.4 TYP		θ	0°	8°

9. Recommended Soldering Footprint



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