SuperMOS – TO-252 -100V BV_{DSS}, 38mΩ $R_{DS(on)}$, P-channel MOSFET

1. Description

The ESE01P30K is P-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 ESE01P30K is Pb-free.

2. Features

- -100V, $R_{DS(ON)}$=38mΩ(Typ.), V_{GS}=-10V
  $R_{DS(ON)}$=42mΩ(Typ.), V_{GS}=-4.5V
- Fast Switching
- 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

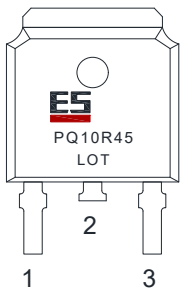
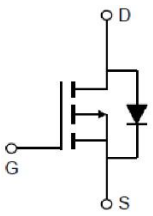
100% UIS TESTED

4. Ordering Information

Part Number	Package	Marking	Material	Packing	Quantity per reel	Flammability Rating	Reel Size
ESE01P30K	TO-252	PQ10R45/LOT	Halogen free	Tape & Reel	2,500 PCS	UL 94V-0	13 inches

Table-1 Ordering information

5. Pin Configuration and Functions

Pin	Function	Outline	Circuit Diagram
1	Gate	Note b 	
3	Source		
2	Drain		

6. Specification

Absolute Maximum Rating & Thermal Characteristics

Ratings at 25 ℃ 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_C=25°C	I_D	-35	A
	T_C=100°C		-22	
Maximum Power Dissipation	T_C=25°C	P_D	119	W
Pulsed Drain Current		I_{DM}	-140	A
Avalanche Current, Single Pulsed(L=0.4mH)		I_{AS}	-28	A
Avalanche Energy, Single Pulsed [a]		E_{AS}	156.8	mJ
Operating Junction Temperature		T_J	150	°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 (t≤10s)	$R_{\theta JA}$		55	°C/W
Junction-to-Case Thermal Resistance	$R_{\theta JC}$		1.05	

Note:

a: The test condition is VDD= -30V, L=0.4mH, IAS= -28A.

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

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	T_J=25℃	I_{DSS}	V_{GS}=0V, V_{DS}=-100V			-1	uA
	T_J=100℃					-100	
Gate-to-source Leakage Current		I_{GSS}	V_{GS}=±20V, V_{DS}=0V			±100	nA
ON CHARACTERISTICS							
Gate Threshold Voltage		$V_{GS(TH)}$	V_{GS}=V_{DS}, I_D=-250uA	-1.2	-1.7	-2.4	V
Drain-to-source On-resistance		$R_{DS(on)}$	V_{GS}=-10V, I_D=-20A		38	45	mΩ
			V_{GS}=-4.5V, I_D=-10A		42	58	
Forward Transconductance		g_{FS}	V_{DS}=-10V, I_D=-20A		44		S
Gate Resistance		R_g	f=1MHz		11		Ω
CHARGES, CAPACITANCES AND GATE RESISTANCE							
Input Capacitance		C_{ISS}	V_{GS}=0V, V_{DS} =-50V f=1MHz		5000		pF
Output Capacitance		C_{OSS}			151		
Reverse Transfer Capacitance		C_{RSS}			130		
Total Gate Charge		$Q_{G(TOT)}$	V_{GS}=-10V, V_{DS}=-50V I_D =-20A		115		nC
Gate-to-Source Charge		Q_{GS}			15		
Gate-to-Drain Charge		Q_{GD}			14		
SWITCHING CHARACTERISTICS							
Turn-On Delay Time		$t_{d(ON)}$	V_{GS}=-10V, V_{DS}=-50V I_D=-20A, R_G=3Ω		14.2		ns
Rise Time		t_r			38.9		
Turn-Off Delay Time		$t_{d(OFF)}$			65		
Fall Time		t_f			37.5		
BODY DIODE CHARACTERISTICS							
Forward Voltage		V_{SD}	V_{GS}=0V, I_{SD}=-20A			-1.2	V

7. Typical Characteristic

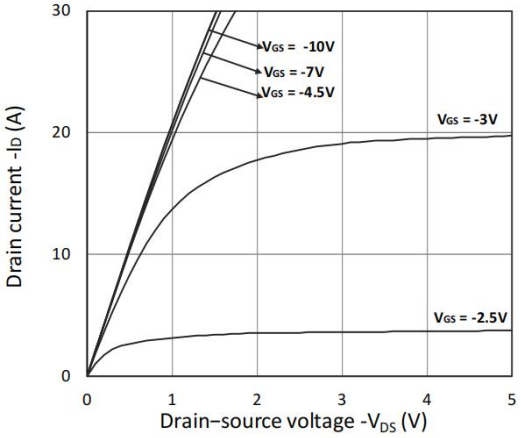


Figure 1. Output Characteristics

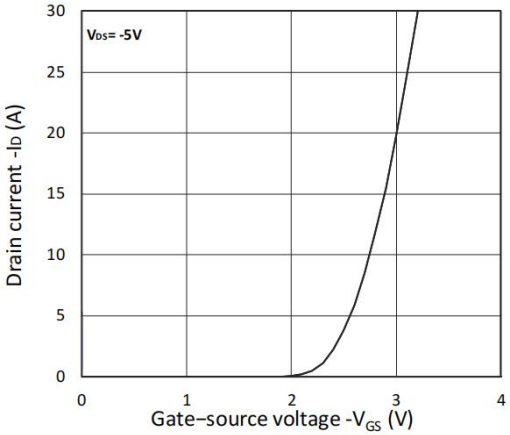


Figure 2. Transfer Characteristics

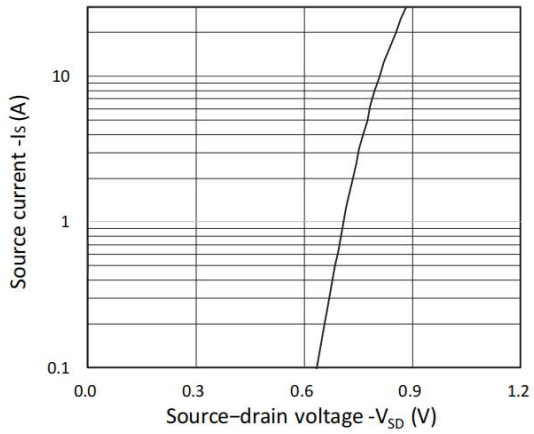


Figure 3. Forward Characteristics of Reverse

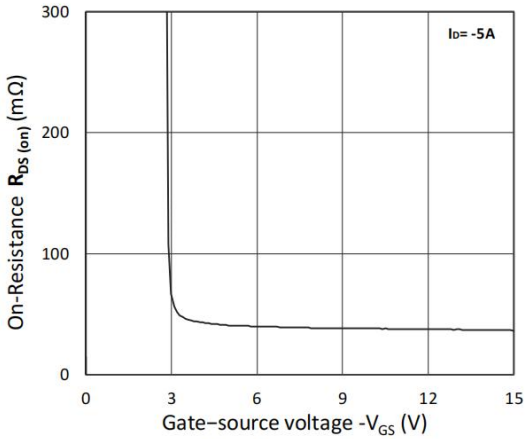


Figure 4. $R_{DS(ON)}$ vs. V_{GS}

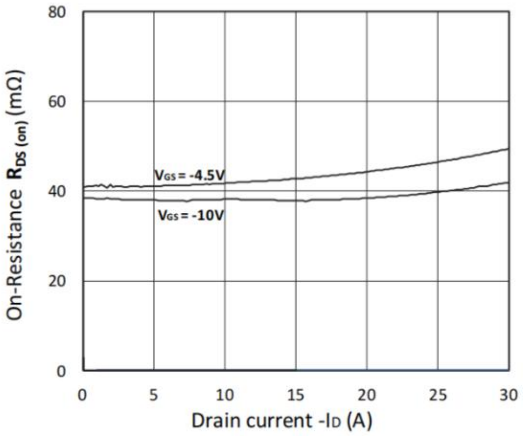


Figure 5. $R_{DS(ON)}$ vs. I_D

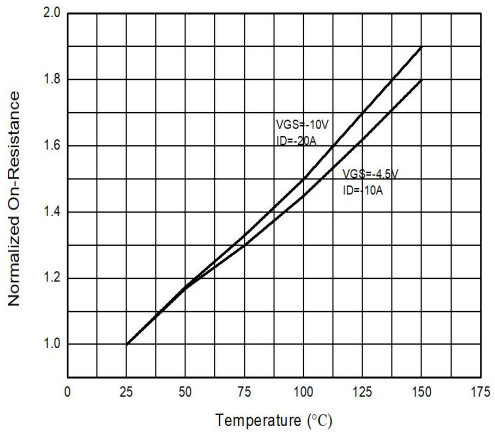


Figure6: Normalized On-Resistance vs Temperature

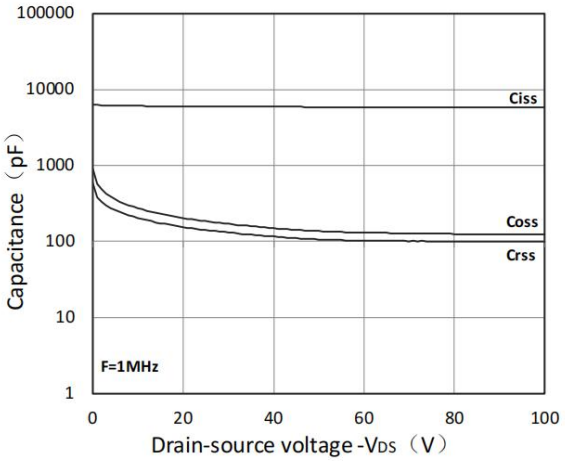
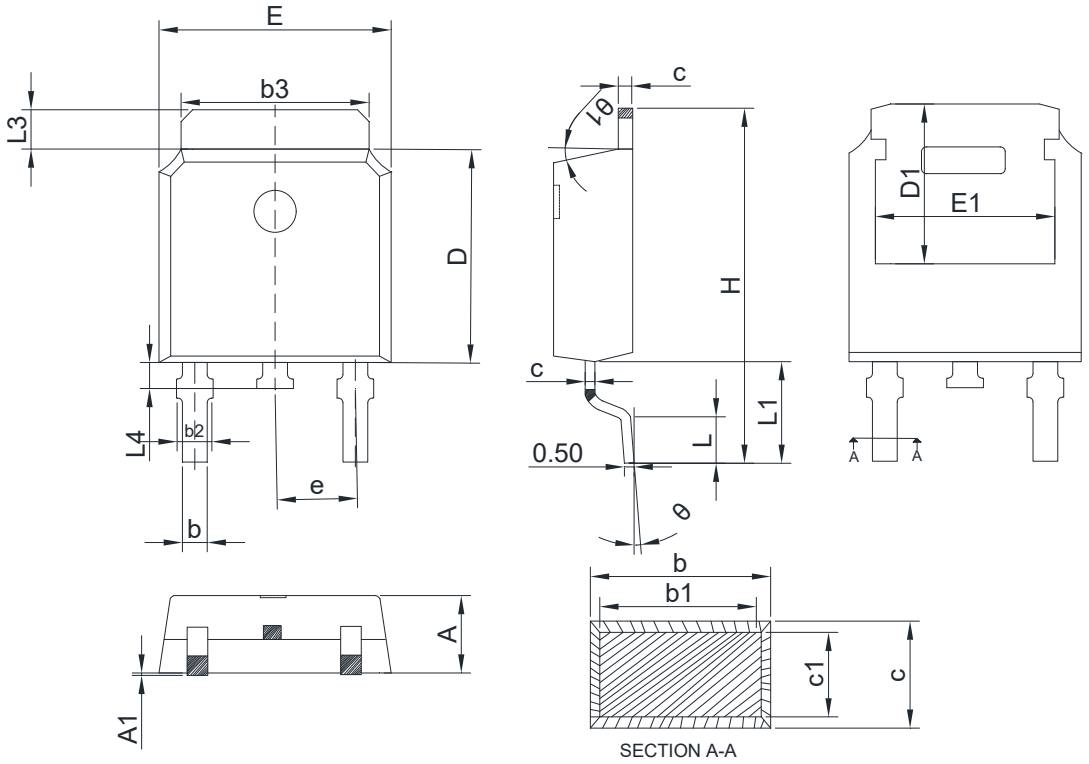


Figure 7. Capacitance Characteristics

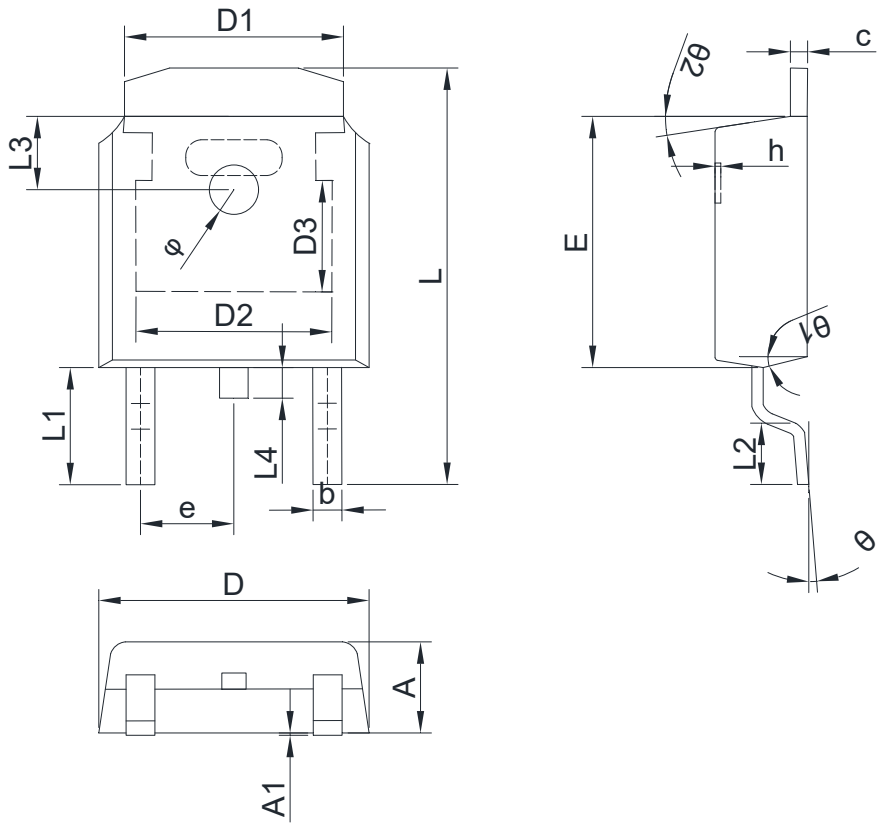
8. Dimension (TO-252)

POD A(Q)



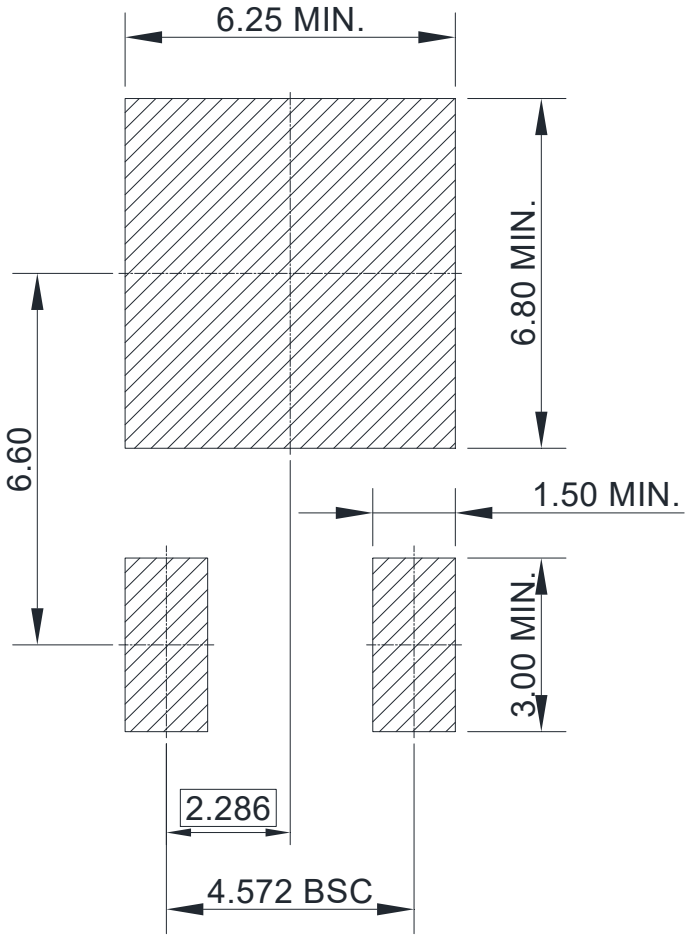
COMMON DIMENSIONS CUNITS MEASURE=MILLIMETER							
SYMBOL	MIN	TYP	MAX	SYMBOL	MIN	TYP	MAX
A	2.20	2.30	2.40	D1	5.21	-	-
A1	0.00	-	0.12	E	6.50	6.60	6.70
b	0.65	-	0.89	E1	4.32	-	-
b1	0.64	0.76	0.79	H	9.70	9.95	10.20
b2	0.76	0.86	1.10	L	1.40	1.50	1.60
b3	5.20	5.33	5.46	L1	2.84REF		
c	0.48	-	0.60	e	2.29BSC		
c1	0.47	0.51	0.55	θ	0°	-	10°
D	6.00	6.10	6.20	θ1	0°	-	15°
L3	0.90	-	1.27	L4	0.60	0.80	1.00

POD B(X)



COMMON DIMENSIONS CUNITS MEASURE=MILLIMETER							
SYMBOL	MIN	TYP	MAX	SYMBOL	MIN	TYP	MAX
A	2.200	2.300	2.400	h	0.000	0.100	0.200
A1	0.000		0.127	L	9.900	10.100	10.300
b	0.640	0.690	0.740	L1	2.888 REF		
c(电镀后)	0.460	0.520	0.580	L2	1.400	1.550	1.700
D	6.500	6.600	6.700	L3	1.600 REF		
D1	5.334 REF			L4	0.600	0.800	1.000
D2	4.826 REF			ϕ	1.100	1.200	1.300
D3	3.166 REF			θ	0°		8°
E	6.000	6.100	6.200	θ1	9° TYP		
e	2.286 TYP			θ2	9° TYP		

9. Recommended Soldering Footprint



DIMENSIONS: MILLIMETERS

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