

SuperMOS – TO-252 60V BV_{DSS}, 14mΩ R_{DS(ON)}, N-channel MOSFET

1. Description

The ESE6050KA 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 ESE6050KA is Pb-free.

2. Features

- 60V, R_{DS(ON)}=14mΩ(Typ.) @V_{GS}=10V
R_{DS(ON)}=18mΩ(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

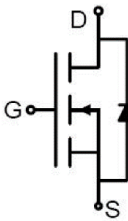
3. Applications

- 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
ESE6050KA	TO-252	GNQ06R18/LOT	Halogen free	Tape & Reel	2,500 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}	60	V
Gate-Source Voltage		V_{GS}	± 20	V
Continuous Drain Current	$T_C=25^{\circ}\text{C}$	I_D	30	A
	$T_C=100^{\circ}\text{C}$		20	
Maximum Power Dissipation		P_D	27.8	W
Pulsed Drain Current		I_{DM}	120	A
Avalanche Current, Single Pulsed ^a		I_{AS}	16.5	A
Avalanche Energy, Single Pulsed ^a		E_{AS}	68	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-Case Thermal Resistance	$R_{\theta JC}$		4.5	$^{\circ}\text{C/W}$

Note:

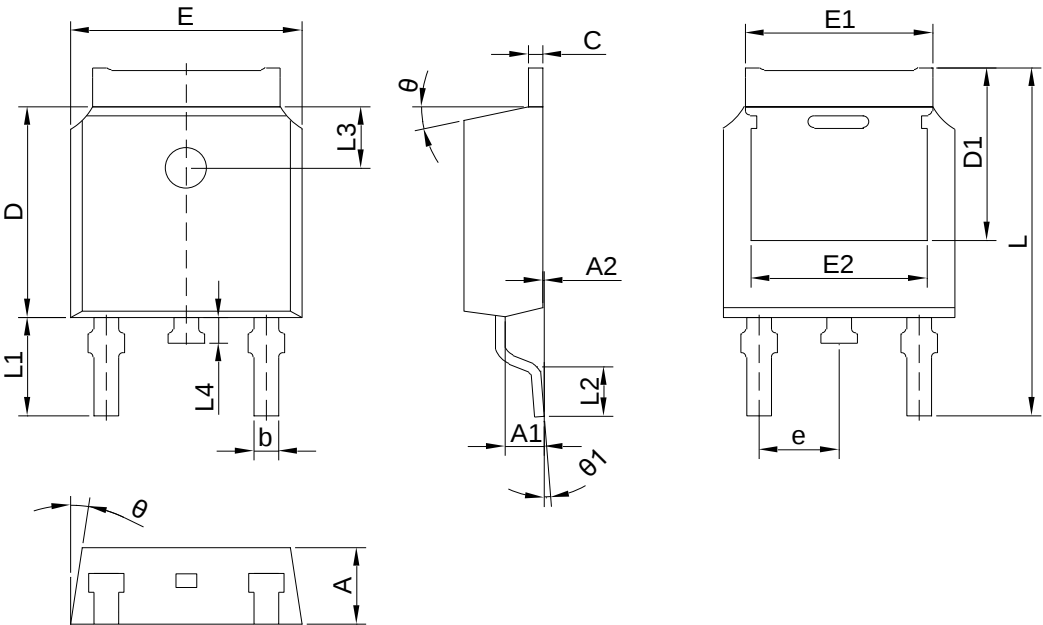
a: $T_J=25^{\circ}\text{C}$, $V_{DD}=30\text{V}$, $V_G=10\text{V}$, $L=0.5\text{mH}$, $R_g=25\Omega$

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	60			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =60V, 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	1.6	2.5	V
Drain-to-source On-resistance	R _{DS(on)}	V _{GS} =10V, I _D =20A		14	18	mΩ
		V _{GS} =4.5V, I _D =10A		18	25	
Forward transconductance	g _{fs}	V _{DS} =5V, I _D =20A			100	S
CHARGES, CAPACITANCES AND GATE RESISTANCE						
Input Capacitance	C _{ISS}	V _{GS} =0V, f=1MHz, V _{DS} =25V		930		pF
Output Capacitance	C _{OSS}			230		
Reverse Transfer Capacitance	C _{RSS}			10		
Total Gate Charge	Q _{G(TOT)}	V _{GS} =10V, V _{DS} =30V, I _D =20A		22		nC
Gate-to-Source Charge	Q _{GS}			4.5		
Gate-to-Drain Charge	Q _{GD}			3.5		
SWITCHING CHARACTERISTICS						
Turn-On Delay Time	t _{d(ON)}	V _{GS} =10V, V _{DS} =30V, I _D =20A, R _G =1.6Ω		4.5		ns
Rise Time	t _r			3		
Turn-Off Delay Time	t _{d(OFF)}			14		
Fall Time	t _f			2.7		
BODY DIODE CHARACTERISTICS						
Forward Voltage	V _{SD}	V _{GS} =0V, I _S =20A			1.5	V

7. Dimension (TO-252)



COMMON DIMENSIONS CUNITS MEASURE=MILLIMETER							
SYMBOL	MIN	TYP	MAX	SYMBOL	MIN	TYP	MAX
A	2.10	2.30	2.50	E2	4.63	4.83	5.03
A1	0.97	1.07	1.17	L	9.90	10.10	10.30
A2	0.00	-	0.12	L1	2.74	2.94	3.14
b	0.66	0.76	0.86	L2	1.40	1.50	1.70
C	0.45	0.51	0.60	L3	1.65	1.80	1.95
D	5.90	6.10	6.30	L4	0.60	0.80	1.00
D1	5.10	5.30	5.45	e	2.286 BSC		
E	6.40	6.60	6.80	θ	5°	7°	10°
E1	5.10	5.33	5.45	θ 1	0°	-	3°

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