



CEK01N65A

650V ▲ 12Ω ▲ 0.3A ▲ Si MOSFET

SILICON Si MOSFET ▲ THT type

N-channel enhancement mode

UL94V-0 rated flame retardant epoxy

TO92 package

Ammo tape

Rugged and reliable


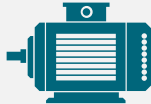



MAXIMUM RATINGS

Parameter (T _C = 25°C, unless otherwise noted)		Characteristics
Drain-Source Voltage	V _{DS}	650V
Gate-Source Voltage	V _{GS}	±30V
Continuous Drain Current	I _D	0.3A
Pulsed Drain Current ^{Note 1}	I _{DM}	1.2A
Maximum Power Dissipation	P _D	3.1W
Operating and Storage Temperature Range	T _J , T _{STG}	-55°C to +150°C

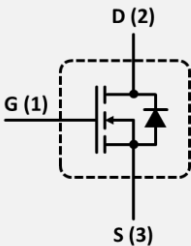
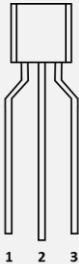
THERMAL CHARACTERISTICS

Parameter	Symbol	Limit
Thermal Resistance, Junction-to-Lead ^{Note 2}	R _{TH_JL}	40°C/W

APPLICATIONS

Industrial Inverters	Motors & Drives	Renewable Energy	SMPS	UPS
				

PIN DESCRIPTION

Circuit Diagram	Outline - Front View	Pin No.	Description
		1 2 3	Gate Drain Source

ELECTRICAL CHARACTERISTICS ▲ $T_C = 25^\circ\text{C}$, unless otherwise noted

Item	Condition	Symbol	Min.	Typ.	Max.	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = 250\mu A$	BV_{DSS}	650			V
Zero Gate Voltage Drain Current	$V_{DS} = 650V, V_{GS} = 0V$	I_{DSS}			1	μA
Gate Body Leakage Current, Forward	$V_{GS} = 30V, V_{DS} = 0V$	I_{GSSF}			100	nA
Gate Body Leakage Current, Reverse	$V_{GS} = -30V, V_{DS} = 0V$	I_{GSSR}			-100	nA
On Characteristics						
Gate Threshold Voltage	$V_{GS} = V_{DS}, I_D = 250\mu A$	$V_{GS(th)}$	2		4	V
Static Drain-Source On-Resistance	$V_{GS} = 10V, I_D = 0.2A$	$R_{DS(ON)}$		12	15	Ω
Dynamic Characteristics ^{Note 3}						
Forward Transconductance	$V_{DS} = 20V, I_D = 0.3A$	g_{FS} ^{Note 2}		0.5		S
Input Capacitance	$V_{DS} = 25V, V_{GS} = 0V, f = 1MHz$	C_{ISS}		170		pF
Output Capacitance	$V_{DS} = 25V, V_{GS} = 0V, f = 1MHz$	C_{OSS}		60		pF
Reverse Transfer Capacitance	$V_{DS} = 25V, V_{GS} = 0V, f = 1MHz$	C_{RSS}		30		pF
Switching Characteristics ^{Note 3}						
Turn-On Delay Time	$V_{DD} = 300V, V_{GS} = 10V, I_D = 0.3A,$ $R_{G(ext)} = 4.7\Omega$	$t_{D(ON)}$		10	20	ns
Turn-On Rise Time	$V_{DD} = 300V, V_{GS} = 10V, I_D = 0.3A,$ $R_{G(ext)} = 4.7\Omega$	t_R		11	22	ns
Turn-Off Delay Time	$V_{DD} = 300V, V_{GS} = 10V, I_D = 0.3A,$ $R_{G(ext)} = 4.7\Omega$	$t_{D(OFF)}$		24	48	ns
Turn-Off Fall Time	$V_{DD} = 300V, V_{GS} = 10V, I_D = 0.3A,$ $R_{G(ext)} = 4.7\Omega$	t_F		62	124	ns
Total Gate Charge	$V_{DS} = 480V, V_{GS} = 10V, I_D = 0.3A$	Q_G		10	12.8	nC
Gate Source Charge	$V_{DS} = 480V, V_{GS} = 10V, I_D = 0.3A$	Q_{GS}		0.6		nC
Gate Drain Charge	$V_{DS} = 480V, V_{GS} = 10V, I_D = 0.3A$	Q_{GD}		7.5		nC
Drain-Source Diode Characteristics and Maximum Ratings						
Drain-Source Diode Forward Current		I_S			0.3	A
Drain-Source Diode Forward Voltage ^{Note 2}	$V_{GS} = 0V, I_S = 0.2A$	V_{SD}			1.6	V

Notes

- 1: Repetitive Rating: Pulse width limited by maximum junction temperature
- 2: Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
- 3: Guaranteed by design, not subject to production testing.

REFERENCE DATA ▲ TYPICAL DEVICE PERFORMANCE

Fig. 1 • Output Characteristics

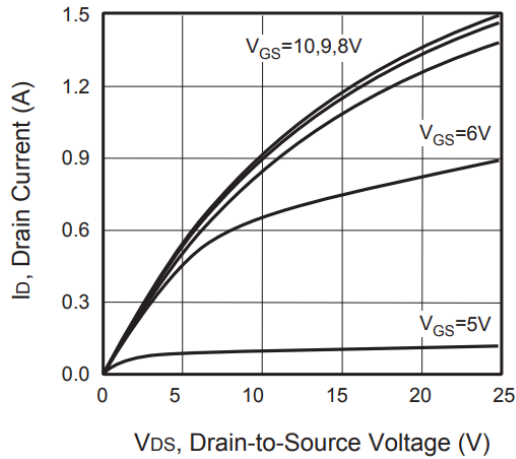


Fig. 2 • Transfer Characteristics

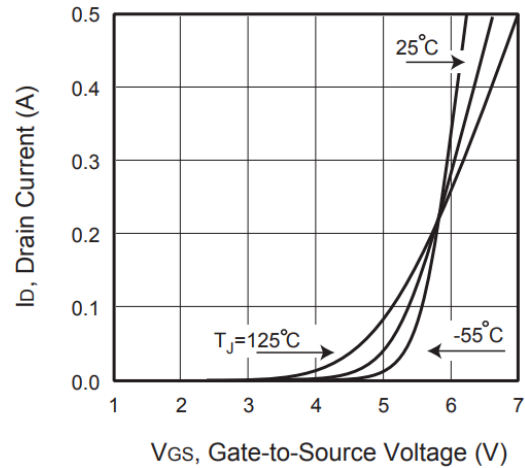


Fig. 3 • Capacitance

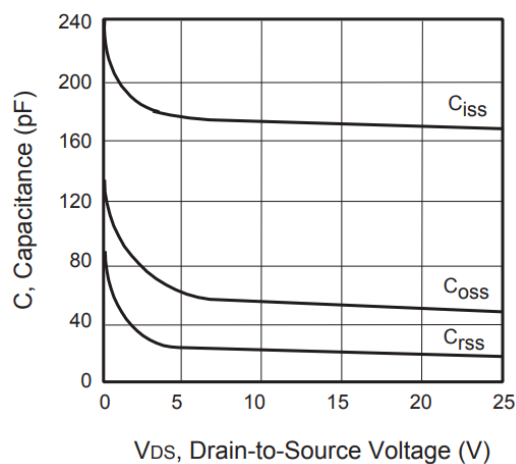


Fig. 4 • On-Resistance Variation with Temperature

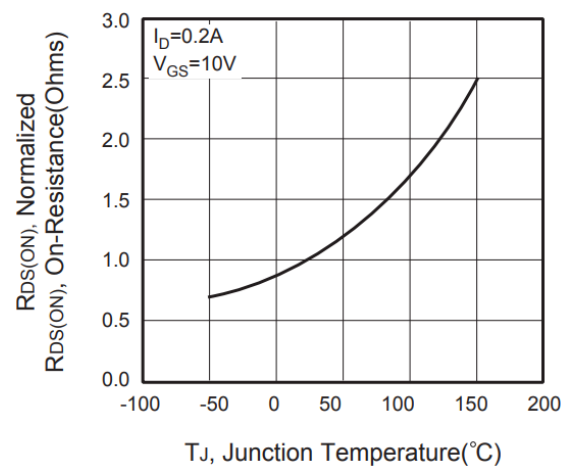


Fig. 5 • Gate Threshold Variation with Temperature

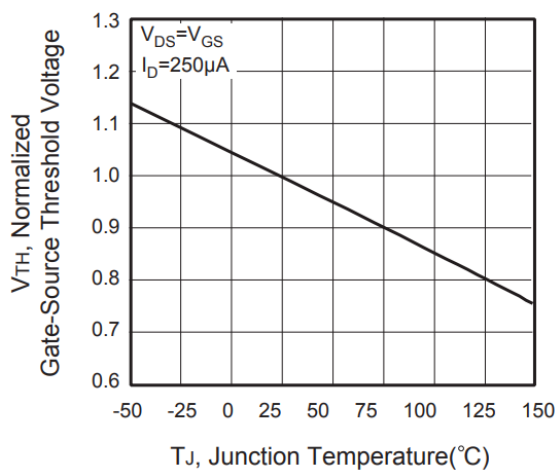
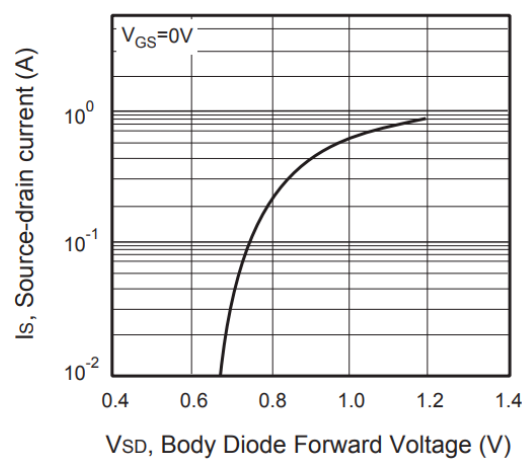


Fig. 6 • Body Diode Forward Voltage Variation with Source Current



REFERENCE DATA ▲ TYPICAL DEVICE PERFORMANCE

Fig. 7 • Gate Charge

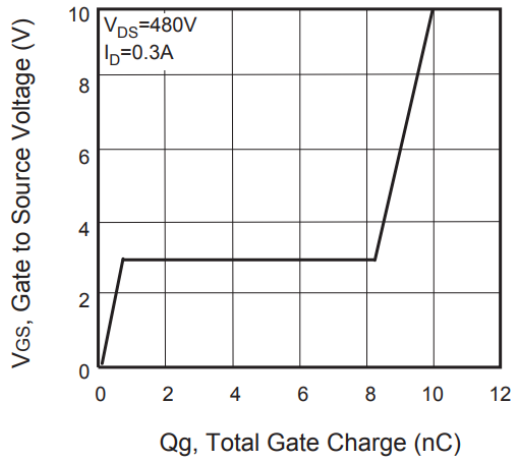


Fig. 8 • Maximum Safe Operating Area

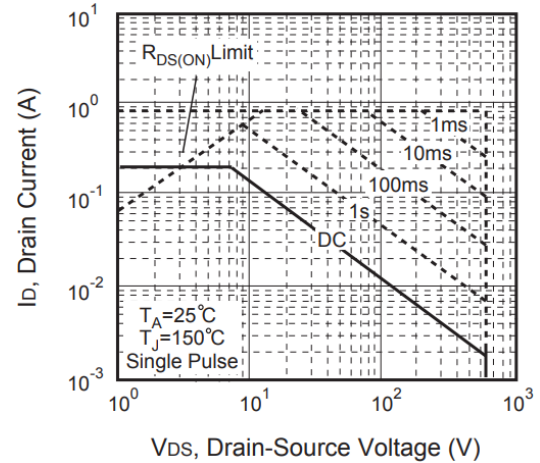


Fig. 9 • Switching Test Circuit



Fig. 10 • Switching Waveforms

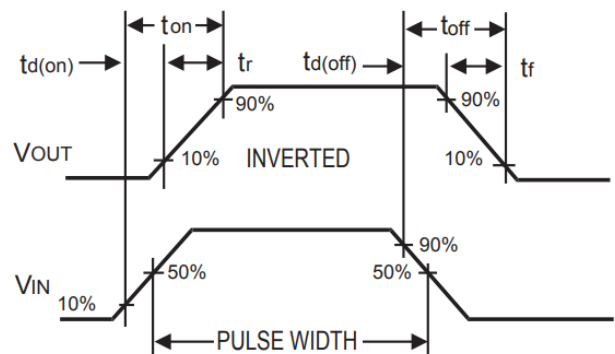
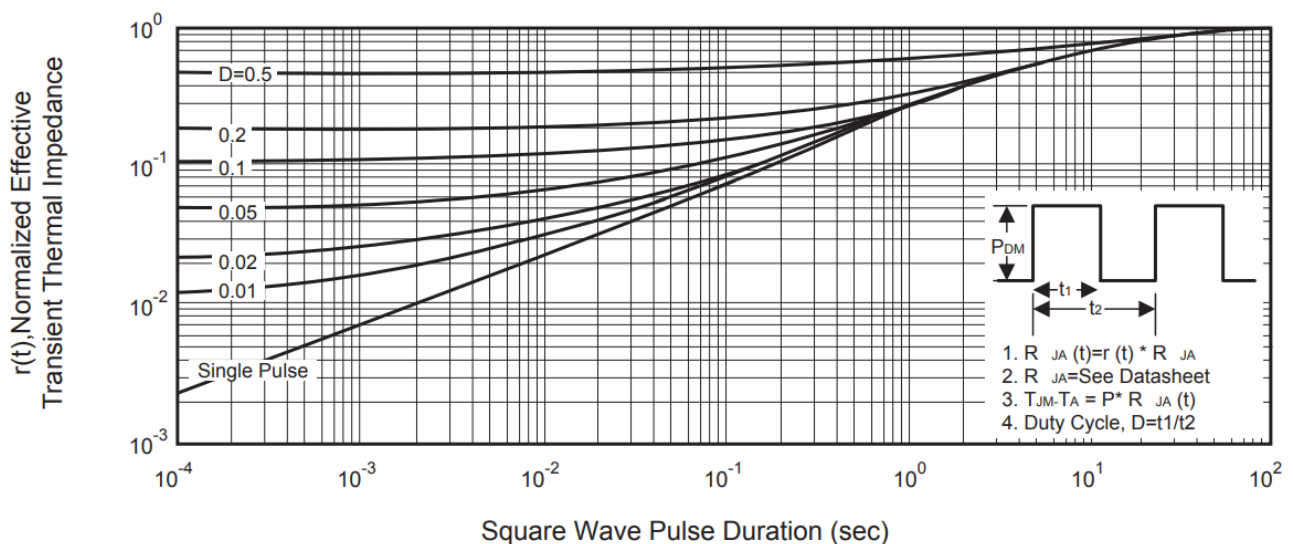
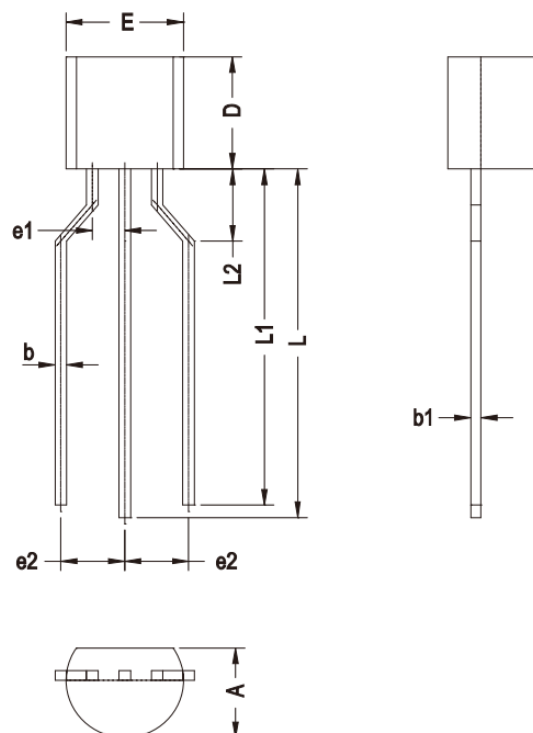


Fig. 11 • Normalized Thermal Transient Impedance Curve



PACKAGE OUTLINE



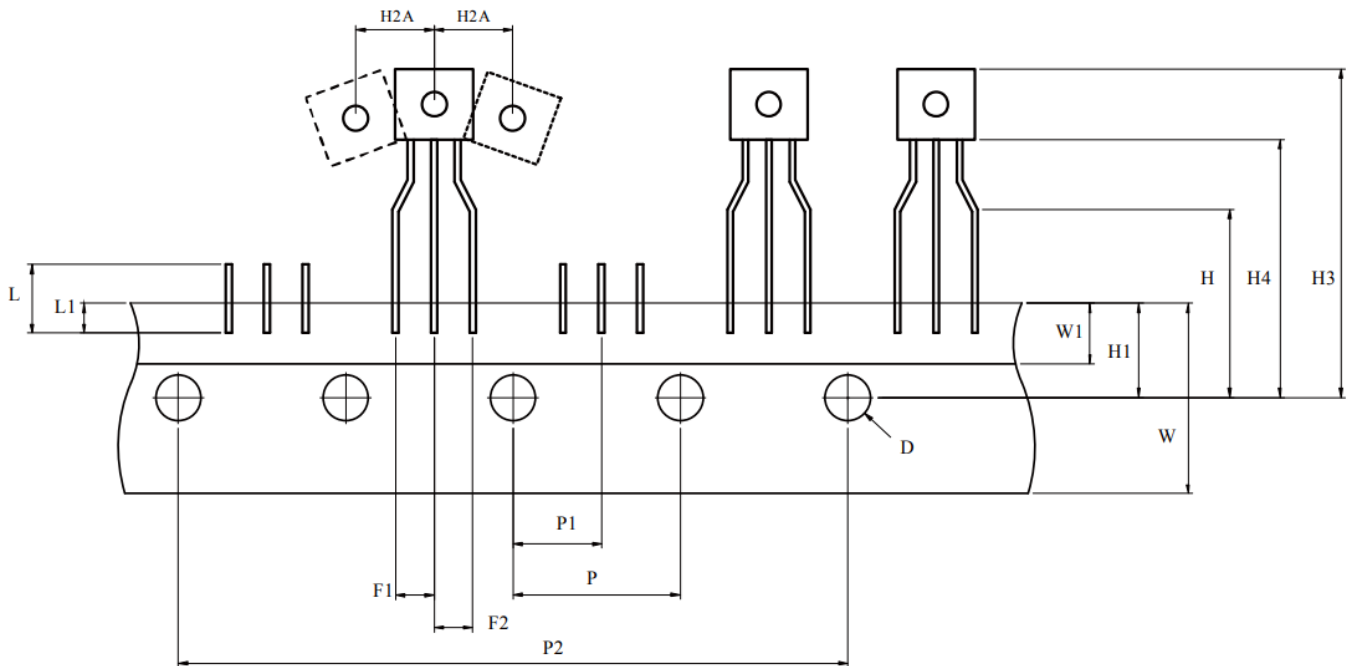
Sym	Millimeters (Min.)	Millimeters (Typ.)	Millimeters (Max.)
A	3.460	3.660	3.860
b	0.360	0.460	0.560
b1	0.350	0.430	0.510
D	4.380	4.580	4.780
E	4.430	4.640	4.850

Sym	Millimeters (Min.)	Millimeters (Typ.)	Millimeters (Max.)
e1	1.270 BSC		
e2	2.500 BSC		
L	14.250	14.560	14.870
L1	12.500	13.500	14.500
L2	2.800	2.900	3.000

ORDERING INFORMATION

Part Number	Package	Packing	Ammo Qty.	Inner Box Qty.	Outer Box Qty.
CEK01N65A	TO-92	Ammo Tape	2,000pcs	2,000pcs	32,000pcs

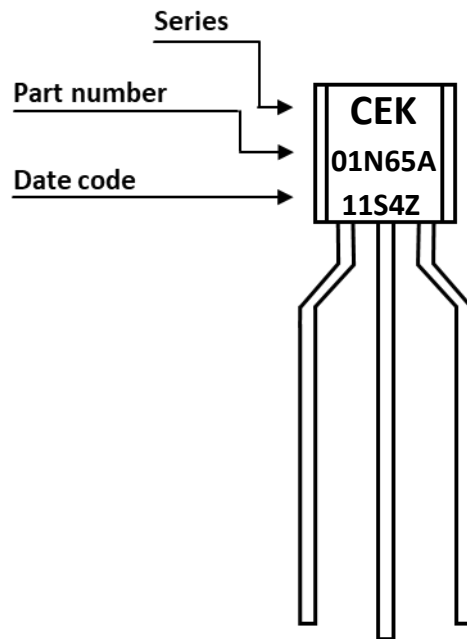
AMMO TAPING DIMENSIONS ▲ All dimensions in mm



Package	D	F1, F2	F1 – F2	H	H1	H2A	H3	H4
TO92	4.00	2.50	±0.30	16.00	9.00	0.50	27.00	20.00
	±0.20	+0.20 -0.10	-	±0.50	±0.50	Max.	Max	Max.
	L	L1	P	P1	P2	W	W1	W2
	11.00	2.50	12.70	6.35	50.80	17.50 ~ 19.00	5.00 ~ 7.00	0.50
	Max.	Min.	±0.20	±0.40	±0.50	-	-	Max.

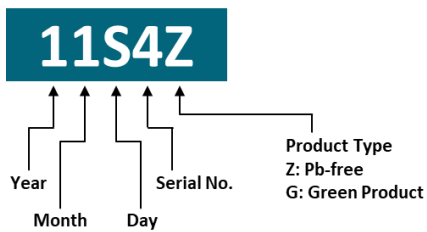
Note: All dimensions meet EIA-481-D requirements.

PART MARKING



DATE CODE

Example: 11S4Z



Coding list for „Day“

1	2	3	4	5	6	7	8	9	A
01	02	03	04	05	06	07	08	09	10
B	C	D	E	F	G	H	I	J	K
11	12	13	14	15	16	17	18	19	20
L	M	N	O	P	Q	R	S	T	U
21	22	23	24	25	26	27	28	29	30
V									
31									

Coding list for „Month“

1	2	3	4	5	6
Jan	Feb	Mar	Apr	May	Jun
7	8	9	A	B	C
Jul	Aug	Sep	Oct	Nov	Dec

Coding list for „Year“

0	1	2	3	4
2020	2021	2022	2023	2024
5	6	7	8	9
2025	2026	2027	2028	2029

RECOMMENDED WAVE SOLDERING PROFILE ▲ THT PACKAGE



Classification wave soldering profile ▲ Refer to EN 61760-1: 2006

Profile Features		Value ▲ Sn-Pb Assembly	Value ▲ Pb-free Assembly
Preheat temperature min.	$T_{s\ min}$	100 °C	100 °C
Preheat temperature typical	$T_{s\ typ}$	120 °C	120 °C
Preheat temperature max.	$T_{s\ max}$	130 °C	130 °C
Preheat time t_s from $T_{s\ min}$ to $T_{s\ max}$	t_s	70 seconds	70 seconds
Peak temperature	T_p	235 °C to 260 °C	245 °C to 260 °C
Time of actual peak temperature	t_p	Max. 10 seconds Max. 5 second each wave	Max. 10 seconds Max. 5 second each wave
Ramp-down rate min.		~ 2 °C/second	~ 2 °C/second
Ramp-down rate typical		~ 3.5 °C/second	~ 3.5 °C/second
Ramp-down rate max.		~ 5 °C/second	~ 5 °C/second
Time 25°C to 25°C		4 minutes	4 minutes

REVISION TABLE

Revision	Date	Status	Notes
001	30/09/2022	Initial release	Initial publication

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