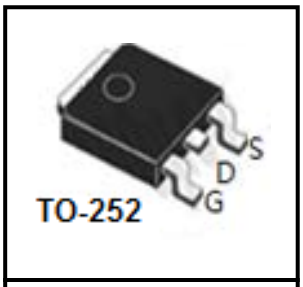
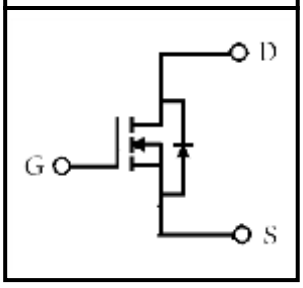
25V N-Channel Trench MOSFET

FEATURES

- Super Low Gate Charge
- 100% EAS Guaranteed
- RoHS compliant
- Green Device Available
- Excellent CdV/dt effect decline
- Advanced high cell density Trench technology





APPLICATIONS

- Load Switching
- Power Motor Controls
- High Frequency Isolated DC-DC Converters with Synchronous Rectification for Industrial

Device Marking and Package Information

Device	Package	Marking
CTD02N004	TO-252	CTD02N004

Absolute Maximum Ratings at T_j= 25ºC unless otherwise noted

Parameter		Symbol	Value	Unit
Drain-Source Voltage (V_{GS} = 0V)		V_{DSS}	25	V
Continuous Drain Current T_C = 25ºC	(note1)	I_D	90	A
Continuous Drain Current T_C = 100ºC	(note1)		65	A
Pulsed Drain Current	(note2)	I_{DM}	340	A
Gate Source Voltage		V_{GSS}	±12	V
Single Pulse Avalanche Energy	(note3)	E_{AS}	340	mJ
Power Dissipation T_C = 25ºC	(note4)	P_D	87	W
Operating Junction and Storage Temperature Range		T_J, T_{stg}	-55~+175	ºC

Thermal Characteristics

Parameter		Symbol	Value	Unit
Thermal Resistance, Junction-Case	(note1)	$R_{\theta JC}$	1.72	ºC/W

Electrical Characteristics T_j= 25ºC unless otherwise specified						
Parameter	**Symbol**	**Test Conditions**	**Value**			**Unit**
			Min.	**Typ.**	**Max.**	
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D = 250μA	25	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 20V, V_{GS} = 0V, T_J = 25ºC	--	--	1	uA
		V_{DS} = 20V, V_{GS} = 0V, T_J = 100ºC	--	--	5	uA
Gate-Source Leakage	I_{GSS}	V_{GS} = ±12V	--	--	±100	nA
Gate-Source Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	0.4	0.75	1.2	V
Drain-Source On-Resistance (note2)	$R_{DS(on)}$	V_{GS} = 10V, I_D = 30A	--	3.1	4	mΩ
		V_{GS} = 4.5V, I_D = 20A	--	3.3	4.5	mΩ
		V_{GS} = 2.5V, I_D = 15A	--	5.5	8	mΩ
Dynamic						
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = 15V, f = 1.0MHz	--	2813	--	pF
Output Capacitance	C_{oss}		--	355	--	
Reverse Transfer Capacitance	C_{rss}		--	263	--	
Total Gate Charge （4.5V）	Q_g	V_{DD} = 10V, I_D = 12A, V_{GS} = 4.5V	--	33	--	nC
Gate-Source Charge	Q_{gs}		--	4	--	
Gate-Drain Charge	Q_{gd}		--	14	--	
Turn-on Delay Time	$t_{d(on)}$	V_{DS} = 15V, R_L = 0.75Ω, V_{GS} = 4.5V,R_G = 3Ω	--	18	--	ns
Turn-on Rise Time	t_r		--	53	--	
Turn-off Delay Time	$t_{d(off)}$		--	76	--	
Turn-off Fall Time	t_f		--	28	--	
Body Diode Characteristics						
Continuous Body Diode Current	I_S	T_C = 25 ºC	--	--	90	A
Body Diode Voltage	V_{SD}	T_J = 25ºC, I_{SD} = 5A, V_{GS} = 0V	--	--	1.2	V
Reverse Recovery Time	t_{rr}	TJ=25℃ I_F=30A, di/dt=100A/μs	--	25	--	nS
Reverse Recovery Charge	Q_{rr}		--	13	--	nC

Notes

1. The data tested by surface mounted on a 1 inch2 FR-4 board with 2OZ copper.
2. The data tested by pulsed , pulse width≦300us , duty cycle≦2%
3. The EAS data shows Max. rating . The test condition is VDD =25V,VGS =10V,L=0.1mH
4. The power dissipation is limited by 175℃ junction temperature
5. The data is theoretically the same as ID and IDM , in real applications , should be limited by total power dissipation.

Typical Characteristics T_J = 25°C, unless otherwise noted

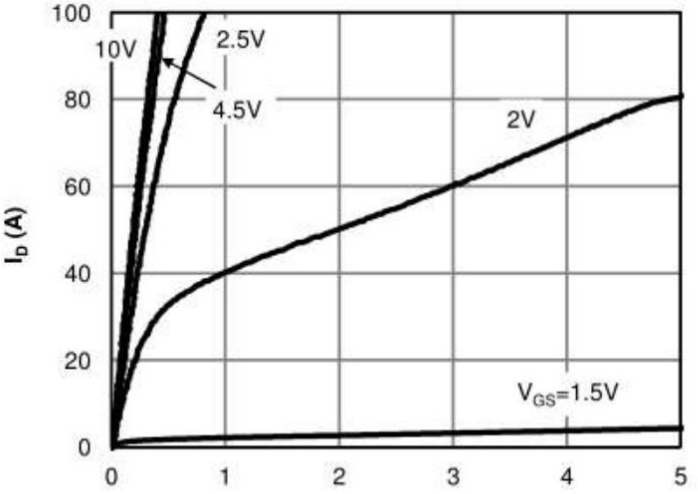


Fig 1: On-Region Characteristics (Note E)

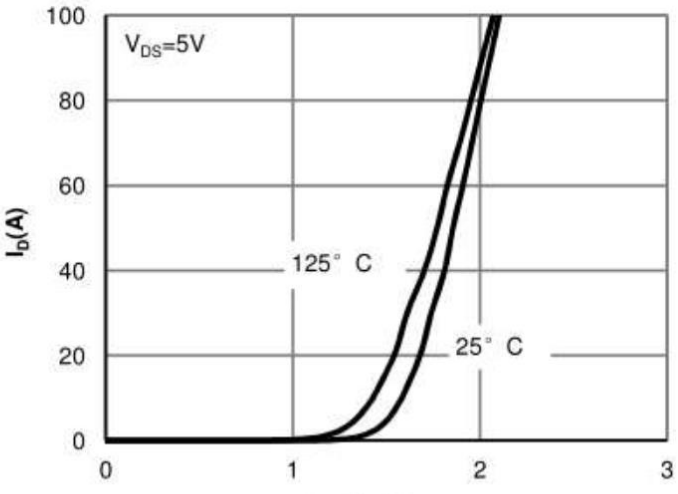


Figure 2: Transfer Characteristics (Note E)

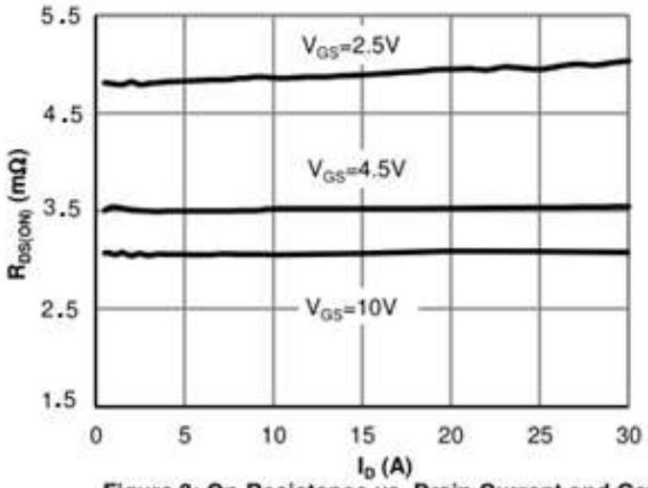


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

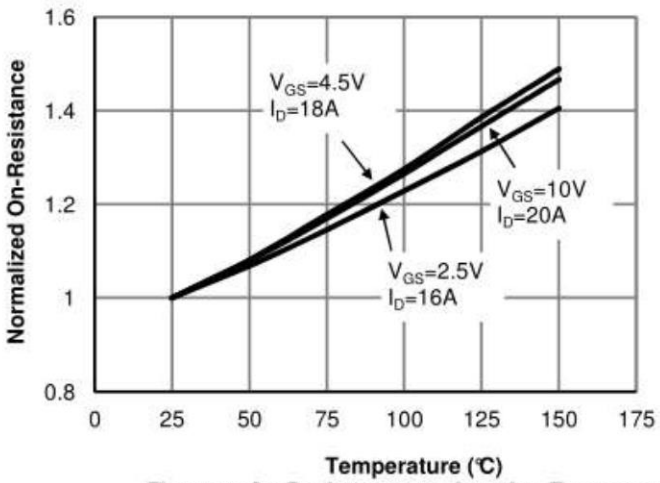


Figure 4: On-Resistance vs. Junction Temperature (Note E)

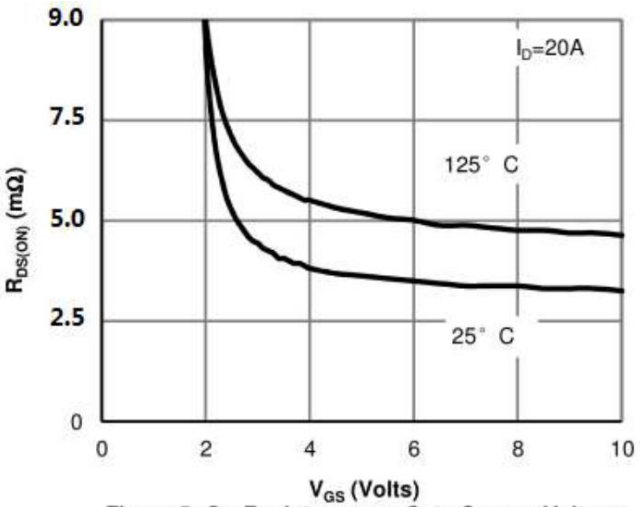


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

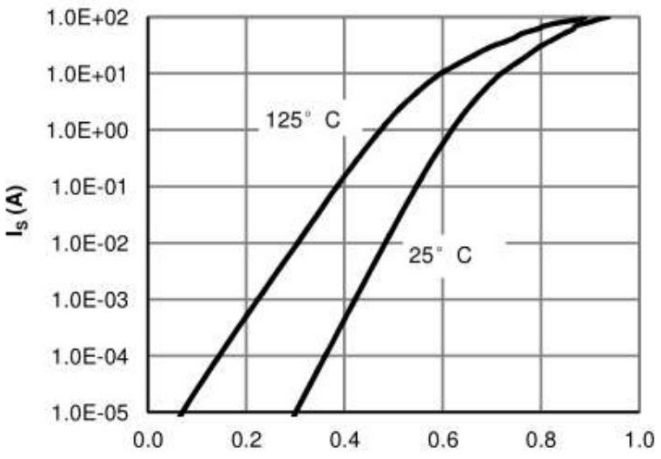
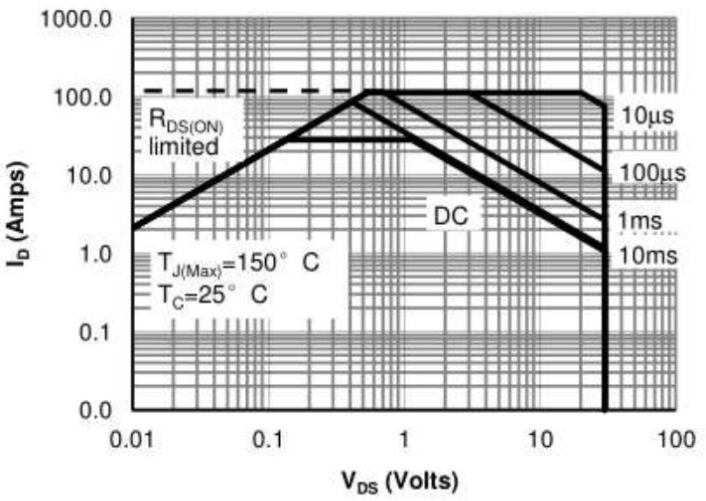


Figure 6: Body-Diode Characteristics (Note E)

Typical Characteristics T_J = 25ºC, unless otherwise noted



VGS> or equal to 2.5V

Figure 7: Maximum Forward Biased Safe Operating Area (Note F)

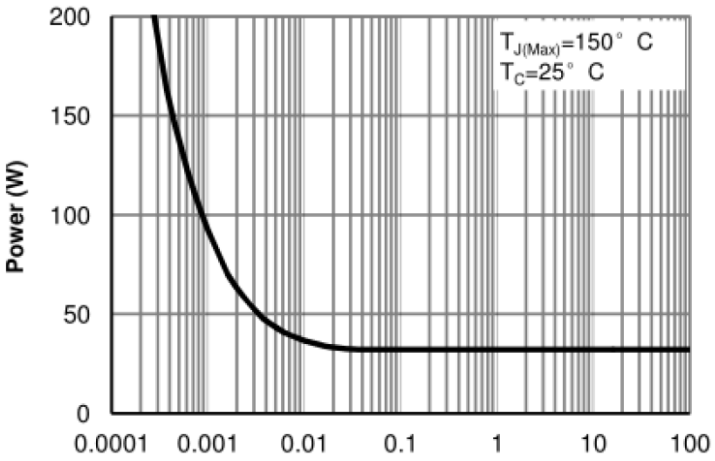


Figure 8: Single Pulse Power Rating Junction-to-Case (Note F)

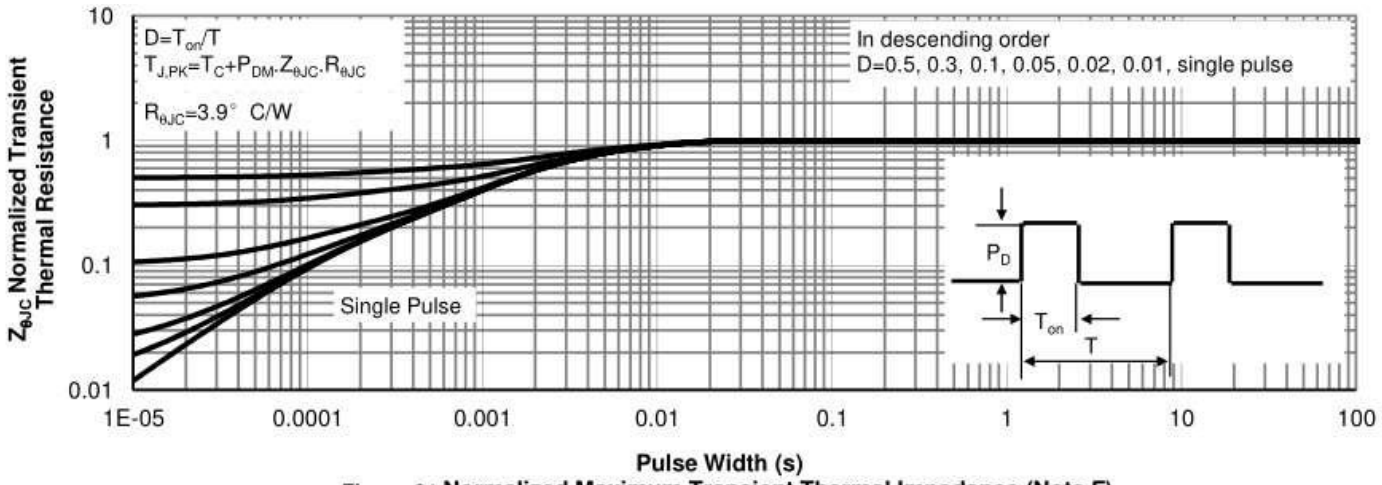


Figure 9: Normalized Maximum Transient Thermal Impedance (Note F)

Figure A：Gate Charge Test Circuit and Waveform

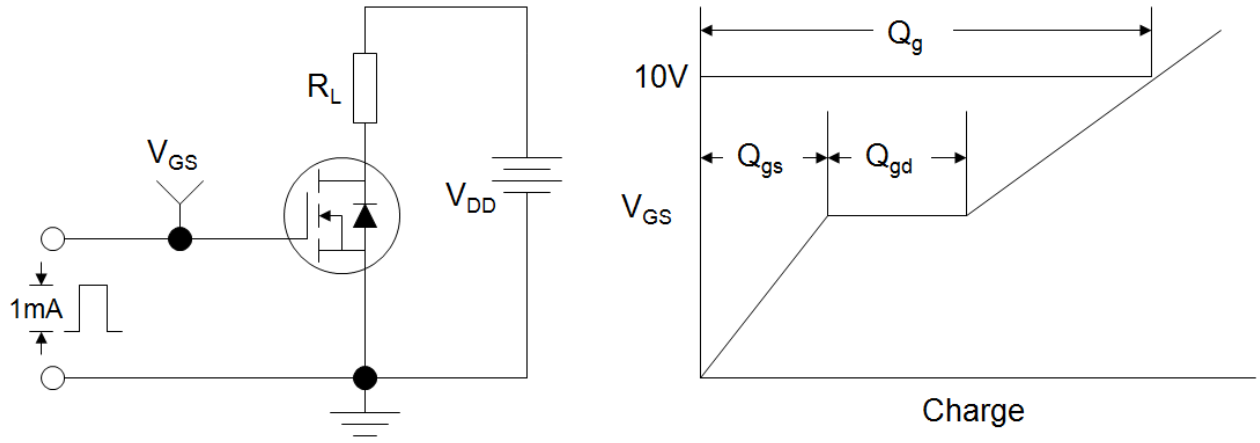


Figure B：Resistive Switching Test Circuit and Waveform

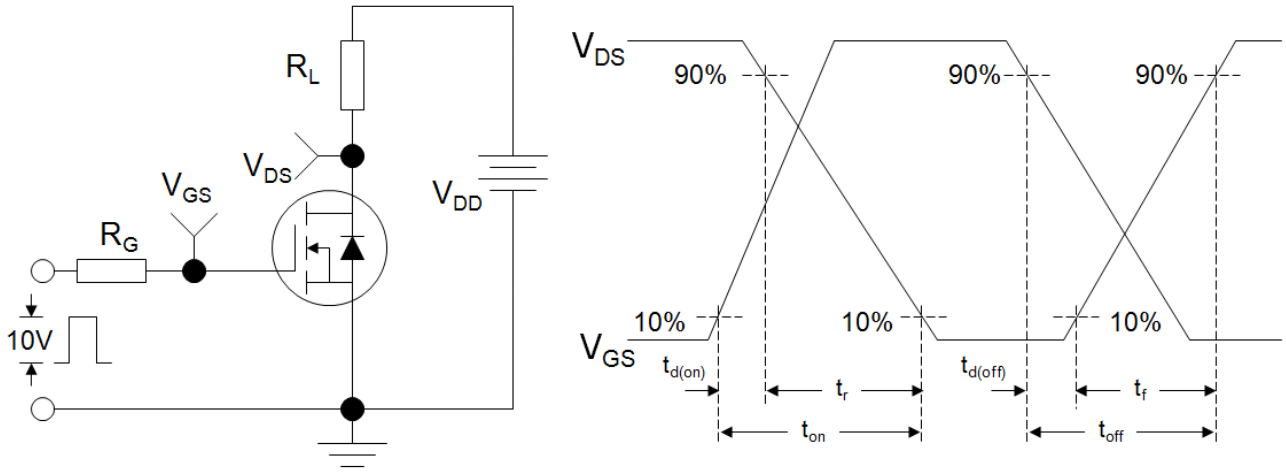
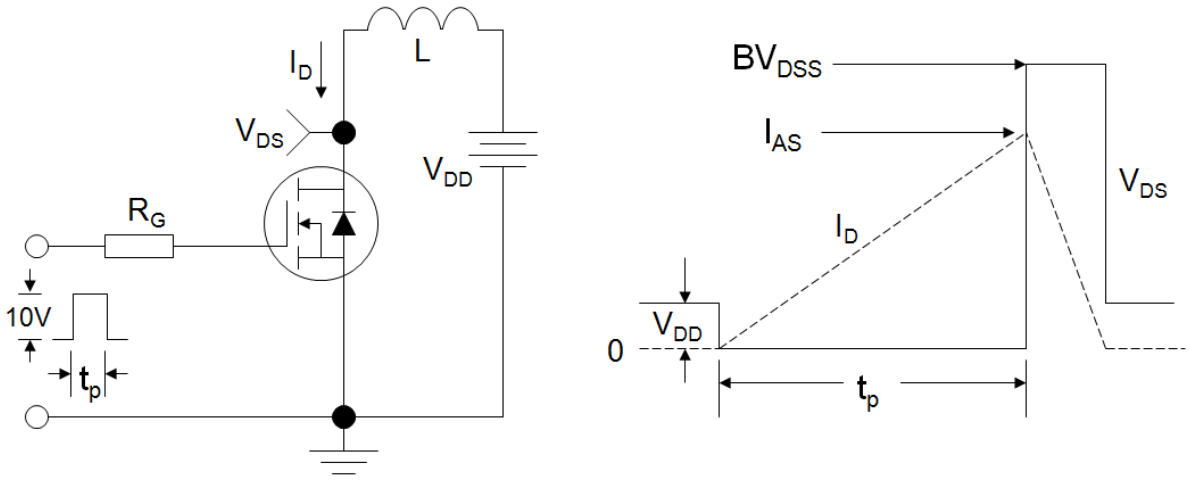


Figure C：Unclamped Inductive Switching Test Circuit and Waveform



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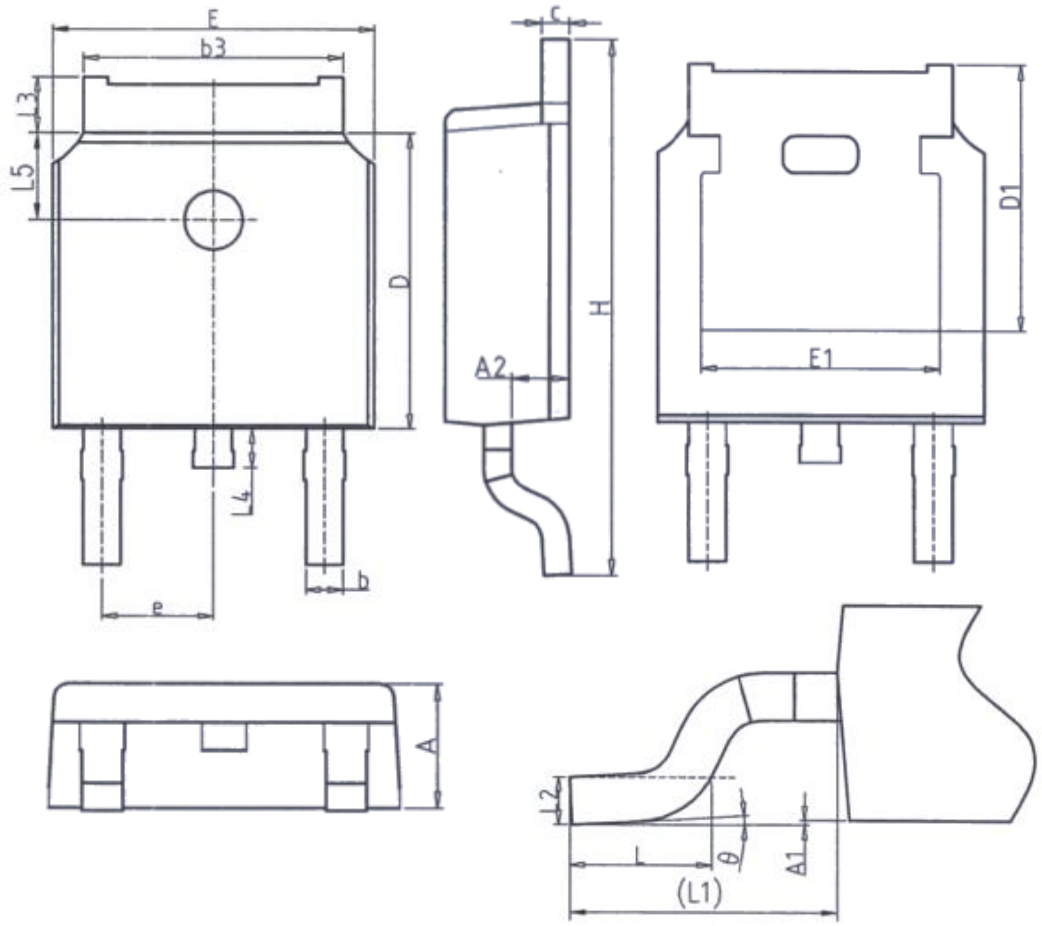

Unit: mm		
Symbol	Min.	Max.
A	2.20	2.40
A1	0.00	0.20
A2	0.97	1.17
b	0.68	0.90
b3	5.20	5.50
c	0.43	0.63
D	5.98	6.22
D1	5.30REF	
E	6.40	6.80
E1	4.63	–

Unit: mm		
Symbol	Min.	Max.
e	2.286BSC	
H	9.40	10.50
L	1.38	1.75
L1	2.90REF	
L2	0.51BSC	
L3	0.88	1.28
L4	–	1.00
L5	1.65	1.95
θ	0°	8°

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