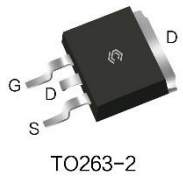
800V Super-Junction Power MOSFET

FEATURES

- Very low FOM $R_{DS(on)} \times Q_g$
- 100% avalanche tested
- RoHS compliant
- Fast switching
- Integrate fast recovery diode



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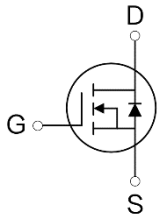


APPLICATIONS

- Switch Mode Power Supply (SMPS)
- Uninterruptible Power Supply (UPS)
- Power Factor Correction (PFC)

RoHS

Device Marking and Package Information

Device	Package	Marking
CLB80R200MF	TO263-2	CLB80R200MF

Absolute Maximum Ratings at T_c= 25℃ unless otherwise noted

Parameter	Symbol	Value	Unit
Drain-Source Voltage (V_{GS} = 0V)	V_{DSS}	800	V
Continuous Drain Current	I_D	24	A
Continuous Drain Current T_C = 100℃		14	
Pulsed Drain Current (note1)	I_{DM}	72	A
Gate-Source Voltage	V_{GSS}	± 30	V
Single Pulse Avalanche Energy (note2)	E_{AS}	172	mJ
Repetitive Avalanche Energy (note1)	E_{AR}	0.68	mJ
Power Dissipation	P_D	379	W
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55~+150	℃

Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-Case	$R_{\theta JC}$	0.33	℃/W
Thermal Resistance, Junction-Ambient	$R_{\theta JA}$	62.5	

Electrical Characteristics T_j= 25℃ 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 = 250uA	800	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 800V, V_{GS} = 0V	--	--	10	uA
Gate-Source Leakage	I_{GSS}	V_{GS} = ±30V	--	--	±100	nA
Gate-Source Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D =250uA	3.0	4.0	5.0	V
Drain-Source On-Resistance (Note3)	$R_{DS(on)}$	V_{GS} = 10V, I_D = 12A	--	0.17	0.2	Ω
Gate resistance	R_G	f = 1.0MHz open drian	--	1.3	--	Ω
Dynamic						
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = 100V, f = 250kHz	--	2858	--	pF
Output Capacitance	C_{oss}		--	75	--	
Reverse Transfer Capacitance	C_{rss}		--	1.3	--	
Effective Output Capacitance (Energy Related)	$C_{o(er)}$	V_{GS}=0V, V_{DS}=0~400V	--	32	--	pF
Effective Output Capacitance (Time Related)	$C_{o(tr)}$		--	343	--	pF
Total Gate Charge	Q_g	V_{DD} = 640V, I_D = 12A, V_{GS} = 0~10V	--	60	--	nC
Gate-Source Charge	Q_{gs}		--	15	--	
Gate-Drain Charge	Q_{gd}		--	24	--	
Gate Plateau Voltage	V_{pl}		--	5.9	--	V
Turn-on Delay Time	$t_{d(on)}$	V_{DD} = 400V, I_D = 12A, R_G = 25Ω	--	63	--	ns
Turn-on Rise Time	t_r		--	31	--	
Turn-off Delay Time	$t_{d(off)}$		--	228	--	
Turn-off Fall Time	t_f		--	40	--	
Body Diode Characteristics						
Continuous Body Diode Current	I_S	T_C = 25℃	--	--	24	A
Pulsed Diode Forward Current	I_{SM}		--	--	72	
Body Diode Voltage	V_{SD}	T_J = 25℃, I_{SD} = 12A, V_{GS} = 0V	--	0.91	1.2	V
Reverse Recovery Time	t_{rr}	V_R = 400V, I_F = 12A, di_F/dt = 100A/μs	--	180	--	ns
Reverse Recovery Charge	Q_{rr}		--	0.97	--	μC
Peak Reverse Recovery Current	I_{rrm}		--	9	--	A

Notes

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. I_{AS} = 6A, V_{DD} = 50V, R_G = 25Ω,L=10mH ,Starting T_J = 25° C
3. Pulse Test: Pulse width ≤ 300 μs, Duty Cycle ≤ 1%

Typical Characteristics T_J = 25℃, unless otherwise noted

Figure 1. Typ.Output Characteristics

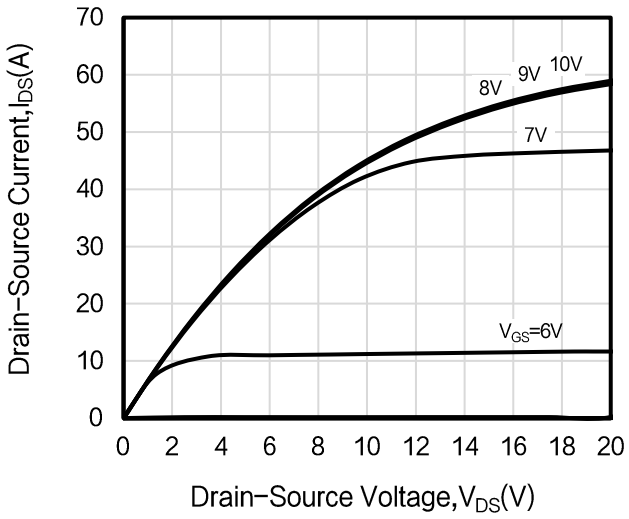


Figure 2. Transfer Characteristics

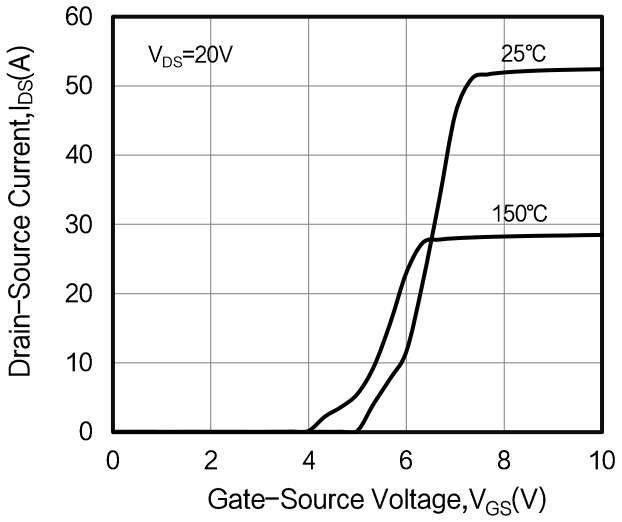


Fig.3 On-Resistance vs.Drain Current

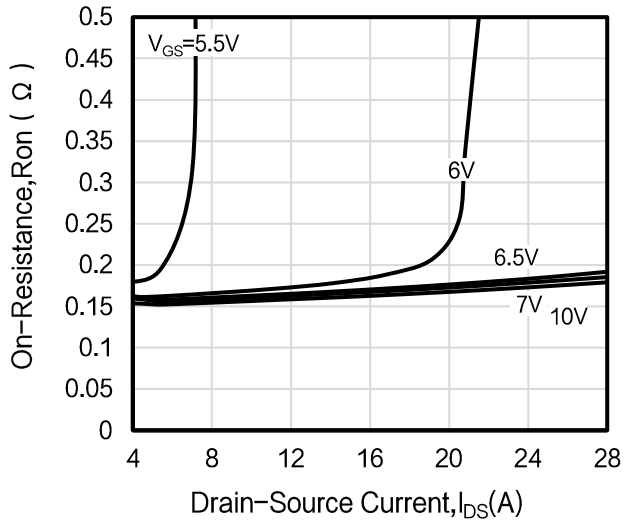


Fig.4 On-Resistance vs. Temperature

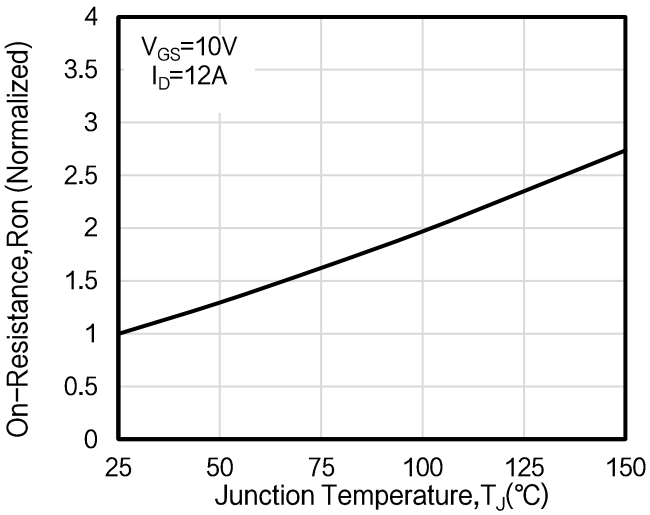


Figure 5. Body Diode Forward Voltage

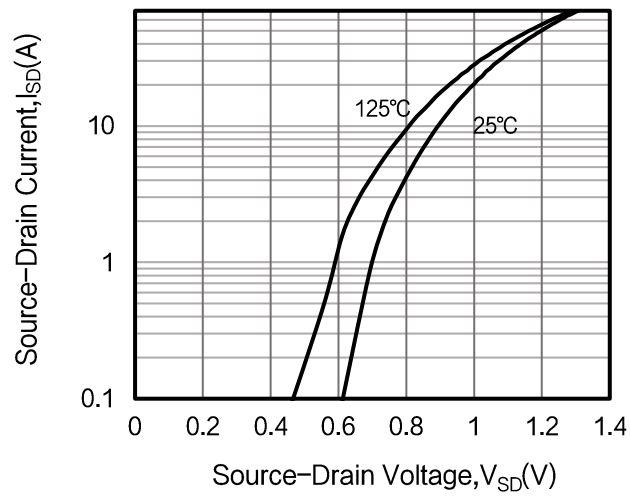
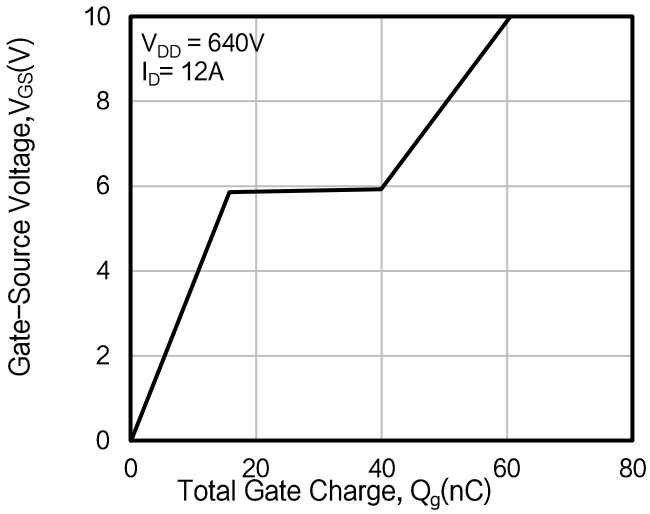


Figure 6. Gate Charge



Typical Characteristics T_J = 25℃, unless otherwise noted

Figure 7. Breakdown Voltage vs.Temperature

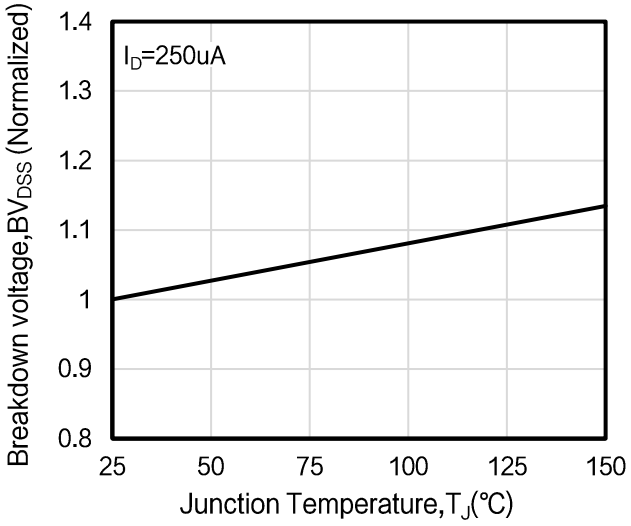


Fig.8 Capacitances

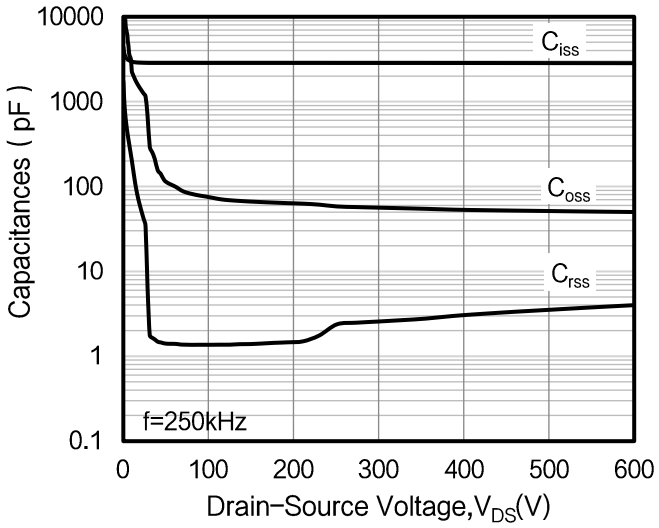


Fig.9 Coss Stored Energy

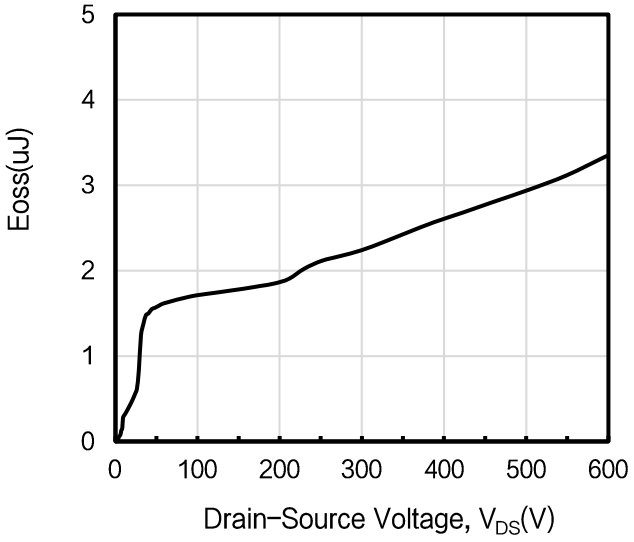


Figure10. Power Dissipation

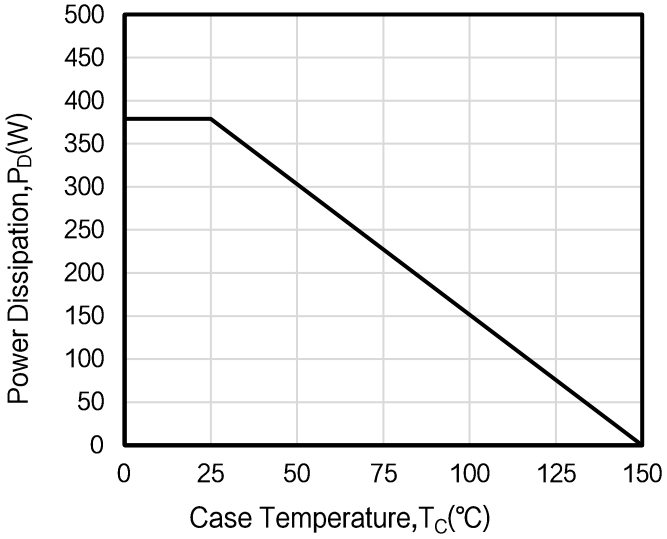


Figure 11. Transient Thermal Impedance

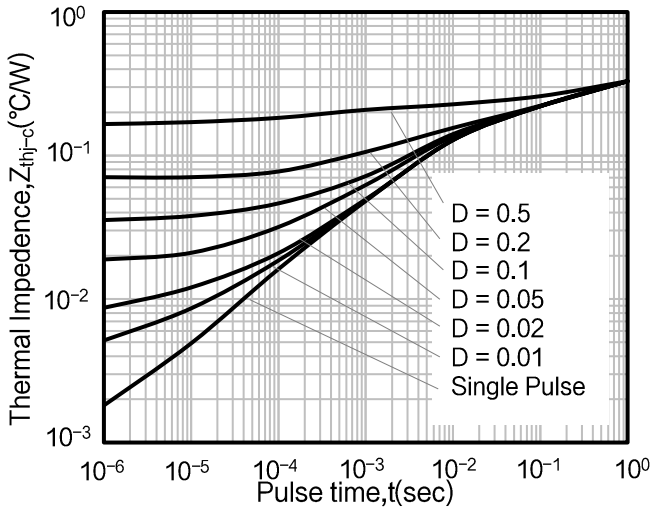


Figure 12. Safe Operation Area

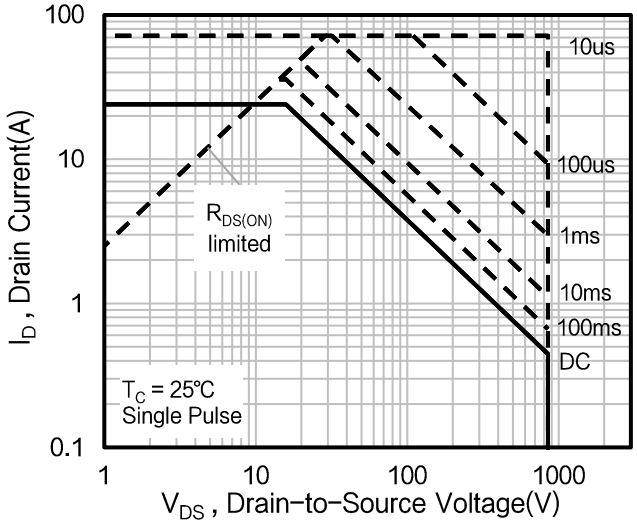


Figure A：Gate Charge Test Circuit and Waveform

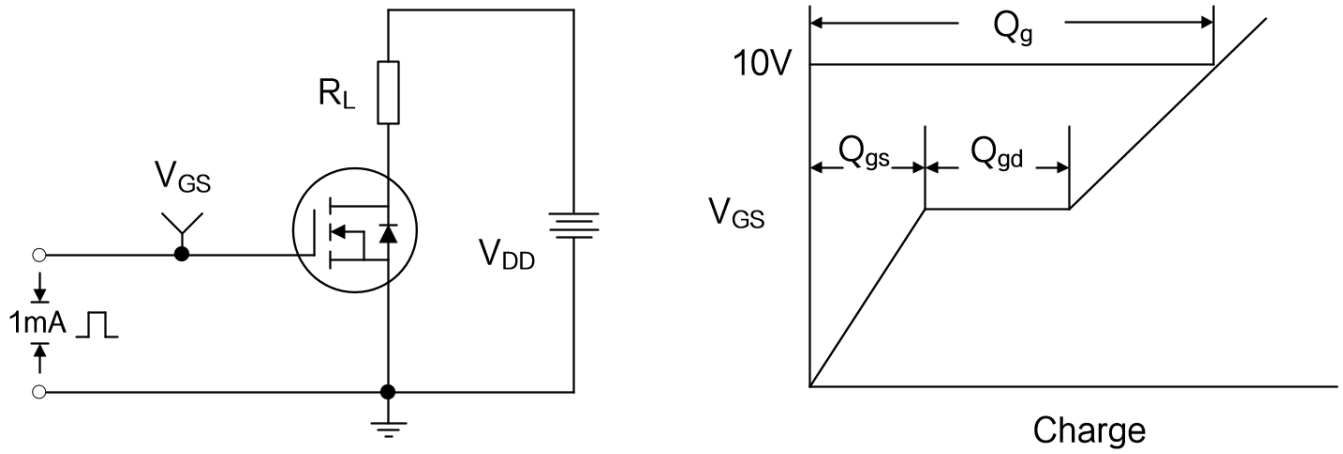


Figure B：Resistive Switching Test Circuit and Waveform

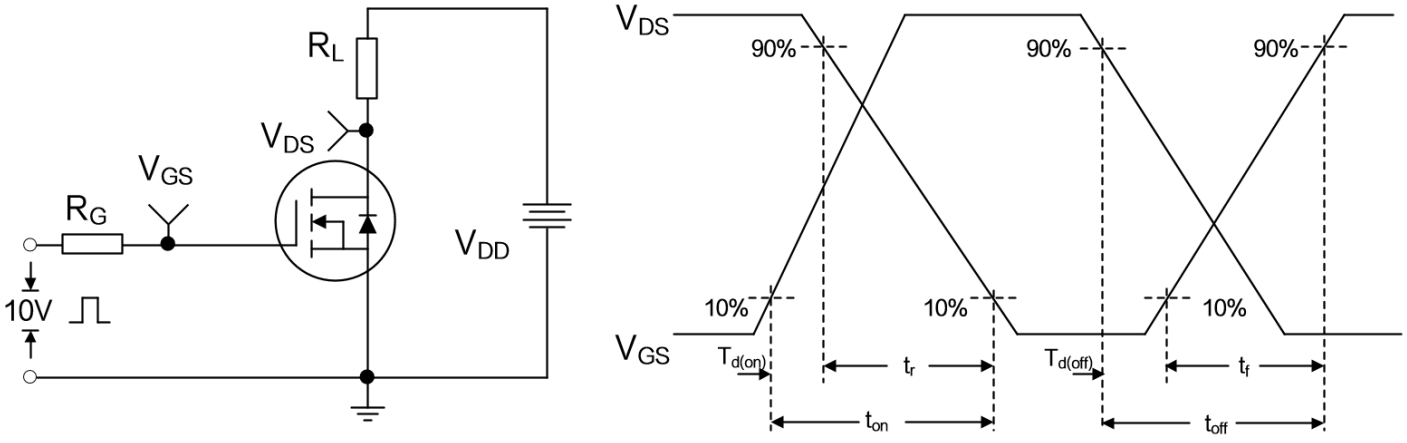
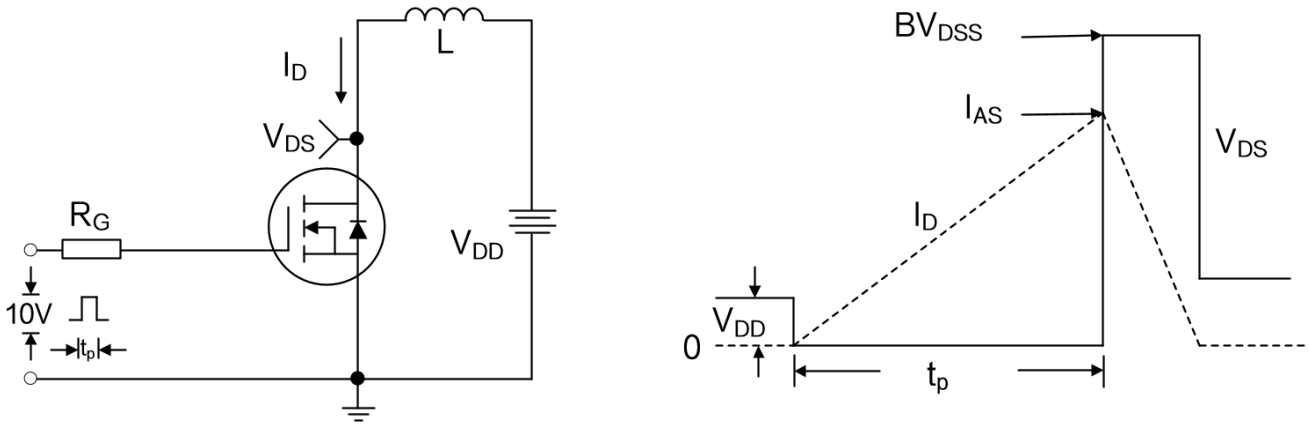


Figure C：Unclamped Inductive Switching Test Circuit and Waveform



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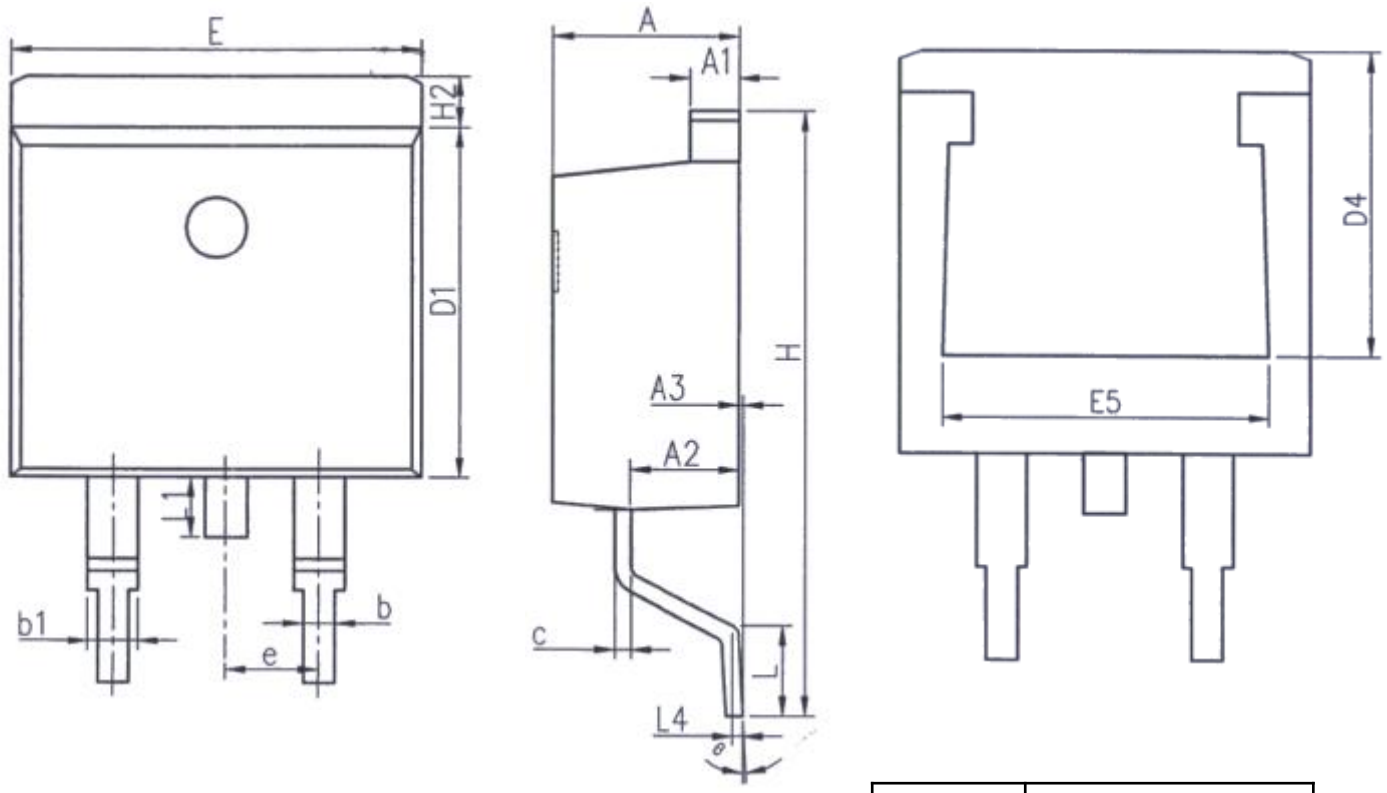

SYMBOLS	MILLIMETERS	
	MIN	MAX
A	4.37	4.77
A1	1.22	1.40
A2	2.49	2.89
A3	0.00	0.25
b	0.7	0.96
b1	1.17	1.47
c	0.30	0.53
D1	8.50	8.90
D4	6.60	-
E	9.86	10.36
E5	7.06	-
e	2.54 BSC	
H	14.70	15.50
H2	1.07	1.47
L	2.00	2.60
L4	025 BSC	
Φ	0°	9°

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