Wuxi Unigroup Microelectronics CO.,LTD.

100V N-Channel SGT MOSFET(Preliminary)

General Description

- Split Gate Trench Power Technology
- Low Qg
- Low Gate Charge
- Optimized for fast-switching Applications
- Add dv/dt ability

Applications

- Power management at uninterruptible power supply
- Isolated DC/DC Converters in Telecom and Industrial

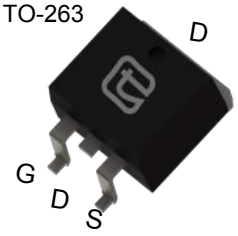
Product Summary

VDS	100V
I_D (at V_{GS}=10V)	120A
$R_{DS(ON)\_typ}$(at V_{GS}=10V)	3.4mΩ

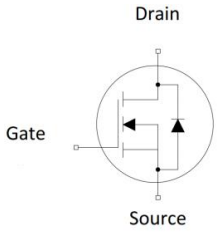
100% UIS Tested

RoHS

TO-263



TO-220



Device	Package	Form	Marking
TSB4D0N100A	TO-263	Tape & Reel	4D0N100A
TSP4D0N100A	TO-220	Tube	4D0N100A

Absolute Maximum Ratings (T_A =25ºC unless otherwise noted)

Parameter		Symbol	Maximum	Units
Drain-Source Voltage		V_{DS}	100	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current	T_C = 25ºC	I_D	120	A
	T_C = 100ºC		110	
Pulsed Drain Current [A]		I_{DM}	480	A
Single Pulse Avalanche Energy [B]	L=0.5mL	E_{AS}	780	mJ
	L=0.1mL		450	mJ
Power Dissipation （TC = 25ºC）		P_D	208	W
Temperature >25ºC ,Decrease per degree			1.7	W/ºC
Operating Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150	ºC

Thermal Resistance

Parameter		Symbol	Maximum	Units
Thermal Resistance, Junction-to-Case	Steady-State	R_{thJC}	0.6	ºC/W
Thermal Resistance, Junction-to-Ambient	Steady-State	R_{thJA}	62.5	

Electrical Characteristics(T_J =25ºC unless otherwise noted)							
Symbol	Parameter	Conditions		Value			Units
				Min	Typ	Max	
STATIC PARAMETERS							
BV_{DSS}	Drain-Source Breakdown Voltage	I_D = 250μA,V_{GS} = 0V		100	--	--	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 100V, V_{GS} = 0V	T_J =25ºC	--	--	1	μA
			T_J =100ºC	--	10	--	
I_{GSS}	Gate-Body Leakage Current	V_{DS} = 0V, V_{GS} =±20V		--	--	±100	nA
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250μA		2.0	--	4.0	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS} = 10V, I_D = 50A(TO-220-3L)		--	3.6	4.15	mΩ
		V_{GS} = 10V, I_D = 50A(TO-263-2L)		--	3.4	3.9	mΩ
R_G	Gate Resistance	f=1MHz		--	2.4	--	Ω
V_{SD}	Diode Forward Voltage	I_S = 50A, V_{GS} = 0V		--	--	1.4	V
I_S	Body-Diode Continuous Current			--	--	120	A
DYNAMIC PARAMETERS							
C_{iss}	Input Capacitance	V_{GS} = 0V, V_{DS} = 50V, f = 1MH$_Z$		--	7266	--	pF
C_{oss}	Output Capacitance			--	864	--	
C_{rss}	Reverse Transfer Capacitance			--	24	--	
SWITCHING PARAMETERS							
Q_g	Total Gate Charge	V_{GS} = 10V,V_{DS} = 50V, I_D = 20A C、D		--	114	--	nC
Q_{gs}	Gate Source Charge			--	37	--	
Q_{gd}	Gate Drain Charge			--	26	--	
$t_{D(on)}$	Turn-On Delay Time	V_{GS} = 10V,V_{DS} = 50V, I_D = 50A, R_G = 3Ω C、D		--	32	--	ns
t_r	Turn-On Rise Time			--	50	--	
$T_{D(off)}$	Turn-Off Delay Time			--	83	--	
t_f	Turn-Off Fall Time			--	31	--	
t_{rr}	Body Diode Reverse Recovery Time	I_F = 50A, di/dt =100A/μs C		--	77	--	ns
Q_{rr}	Body Diode Reverse Recovery Charge			--	180	--	nC

A. Pulse width=5μs；

B. V_{DD}=80V，R_G=25Ω，T_J=25C（Starting temperature）；

C. Pulse width<300μs，Duty Cycle<2%；

D. The power dissipation P_D is based on $T_{J(MAX)}$ =175ºC, using junction-to-case thermal resistance, and is more useful in setting the upper dissipation limit for cases where additional heatsinking is used；

Typical Characteristics T_J = 25ºC, unless otherwise noted

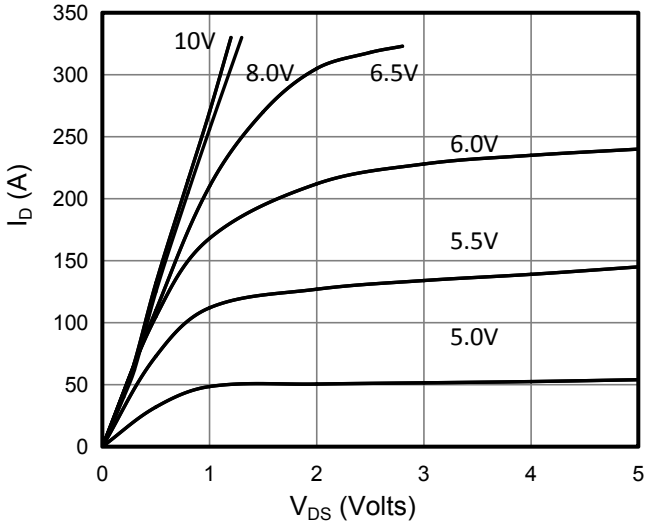


Figure 1: On-Region Characteristics

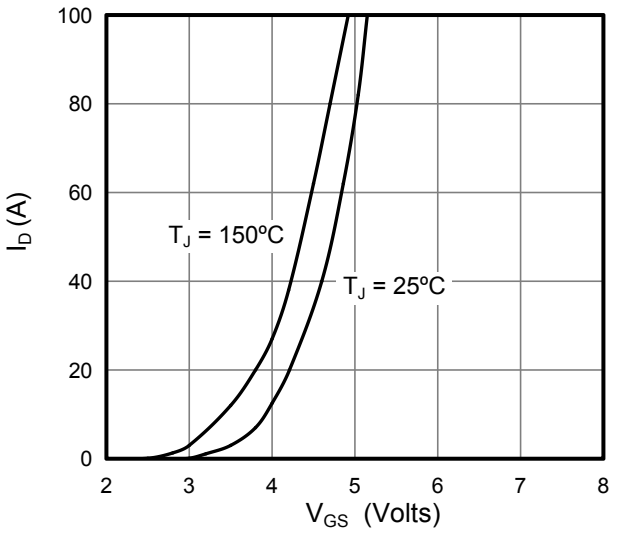


Figure 2: Transfer Characteristics

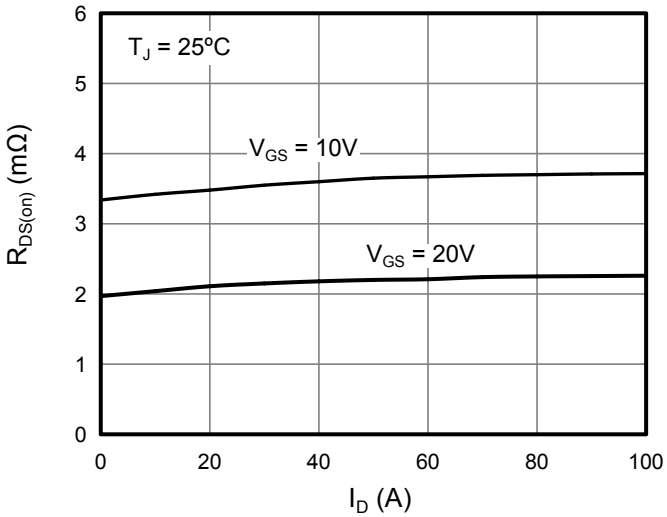


Figure 3: On-Resistance vs. Drain Current

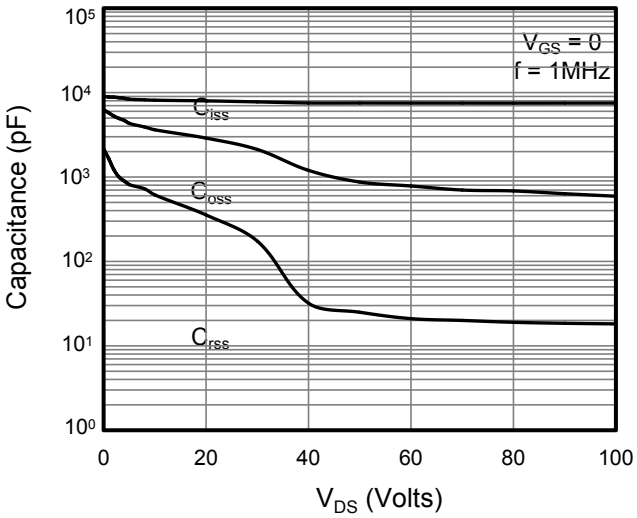


Figure 4: Capacitance Characteristics

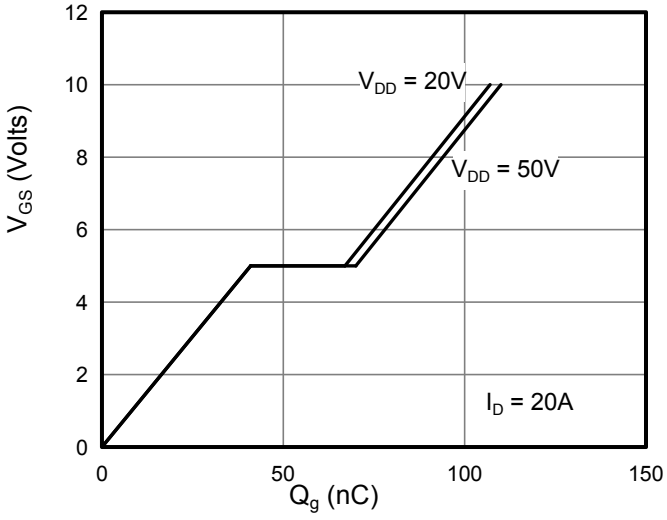


Figure 5: Gate Charge Characteristics

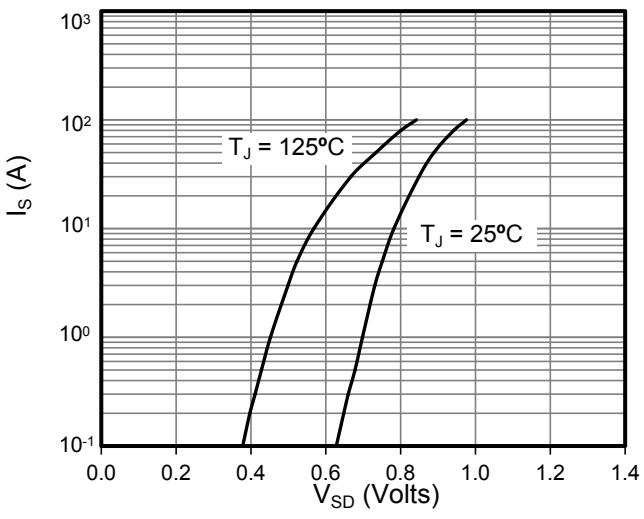


Figure 6: Body Diode Forward Voltage

Typical Characteristics T_J = 25ºC, unless otherwise noted

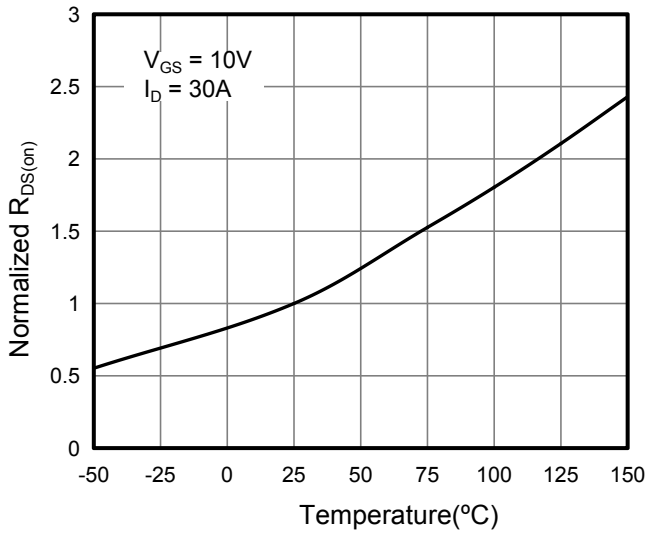


Figure 7: On-Resistance vs. Junction Temperature

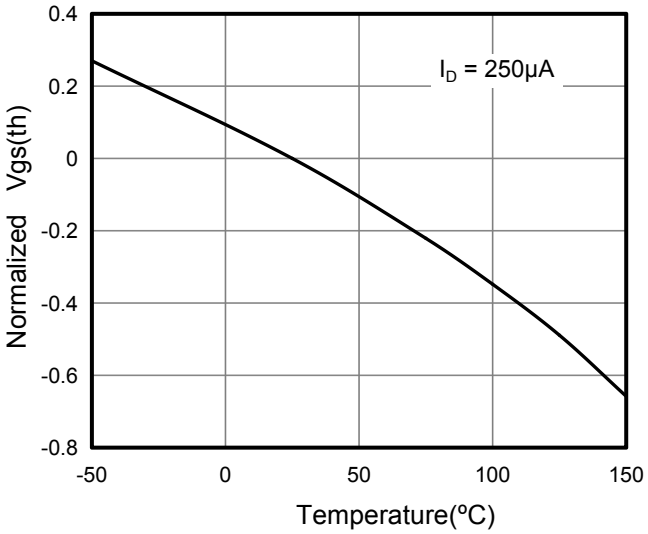


Figure 8: Vgs(th) vs. Junction Temperature

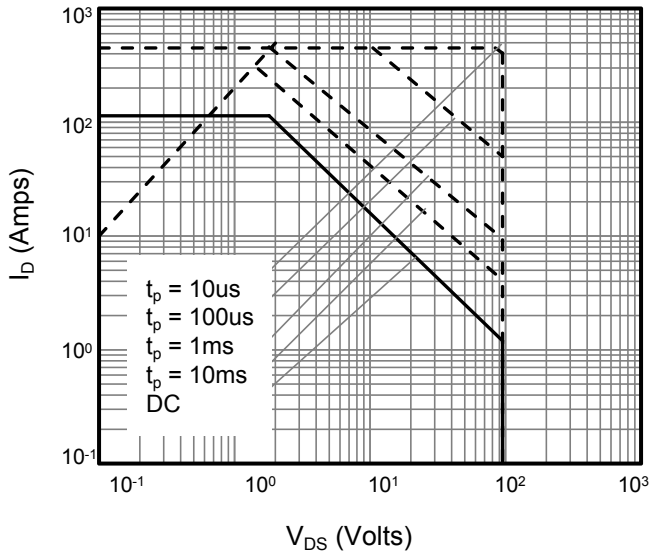


Figure 10: Safe Operating Area

Figure A：Gate Charge Test Circuit and Waveform

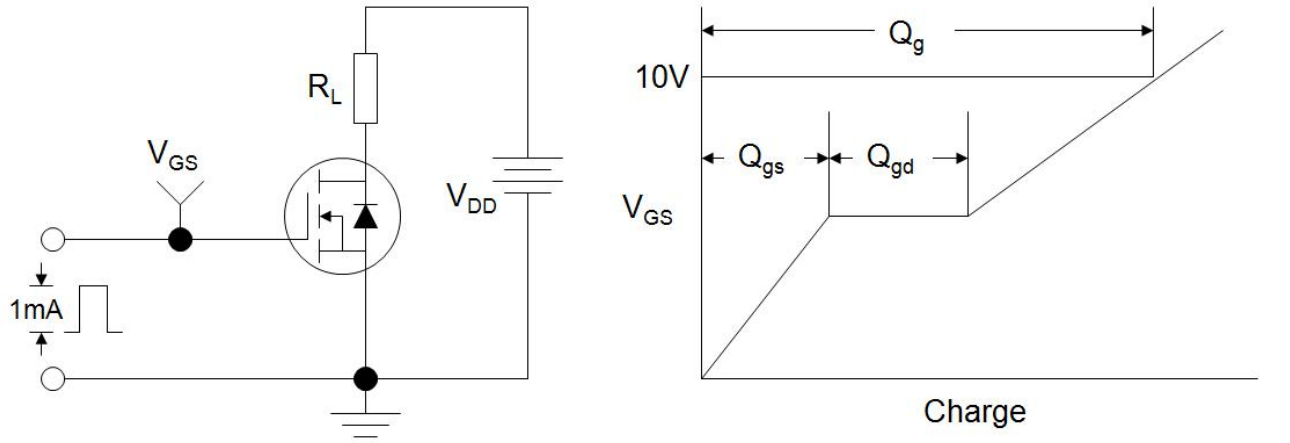


Figure B：Resistive Switching Test Circuit and Waveform

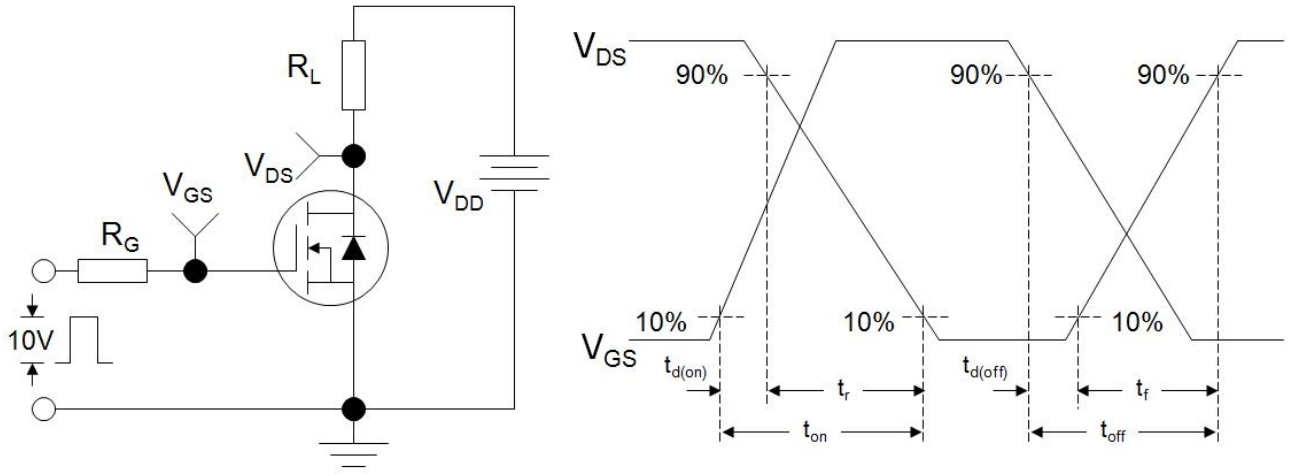
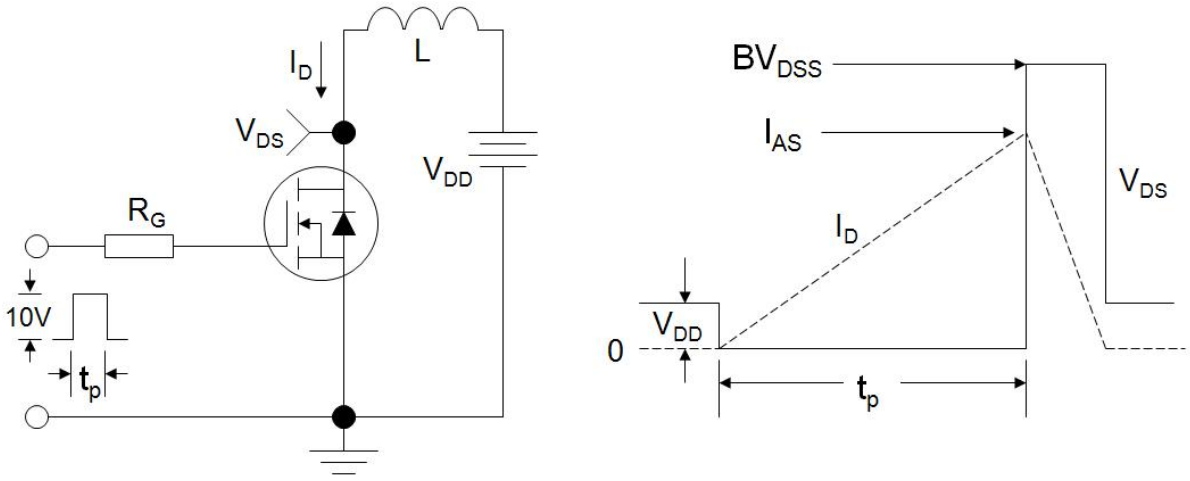
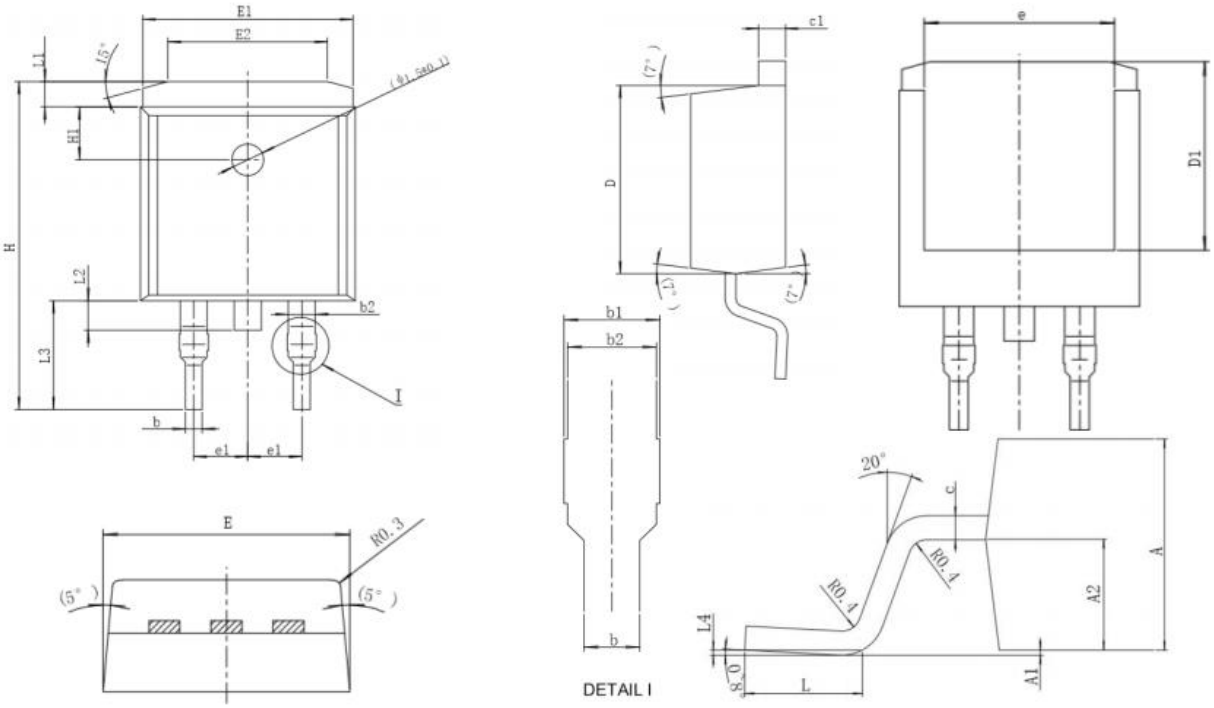


Figure C：Unclamped Inductive Switching Test Circuit and Waveform

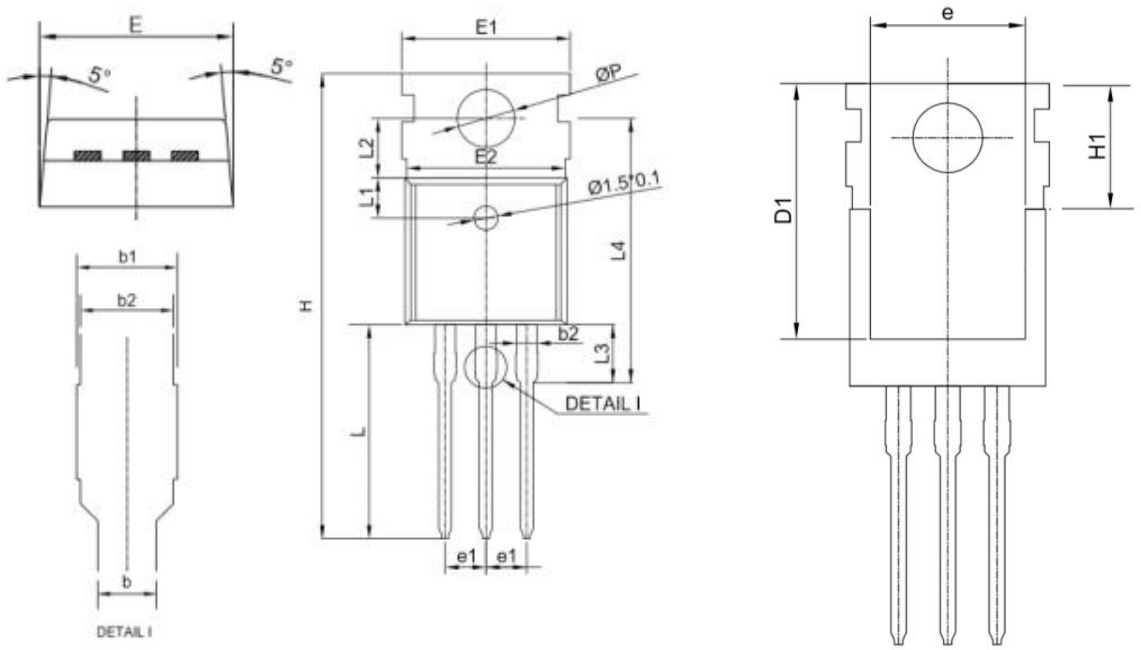


TO-263（Q）



SYMBOL	MIN	NOM	MAX
A	4.56	4.57	4.58
A1	0.02	0.12	0.22
A2	2.3	2.4	2.5
b	0.75	0.80	0.85
b1	1.27	1.37	1.47
b2	1.22	1.27	1.32
c	0.51	0.52	0.53
c1	1.29	1.30	1.32
D	9.14	9.15	9.16
D1	7.93	7.94	7.95
E	10.0	10.1	10.2
E1	9.85	9.88	9.91
E2	7.4	7.5	7.6
e	7.5	8	8.5
e1	2.53	2.54	2.55
H	15.3	15.5	15.7
H1	2.4	2.5	2.6
L	2.44	2.54	2.64
L1	1.1	1.2	1.3
L2	1.20	1.45	1.70
L3	5.14	5.15	5.16
L4	0.11	0.12	0.13

TO-220（Q）



SYMBOL	MIN	NOM	MAX
A	4.56	4.57	4.58
A1	1.28	1.3	1.32
A2	2.3	2.4	2.5
b	0.7	0.8	0.9
b1	1.27	1.37	1.47
b2	1.26	1.27	1.28
c	0.4	0.5	0.6
D	9.14	9.15	9.16
D1	13.2	13.21	13.22
E	10	10.1	10.2
E1	10.4	10.5	10.6
E2	9.87	9.88	9.89
e	7.5	8	8.5
e1	2.53	2.54	2.55
H	28.8	29	29.2
H1	6.4	6.5	6.6
L	13.34	13.35	13.36
L1	2.4	2.5	2.6
L2	3.6	3.7	3.8
L3	2.92	3	3.08
L4	15.82	15.9	15.98
Q	2.73	2.8	2.87
P	3.6	-	3.65

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