

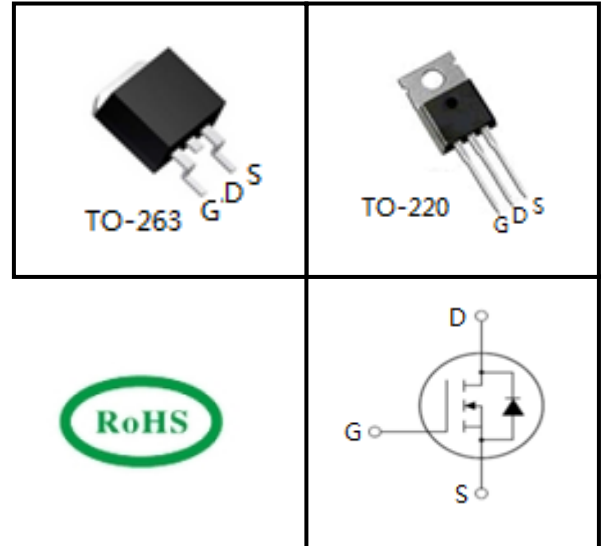
68V N-Channel Trench MOSFET

FEATURES

- Trench Power MOSFET Technology
- Low $R_{DS(ON)}$
- Low Gate Charge
- Optimized For Fast-switching Applications

APPLICATIONS

- DC/DC Converters
- Synchronous Rectification



Device Marking and Package Information

Device	Package	Marking
CTB06N005	TO-263	CTB06N005
CTP06N005	TO-220	CTP06N005

Absolute Maximum Ratings at $T_J = 25^\circ\text{C}$ unless otherwise noted

Parameter	Symbol	Value	Unit
Drain-Source Voltage ($V_{GS} = 0V$)	V_{DSS}	68	V
Continuous Drain Current $T_C = 25^\circ\text{C}$	I_D	135	A
Continuous Drain Current $T_C = 100^\circ\text{C}$		94	A
Pulsed Drain Current (note1)	I_{DM}	540	A
Gate Source Voltage	V_{GSS}	± 20	V
Single Pulse Avalanche Energy (note2)	E_{AS}	290	mJ
Avalanche Current	I_{AS}	44	A
Power Dissipation $T_C = 25^\circ\text{C}$ (note3)	P_D	160	W
Power Dissipation $T_C = 100^\circ\text{C}$ (note3)		80	W
Operating Junction and Storage Temperature Range	T_J, T_{stg}	$-55 \sim +175$	$^\circ\text{C}$

Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	0.95	$^\circ\text{C/W}$
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	65	

Electrical Characteristics $T_J = 25^\circ\text{C}$ 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	68	--	--	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 68V, V _{GS} = 0V, T _J = 25°C	--	--	1	uA
		V _{DS} = 68V, V _{GS} = 0V, T _J = 100°C	--	--	25	uA
Gate-Source Leakage	I _{GSS}	V _{GS} = ±20V	--	--	±100	nA
Gate-Source Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250μA	2	3	4	V
Drain-Source On-Resistance (note2)	R _{DS(on)}	V _{GS} = 10V, I _D = 30A	--	4.2	5.0	mΩ
Forward Transconductance	gfs	V _{DS} = 5V, I _D = 20A	30	--	--	S
Dynamic						
Input Capacitance	C _{iss}	V _{GS} = 0V, V _{DS} = 30V, f = 1.0MHz	--	6646	--	pF
Output Capacitance	C _{oss}		--	443	--	
Reverse Transfer Capacitance	C _{rss}		--	396	--	
Total Gate Charge	Q _g	V _{DS} = 30V, I _D = 30A, V _{GS} = 10V	--	114	--	nC
Gate-Source Charge	Q _{gs}		--	26	--	
Gate-Drain Charge	Q _{gd}		--	34	--	
Turn-on Delay Time	t _{d(on)}	V _{DD} = 30V, I _D = 30A ,R _G = 2.5Ω	--	17	--	ns
Turn-on Rise Time	t _r		--	11	--	
Turn-off Delay Time	t _{d(off)}		--	55	--	
Turn-off Fall Time	t _f		--	15	--	
Body Diode Characteristics						
Source-Drain Current(Body Diode)	I _{SD}	T _C = 25°C	--	--	135	A
Pulsed Source-Drain Current(Body Diode)	I _{SDM}		--	--	540	
Body Diode Voltage	V _{SD}	T _J = 25°C, I _{SD} = 20A, V _{GS} = 0V	--	--	1.2	V
Reverse Recovery Time	t _{rr}	I _F = 20A di _F /dt = 100A/μs	--	30	--	ns
Reverse Recovery Charge	Q _{rr}		--	51	--	nC

Notes

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. $I_{AS} = 30A, V_{DD} = 50V, L = 0.3mH, R_G = 25\Omega$, Starting $T_J = 25^\circ\text{C}$
3. The power dissipation PD is based on $T_J(\text{MAX}) = 175^\circ\text{C}$, using junction-to-case thermal resistance.

Typical Characteristics $T_J = 25^\circ\text{C}$, unless otherwise noted

Figure 1. Output Characteristics

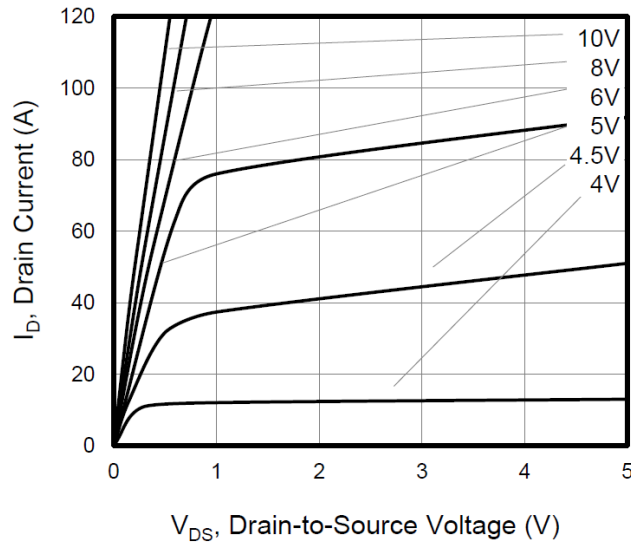


Figure 2. Transfer Characteristics

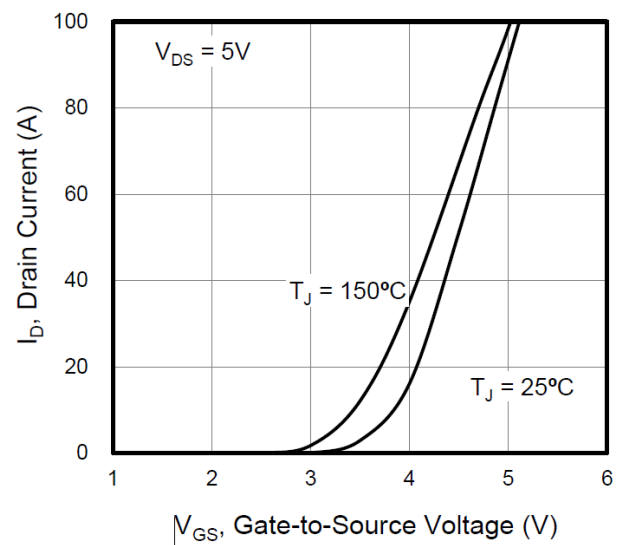


Figure 3. On-Resistance vs. Drain Current

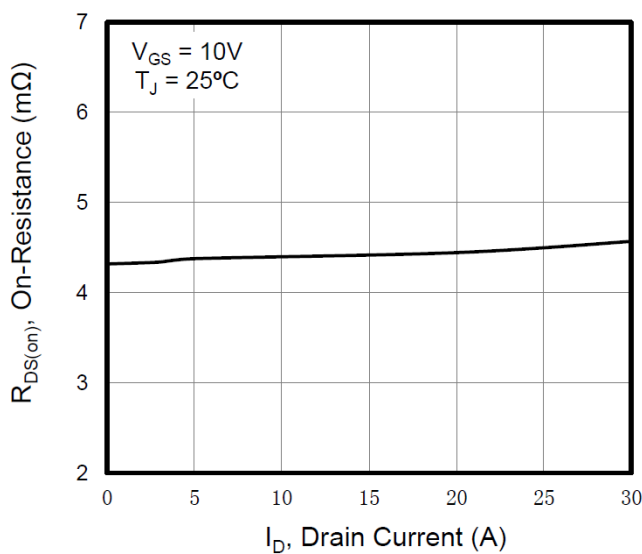


Figure 4. Capacitance

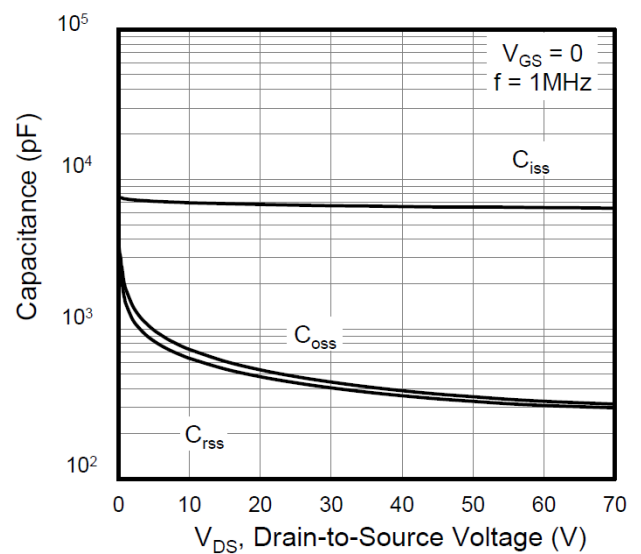


Figure 5. Gate Charge

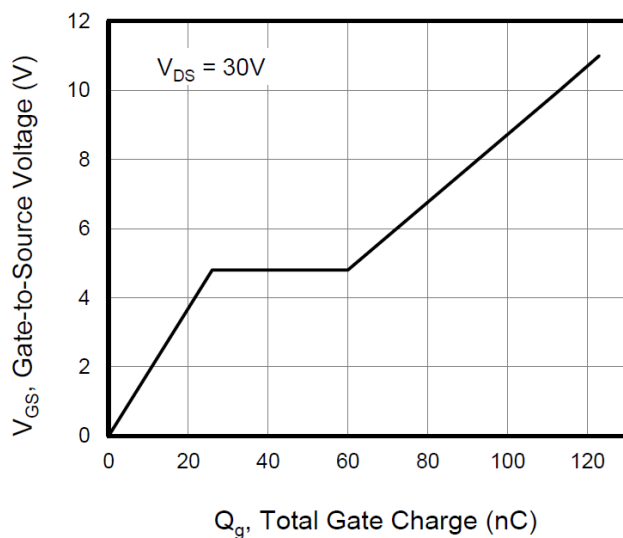
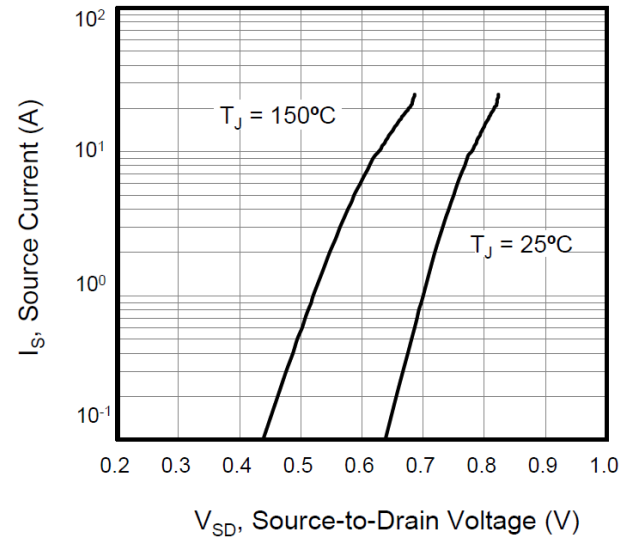


Figure 6. Body Diode Forward Voltage



Typical Characteristics $T_J = 25^\circ\text{C}$, unless otherwise noted

Figure 7. On-Resistance vs. Temperature

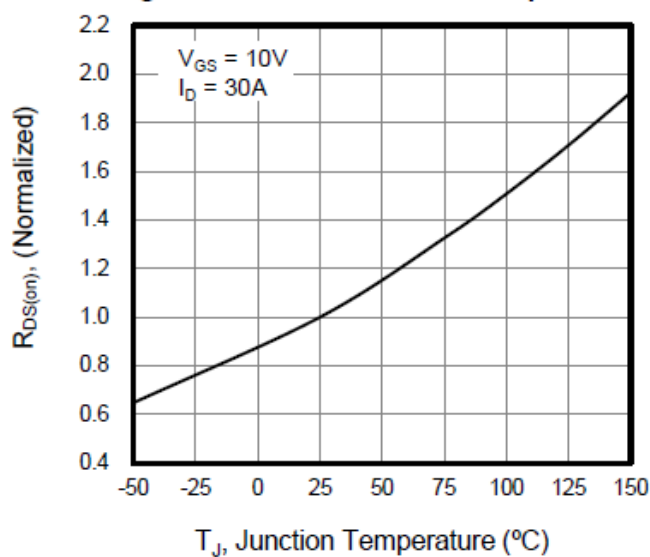


Figure 8. Threshold Voltage vs. Temperature

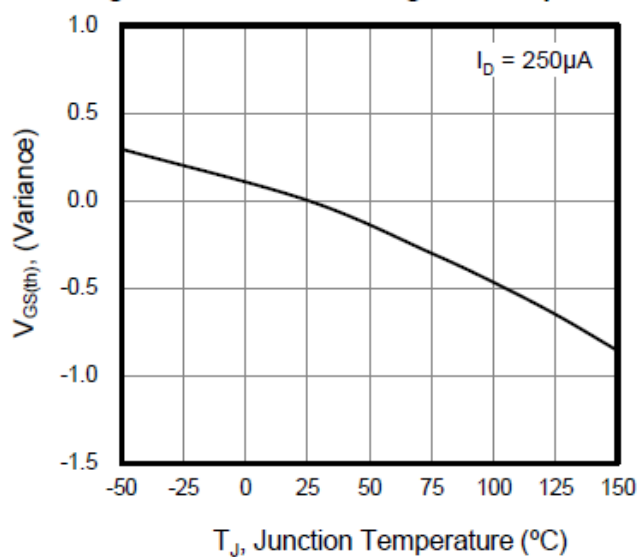


Figure 9. Transient Thermal Impedance

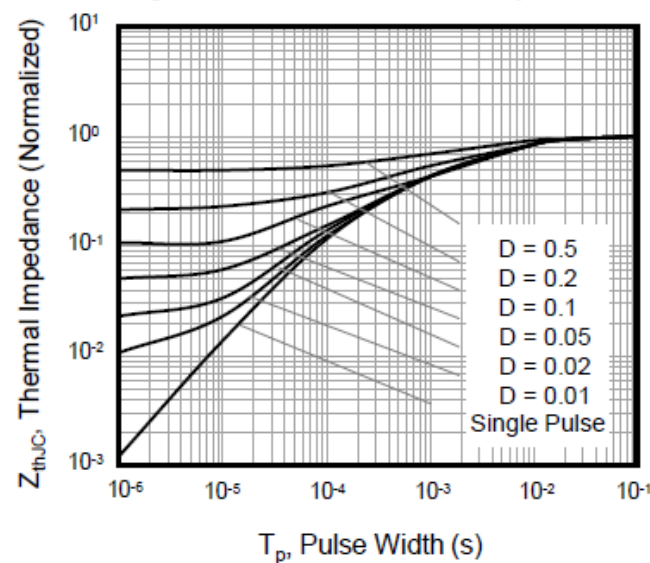


Figure 10. Safe operation area

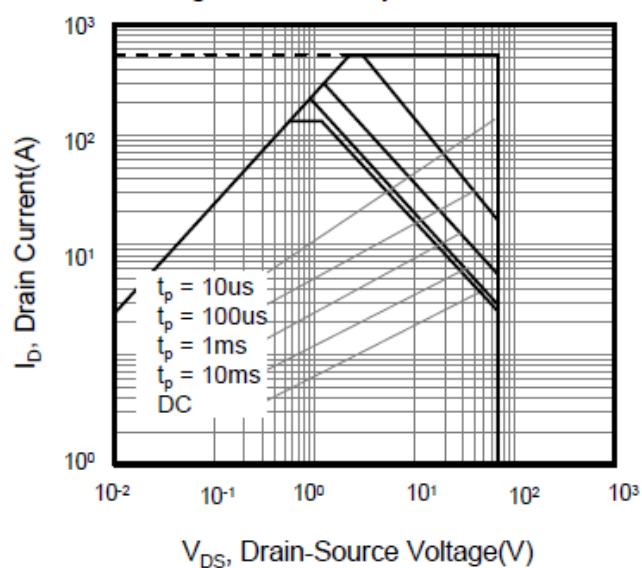
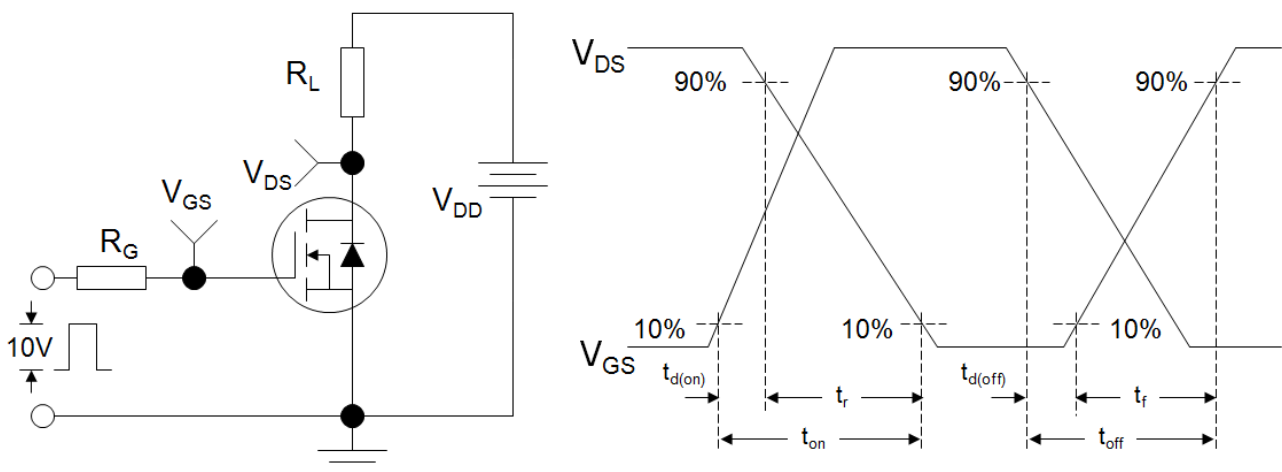
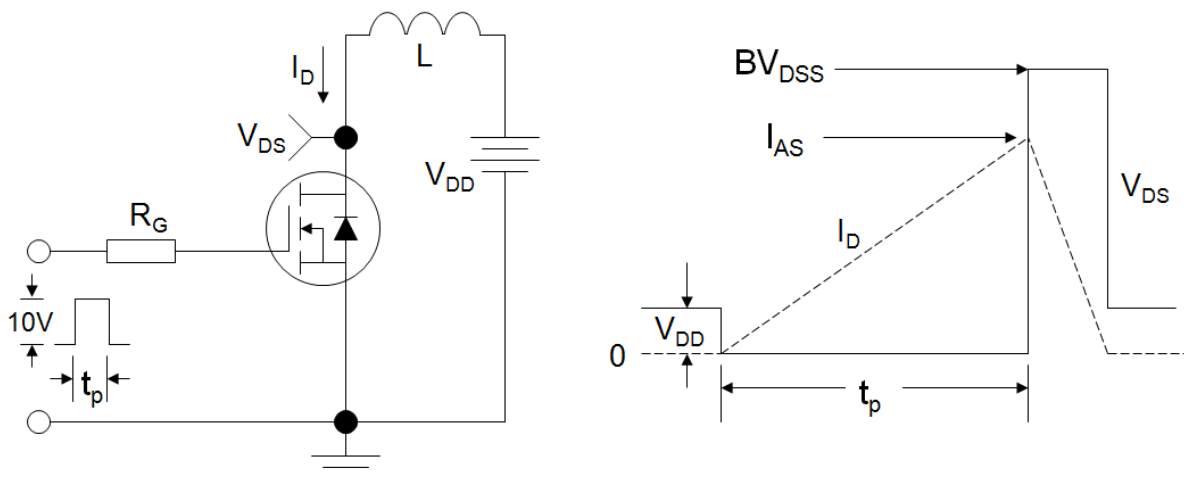
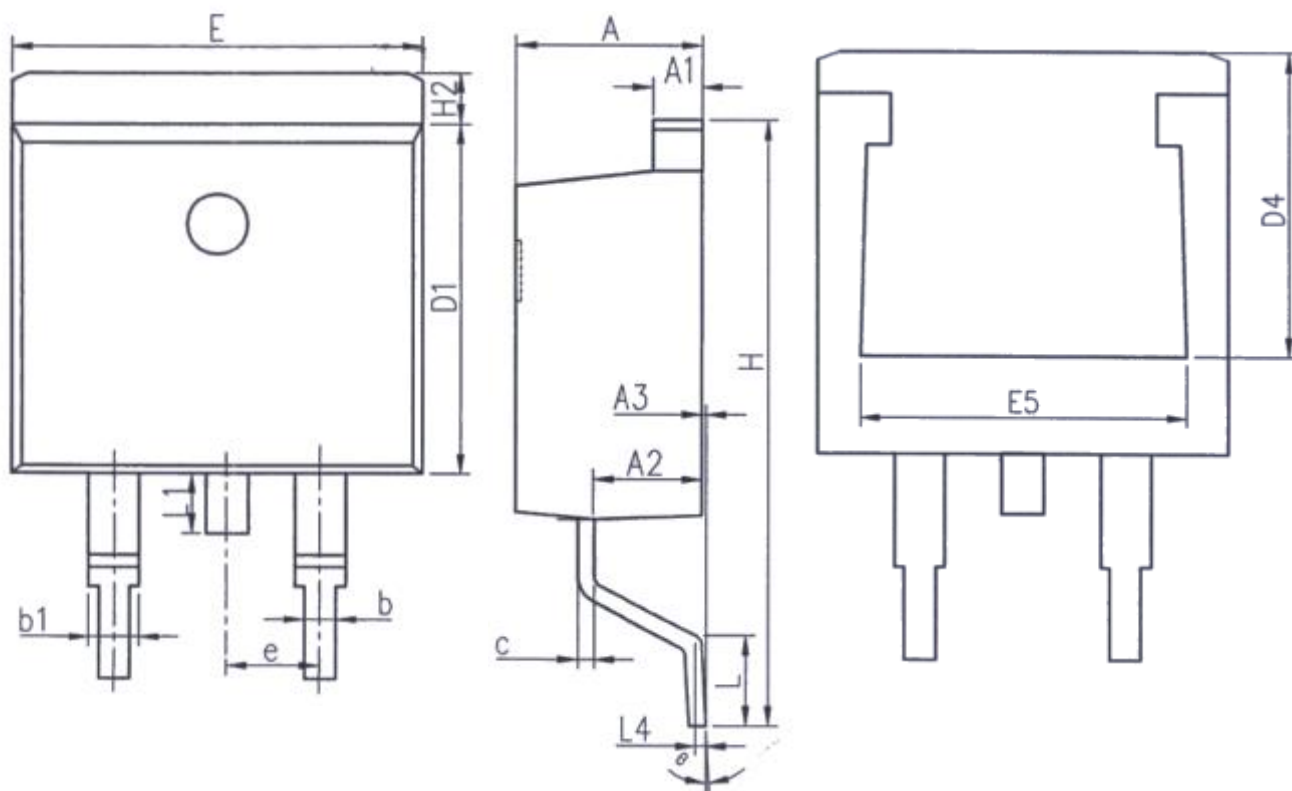


Figure A: Gate Charge Test Circuit and Waveform

Figure B: Resistive Switching Test Circuit and Waveform

Figure C: Unclamped Inductive Switching Test Circuit and Waveform


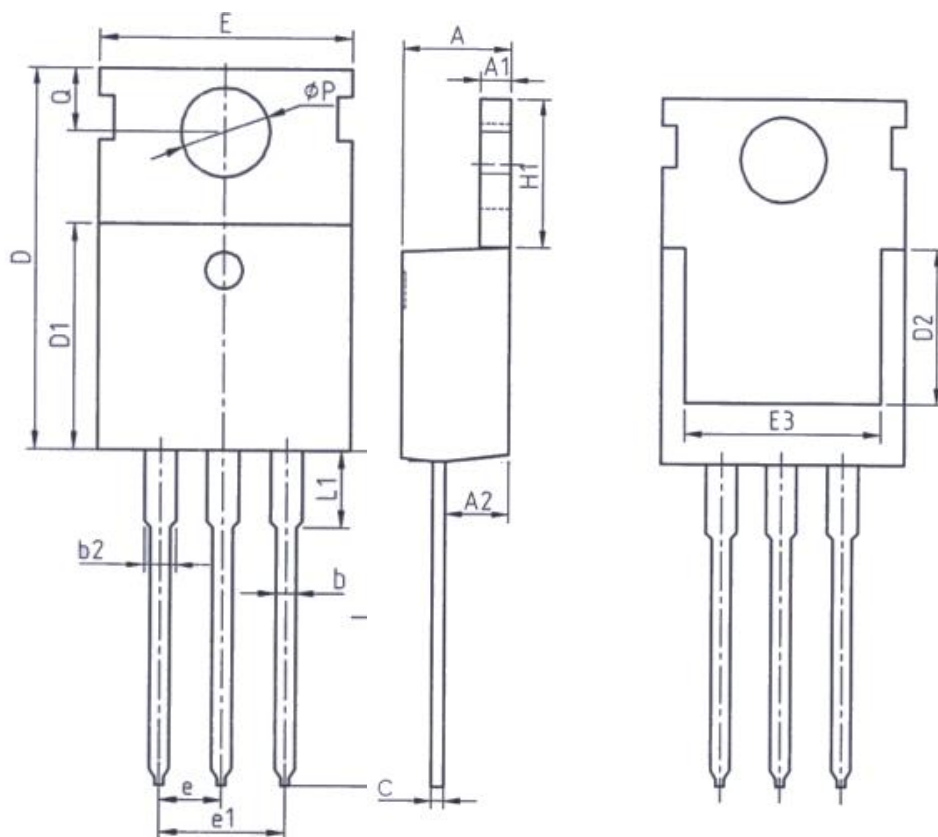
TO-263



Unit: mm		
Symbol	Min.	Max.
A	4.37	4.77
A1	1.22	1.42
A2	2.49	2.89
A3	0.00	0.25
b	0.70	0.96
b1	1.17	1.47
c	0.30	0.53
D1	8.50	8.90
D4	6.60	-

Unit: mm		
Symbol	Min.	Max.
E	9.86	10.36
E5	7.06	-
e	2.54BSC	
H	14.70	15.50
H2	1.07	1.47
L	2.00	2.60
L1	1.40	1.70
L4	0.25BSC	
θ	0°	9°

TO-220



Unit: mm		
Symbol	Min.	Max.
A	4.37	4.77
A1	1.25	1.45
A2	2.20	2.60
b	0.70	0.95
b2	1.17	1.47
c	0.40	0.65
D	15.10	16.10
D1	8.80	9.40
D2	5.50	—

Unit: mm		
Symbol	Min.	Max.
E	9.70	10.30
E3	7.00	—
e	2.54BSC	
e1	5.08BSC	
H1	6.25	6.85
L	12.75	13.80
L1	—	3.40
P	3.40	3.80
Q	2.60	3.00

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