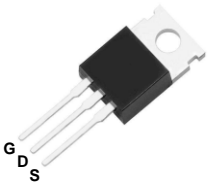


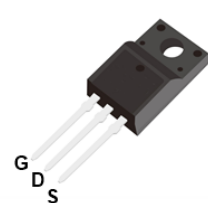
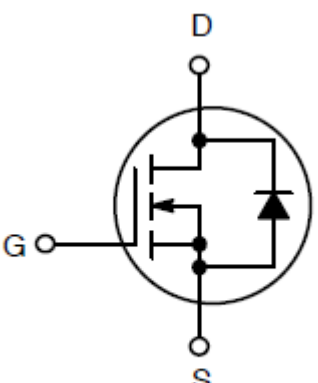


N-channel 800V, 220mΩ typ.,
 Super Junction MOSFET G1 in TO-220, TO-263, TO-247 and TO-220F

Datasheet - production data

1. Descriptions

TO-220 	TO-263 
TO-247 	TO-220F 
N-Channel MOSFET  POWER MOSFET	

Key Performance Parameters

Parameters	Value	Unit
BV_{DSS}	800	V
$R_{DS(on),max}$	250	mΩ
$Q_{g,typ}$	27	nC
$I_{D,pulse}$	54	A
E_{AS}	650	mJ

Features

- Ultra-fast body diode.
- Extremely low losses due to very low FOM $R_{dson} * Q_g$ and E_{oss} .
- Very high commutation ruggedness.
- Qualified for industrial grade applications according to JEDEC.

Applications

- PC power.
- Server power supply.
- Telecom.
- LED lighting.
- EV Charger.
- Solar/UPS.

Type/Ordering Code	Package	Marking	Related Links
CPP80R250G1	TO-220	80R250G1	See Appendix A
CPB80R250G1	TO-263	80R250G1	
CPW80R250G1	TO-247	80R250G1	
CPA80R250G1	TO-220F	80R250G1	

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2. Maximum Ratings

at $T_j = 25^\circ\text{C}$, unless otherwise specified

Table 1. Absolute Maximum Ratings

Symbol	Parameter	Values			Unit	Test Condition
		Min.	Typ.	Max.		
V_{DS}	Drain-source voltage ¹⁾	-	-	800	V	$V_{GS}=0V$, $I_D=250\mu A$
I_D	Continuous drain current ²⁾	-	-	18 8	A	$T_C=25^\circ\text{C}$ $T_C=125^\circ\text{C}$
$I_{D,pulse}$	Pulsed drain current	-	-	54	A	$T_C=25^\circ\text{C}$
E_{AS}	Avalanche energy, single pulse ³⁾	-	-	650	mJ	$I_D=5.1A$; $V_{DD}=50V$
I_{AR}	Avalanche current, repetitive	-	-	5.1	A	-
dv/dt	MOSFET dv/dt ruggedness	-	-	50	V/ns	$V_{DS}=0\dots 520V$
V_{GS}	Gate source voltage	-30	-	30	V	static; AC ($f > 1\text{ Hz}$)
P_{tot}	Power dissipation (Non FullPAK) TO-220, TO-263, TO-247	-	-	227	W	$T_C=25^\circ\text{C}$
P_{tot}	Power dissipation (FullPAK) TO-220F	-	-	34	W	$T_C=25^\circ\text{C}$
T_j, T_{stg}	Operating and storage temperature	-55	-	150	$^\circ\text{C}$	-
I_S	Continuous diode forward current	-	-	18	A	$T_C=25^\circ\text{C}$
$I_{S,pulse}$	Diode pulse current ²⁾	-	-	54	A	$T_C=25^\circ\text{C}$
dv/dt	Reverse diode dv/dt ⁴⁾	-	-	50	V/ns	$V_{DS}=0\dots 400V$, $I_{SD} \leq I_S$, $T_j=25^\circ\text{C}$

1) Limited by T_j max. Maximum duty cycle $D=0.75$.

2) Pulse width t_p limited by T_j ,max.

3) $V_{DD}=50V$, $R_G=25\Omega$, Starting $T_j=25^\circ\text{C}$.

4) $V_{DClk}=400V$; $V_{DS,peak} < V_{(BR)DSS}$; identical low side and high side switch with identical R_G .

3. Thermal Characteristics

Table 2. Thermal Characteristics (Non FullPAK) TO-220, TO-263, TO-247

Symbol	Parameter	Values			Unit	Test Condition
		Min.	Typ.	Max.		
R_{thJC}	Thermal resistance, junction - case	-	-	0.55	°C/W	$T_C = 25^\circ\text{C}$
R_{thJA}	Thermal resistance, junction - ambient	-	-	62	°C/W	$T_C = 25^\circ\text{C}$
T_{sold}	Soldering temperature, wavesoldering only allowed at leads	-	-	260	°C	Lead Temperature (Soldering, 10 sec)

Table 3. Thermal Characteristics (FullPAK) TO-220F

Symbol	Parameter	Values			Unit	Test Condition
		Min.	Typ.	Max.		
R_{thJC}	Thermal resistance, junction - case	-	-	3.67	°C/W	$T_C = 25^\circ\text{C}$
R_{thJA}	Thermal resistance, junction - ambient	-	-	62.5	°C/W	$T_C = 25^\circ\text{C}$
T_{sold}	Soldering temperature, wavesoldering only allowed at leads	-	-	260	°C	Lead Temperature (Soldering, 10 sec)

4. Electrical Characteristics

at $T_j = 25^\circ\text{C}$, unless otherwise specified

Table 4. Static Characteristics

Symbol	Parameter	Values			Unit	Test Condition
		Min.	Typ.	Max.		
$V_{(BR)DSS}$	Drain-source breakdown voltage	800	-	-	V	$V_{GS}=0V, I_D=250\mu A$
$V_{(GS)th}$	Gate threshold voltage	2.0	3.0	4.0	V	$V_{DS}=V_{GS}, I_D=250\mu A$
I_{DSS}	Zero gate voltage drain current	-	-	10	μA	$V_{DS}=800V, V_{GS}=0V, T_j=25^\circ C$
I_{GSS}	Gate-source leakage current	-	-	± 100	nA	$V_{GS}=\pm 30V, V_{DS}=0V$
$R_{DS(on)}$	Drain-source on-state resistance	-	220	250	m Ω	$V_{GS}=10V, I_D=8.5A, T_j=25^\circ C$
R_G	Gate resistance	-	15	-	Ω	$V_{DD}=0V, V_{GS}=0V, F=1MHz$

Table 5. Dynamic Characteristics

Symbol	Parameter	Values			Unit	Test Condition
		Min.	Typ.	Max.		
C_{iss}	Input capacitance	-	1510	-	pF	$V_{GS}=0V, V_{DS}=100V, f=250KHz$
C_{oss}	Output capacitance	-	58	-	pF	$V_{GS}=0V, V_{DS}=100V, f=250KHz$
C_{riss}	Reverse transfer capacitance	-	2	-	pF	$V_{GS}=0V, V_{DS}=100V, f=250KHz$
$t_{d(on)}$	Turn-on delay time	-	13	-	ns	$V_{DD}=400V, V_{GS}=10V, I_D=9A$
t_r	Rise time	-	2	-	ns	$V_{DD}=400V, V_{GS}=10V, I_D=9A$
$t_{d(off)}$	Turn-off delay time	-	80	-	ns	$V_{DD}=400V, V_{GS}=10V, I_D=9A$
t_f	Fall time	-	7	-	ns	$V_{DD}=400V, V_{GS}=10V, I_D=9A$

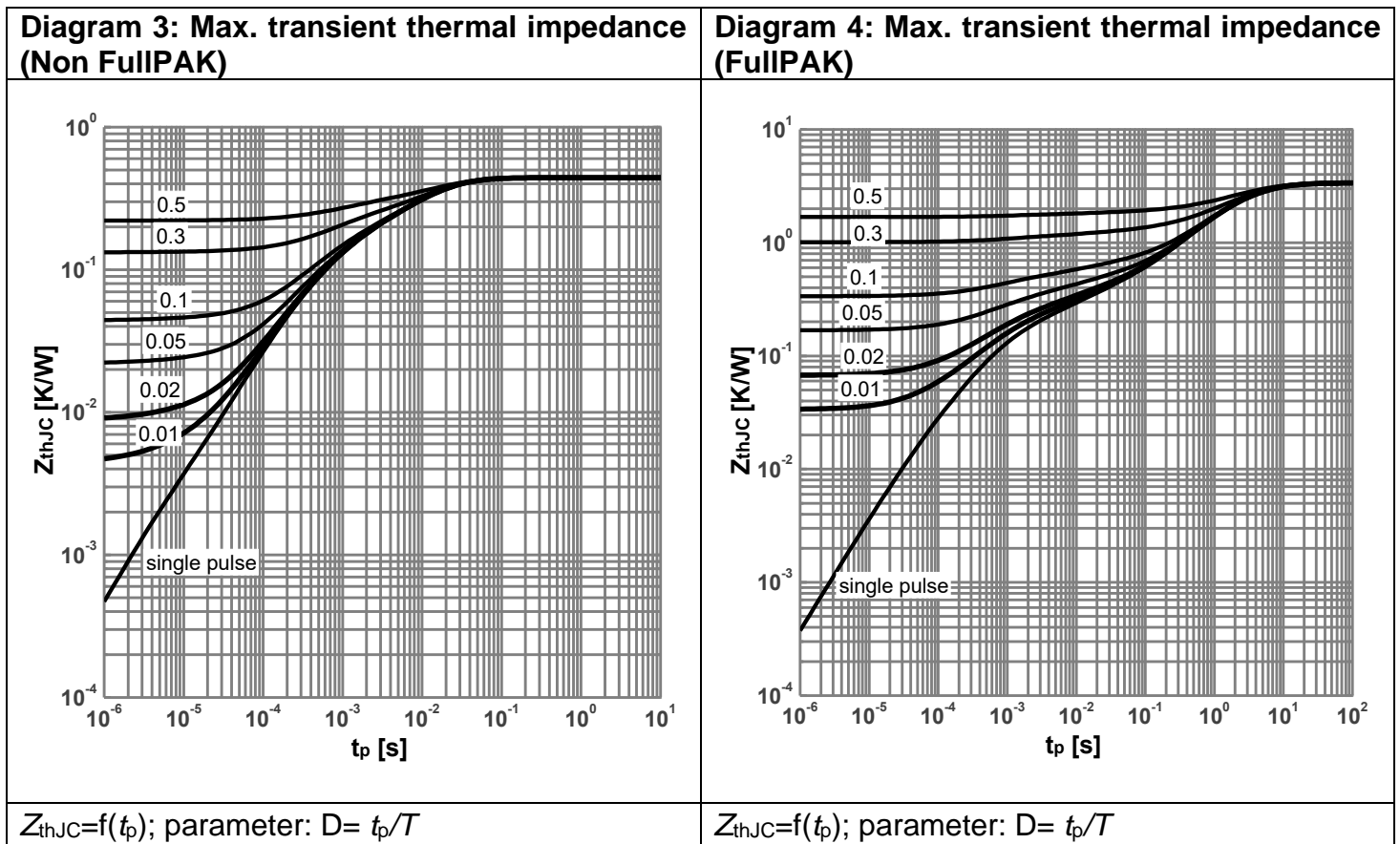
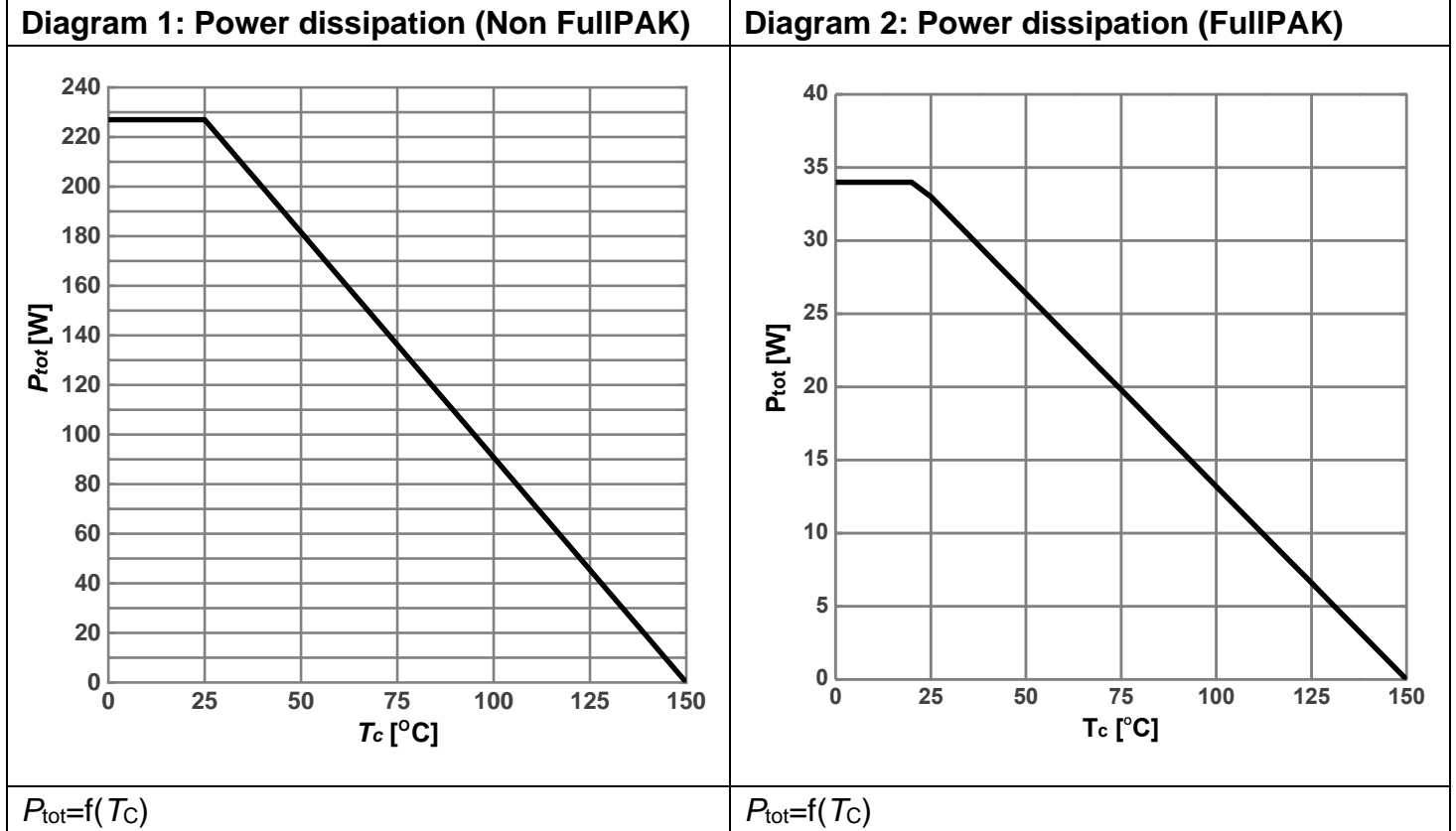
Table 6. Gate Charge Characteristics

Symbol	Parameter	Values			Unit	Test Condition
		Min.	Typ.	Max.		
Q_{gs}	Gate to source charge	-	5.5	-	nC	$V_{DD}=400V, I_D=9A, V_{GS}=0 \text{ to } 10V$
Q_{gd}	Gate to drain charge	-	8	-	nC	$V_{DD}=400V, I_D=9A, V_{GS}=0 \text{ to } 10V$
Q_g	Gate charge total	-	27	-	nC	$V_{DD}=400V, I_D=9A, V_{GS}=0 \text{ to } 10V$
$V_{plateau}$	Gate plateau voltage	-	3.8	-	V	$V_{DD}=400V, I_D=9A, V_{GS}=0 \text{ to } 10V$

Table 7. Reverse Diode Characteristics

Symbol	Parameter	Values			Unit	Test Condition
		Min.	Typ.	Max.		
V_{SD}	Diode forward voltage	-	0.8	-	V	$V_{GS}=0V, I_F=8.5A, T_i=25^\circ C$
t_{rr}	Reverse recovery time	-	255	-	ns	$V_R=400V, I_F=9A, di/dt=100A/\mu s$
Q_{rr}	Reverse recovery charge	-	3.1	-	μC	$V_R=400V, I_F=9A, di/dt=100A/\mu s$
I_{rrm}	Peak reverse recovery current	-	20	-	A	$V_R=400V, I_F=9A, di/dt=100A/\mu s$

5. Electrical Characteristics Diagrams



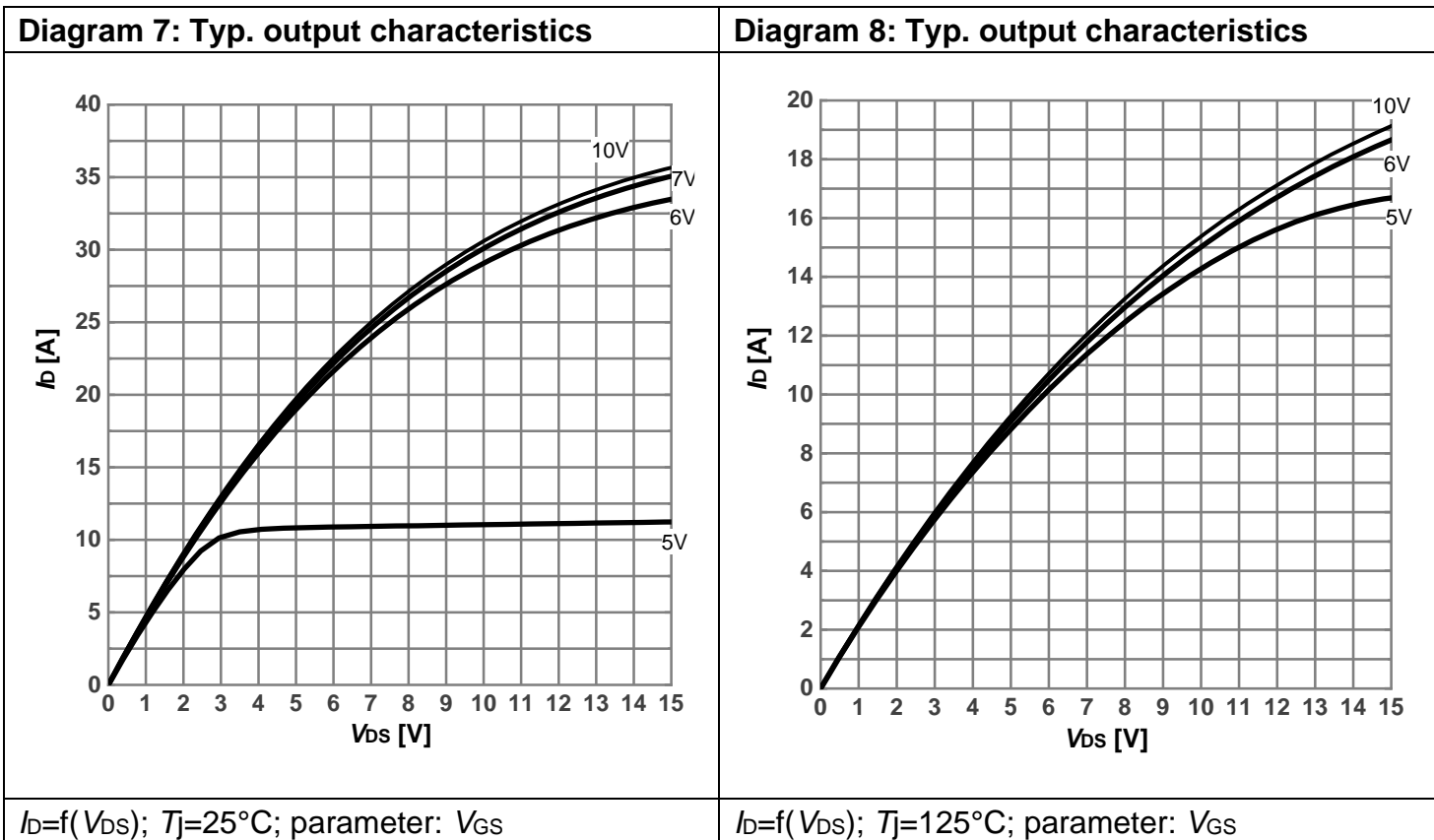
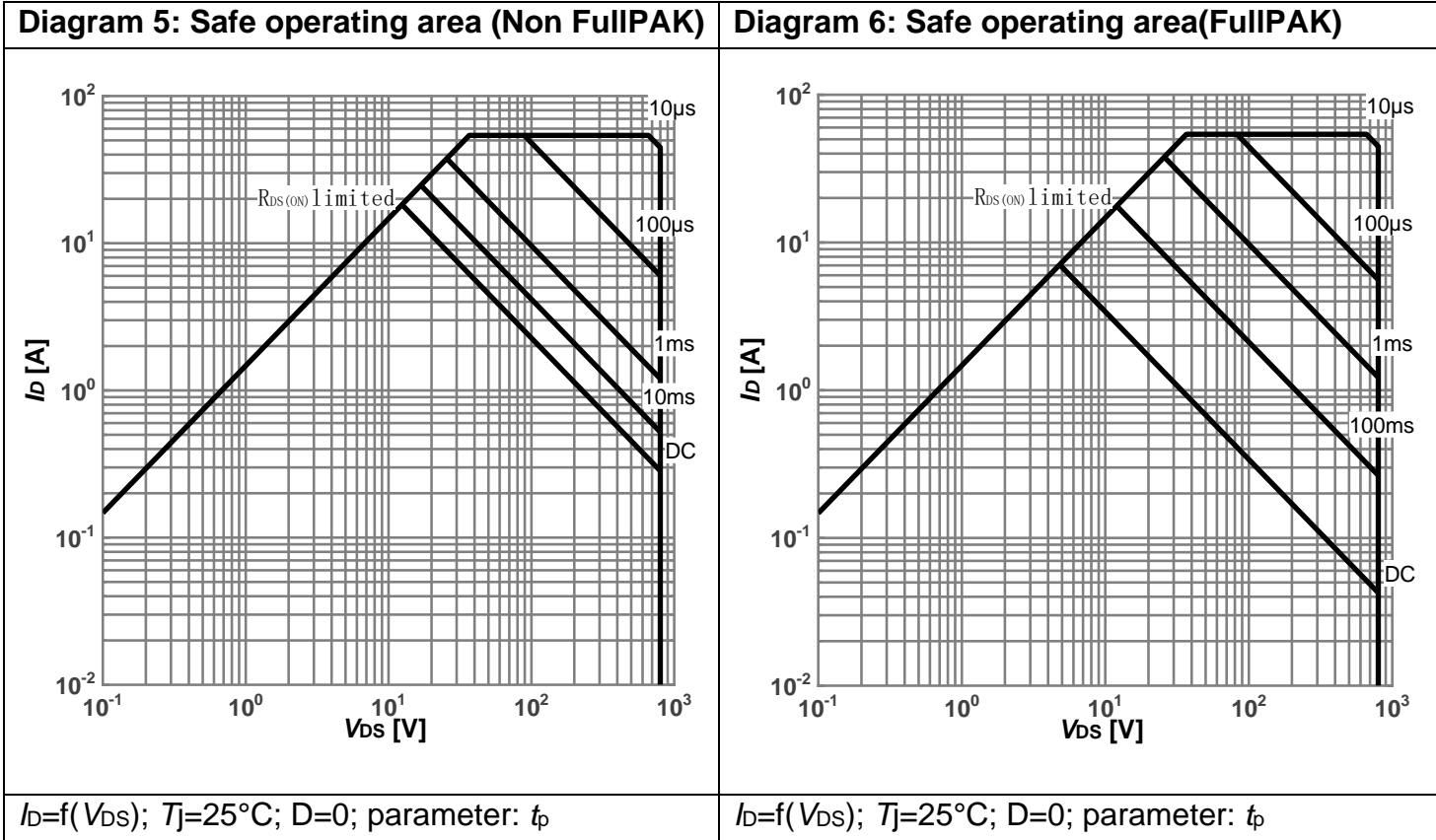
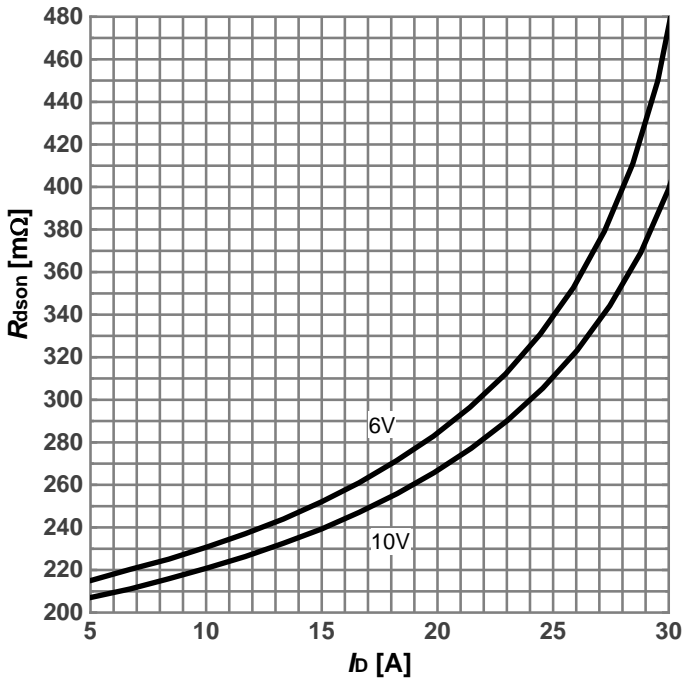
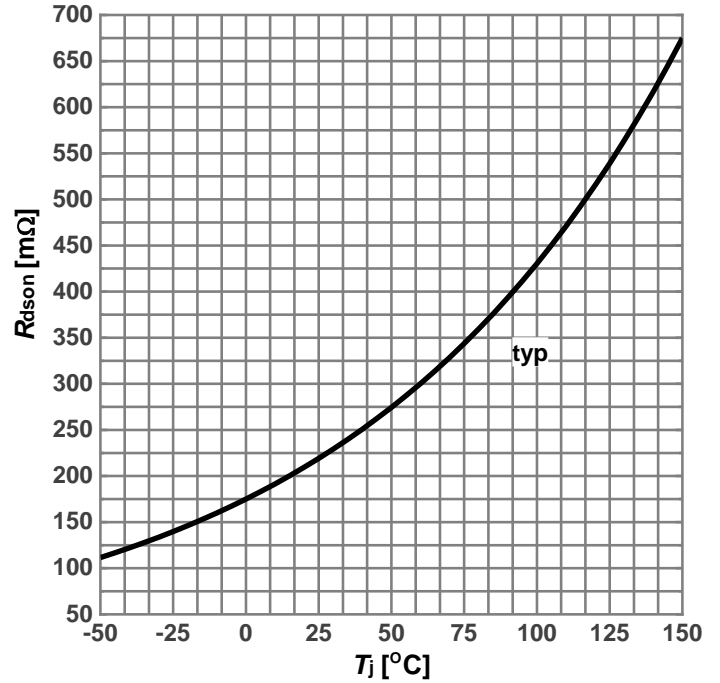


Diagram 9: Typ. drain-source on-state resistance



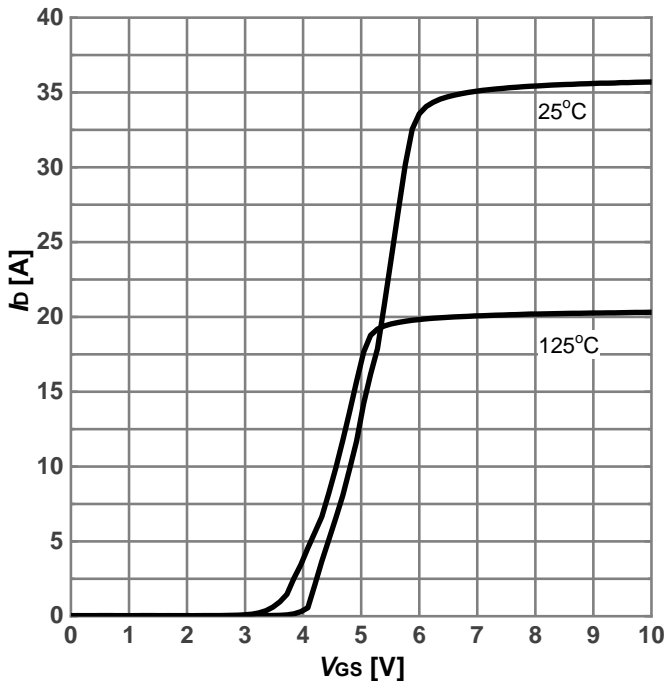
$R_{DS(on)}=f(I_D)$; $T_j=25^\circ C$; parameter: V_{GS}

Diagram 10: Drain-source on-state resistance



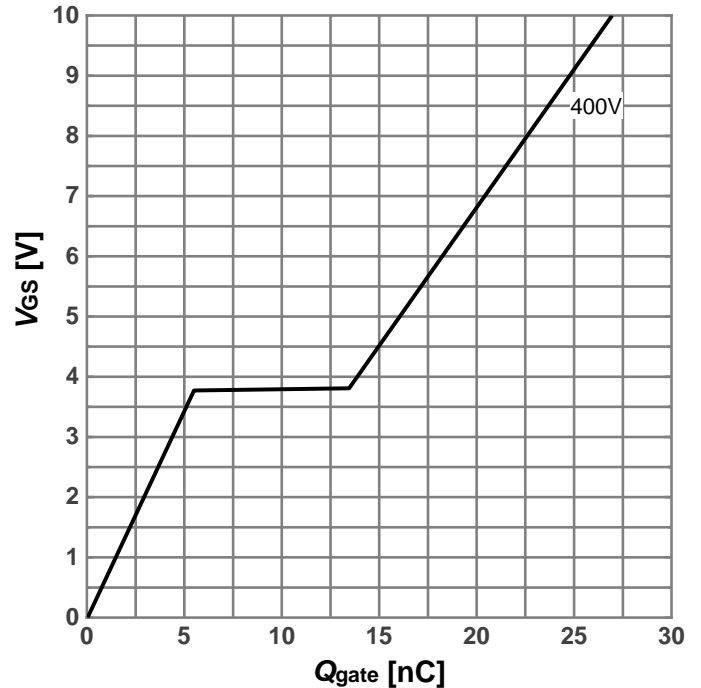
$R_{DS(on)}=f(T_j)$; $I_D=8.5A$; $V_{GS}=10V$

Diagram 11: Typ. transfer characteristics



$I_D=f(V_{GS})$; $V_{DS}=20V$; parameter: T_j

Diagram 12: Typ. gate charge



$V_{GS}=f(Q_{gate})$; $I_D=9A$ pulsed; $V_{DS}=400V$

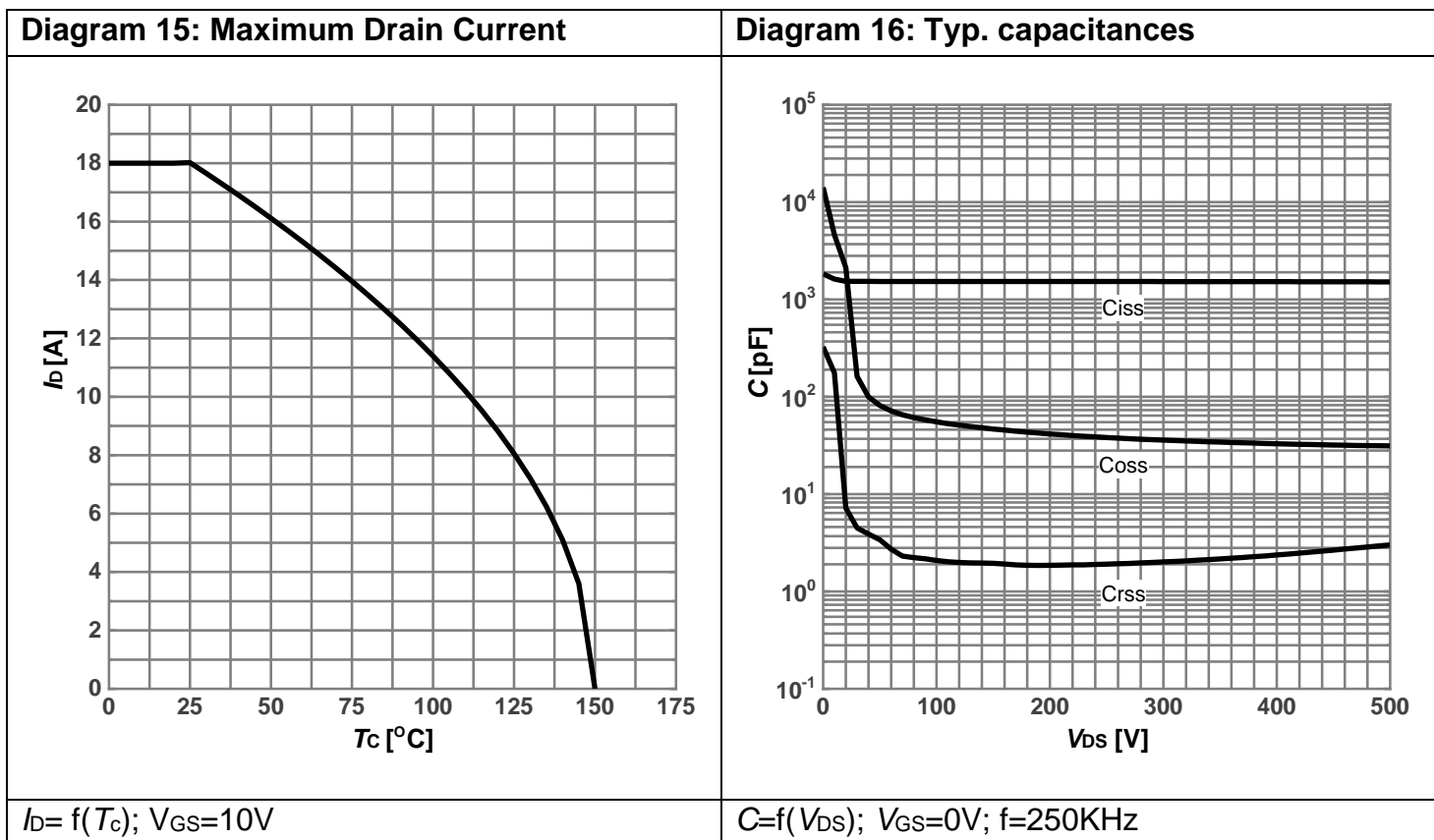
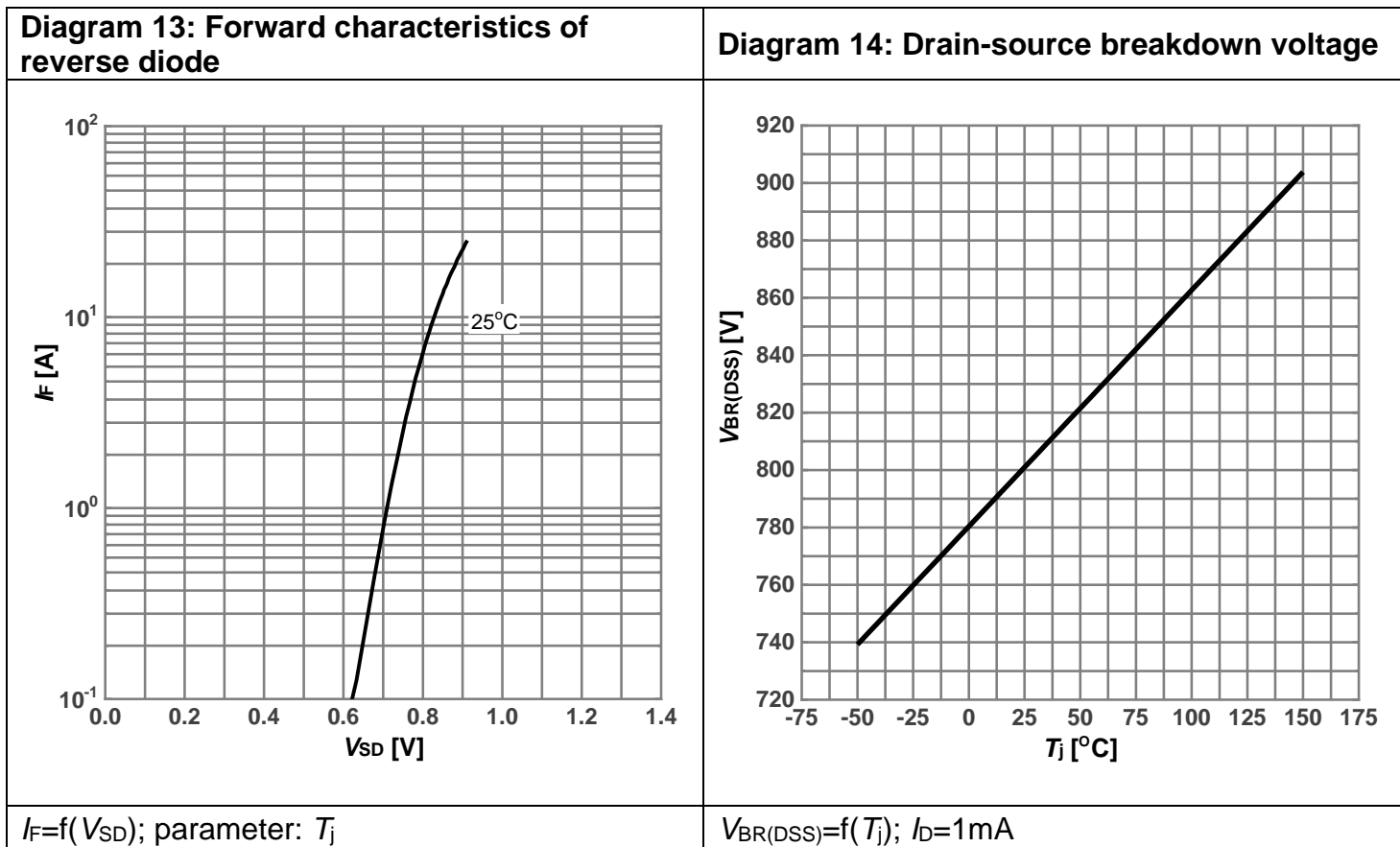
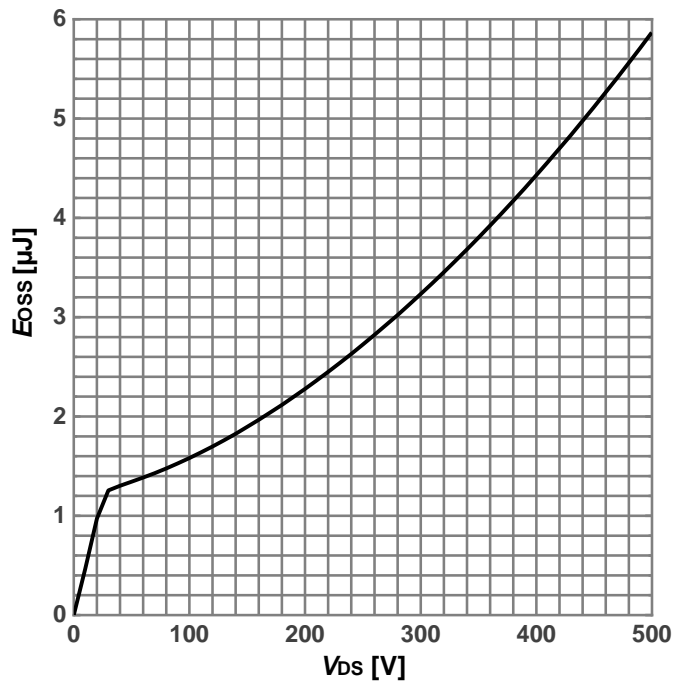


Diagram 17: Typ. Coss stored energy



$$E_{oss} = f(V_{ds})$$

6. Test Circuits

Table 8. Diode Characteristics

<p>Test circuit for diode characteristics</p>	<p>Diode recovery waveform</p>
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Table 9. Switching Times

<p>Switching times test circuit for inductive load</p>	<p>Switching times waveform</p>
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Table 10. Unclamped Inductive Load

<p>Unclamped inductive load test circuit</p>	<p>Unclamped inductive waveform</p>
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7. Package Outlines

Figure 1 Outline TO-220 Dimensions in mm

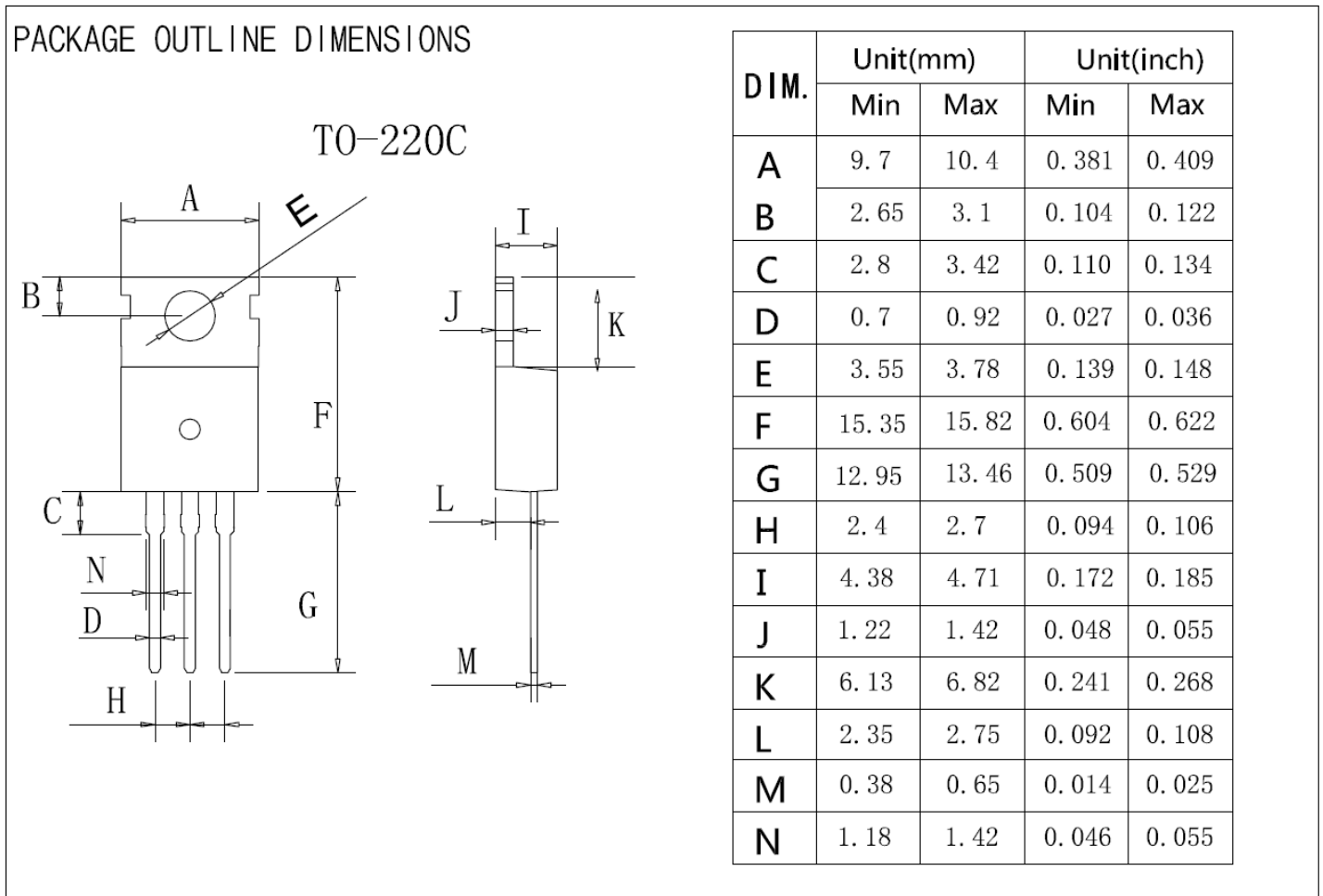
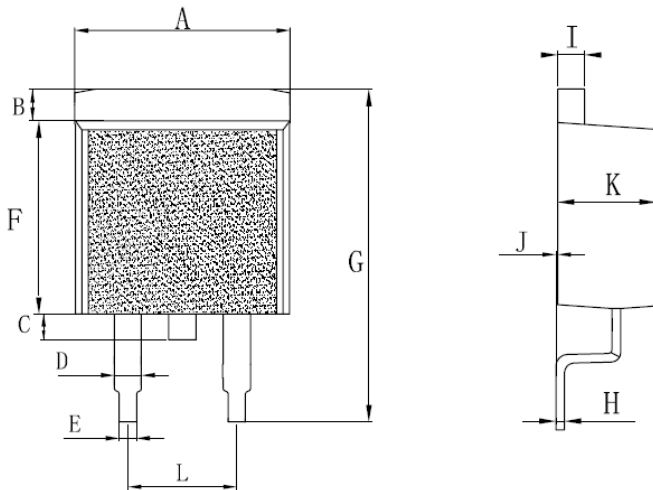


Figure 2 Outline TO-263 Dimensions in mm

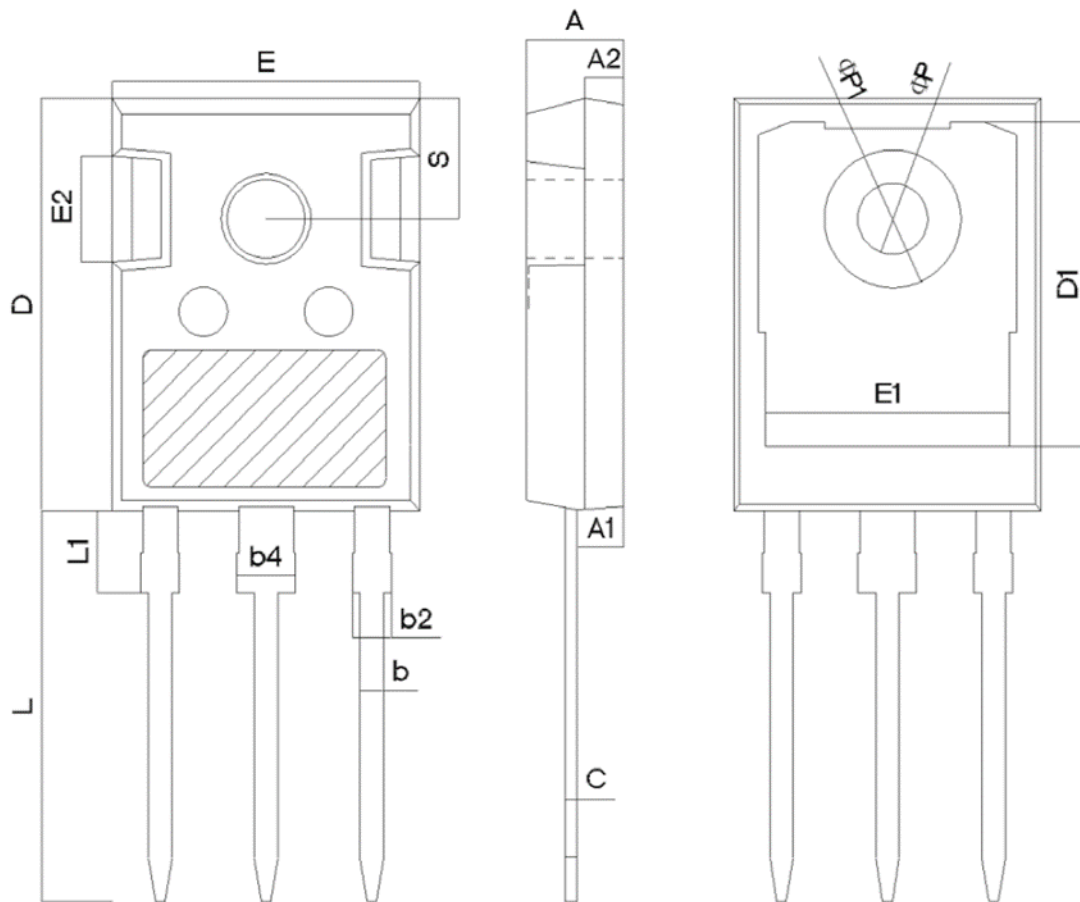
PACKAGE OUTLINE DIMENSIONS

TO-263



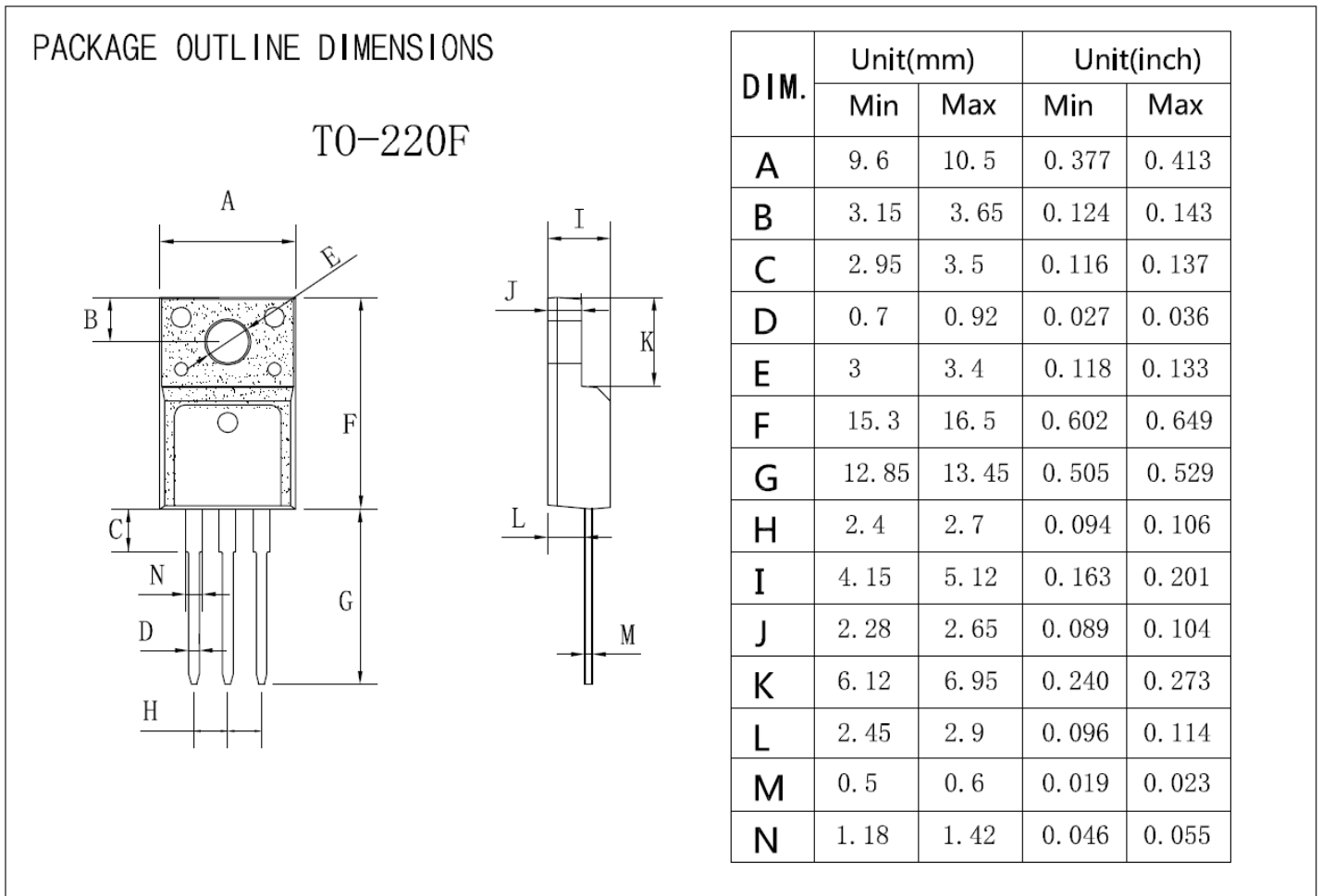
DIM.	Unit(mm)		Unit(inch)	
	Min	Max	Min	Max
A	9.7	10.4	0.381	0.409
B	1.31	1.62	0.051	0.063
C	0.65	1.22	0.025	0.048
D	1.15	1.36	0.045	0.053
E	0.62	0.95	0.024	0.037
F	8.75	9.32	0.344	0.366
G	14.75	15.8	0.580	0.622
H	0.32	0.48	0.012	0.018
I	1.18	1.36	0.046	0.053
J	0	0.15	0	0.005
K	4.38	4.86	0.172	0.191
L	4.85	5.23	0.190	0.205

Figure 3 Outline TO-247 Dimensions in mm



SYMBOL	mm		
	MIN	NOM	MAX
A	4.80	5.00	5.20
A1	2.21	2.41	2.61
A2	1.85	2.00	2.15
b	1.11	1.21	1.36
b2	1.91	2.01	2.21
b4	2.91	3.01	3.21
c	0.51	0.61	0.75
D	20.70	21.00	21.30
D1	16.25	16.55	16.85
E	15.50	15.80	16.10
E1	13.00	13.30	13.60
E2	4.80	5.00	5.20
E3	2.30	2.50	2.70
e	5.44BSC		
L	19.62	19.92	20.22
L1	-	-	4.30
ΦP	3.40	3.60	3.80
ΦP1	-	-	7.30
S	6.15BSC		

Figure 4 Outline TO-220 FullPAK Dimensions in mm



8. Appendix

CoolSemi Webpage: www.coolsemi.com.

单击下面可查看定价，库存，交付和生命周期等信息

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