

Features

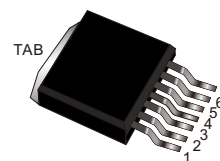
- High blocking voltage with low on-resistance
- High speed switching with low capacitance
- Easy to Parallel
- Simple to Drive

Product Summary			
V _{DS}	R _{DS(on)} (mΩ)Typ	I _D (A)	Q _g (Typ)
650V	30 @ 18V 30A	60	128nc

TO-263-7L

Mechanical Data

- Case:TO-263-7L Package



Application

- EV Charging
- Renewable Energy
- Automotive DC/DC converters
- Server Power Supplies

Block Diagram

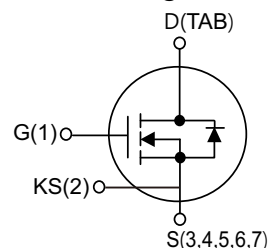


Table1 Absolute Maximum Ratings (T_C=25°C, unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V _{DS}	650	V
Gate-Source Voltage(Max)	V _{GS(max)}	-10/+22	V
Recommend Gate-Source Voltage	V _{GSop}	-5/+18	V
Continuous Drain Current	I _D	T _C =25°C	60
		T _C =100°C	48
Pulsed Drain Current (Note 1)	I _{DM}	135	A
Power Dissipation T _C =25°C	P _D	326	W
Operating Junction and Storage Temperature	T _J /T _{STG}	-55 ~ +175	°C

Table 2.Thermal Characteristics

Parameter	Symbol	SC30N65D7L	Unit
Thermal resistance Junction to Case	R _{θJC}	0.46	°C/W
Thermal resistance Junction to Ambient	R _{θJA}	40	°C/W

Table 3. Electrical Characteristics (T_J=25°C, unless otherwise specified)

Parameter		Symbol	Test Conditions	Min	Typ	Max	Unit
Off Characteristics							
Drain-Source Breakdown Voltage		BV _{DSS}	V _{GS} =0V,I _D =250μA	650	-	-	V
Drain-Source Leakage Current		I _{DSS}	V _{Ds} =650V,V _{GS} =0V,T _J =25°C	-	-	100	μA
			V _{Ds} =650V,V _{GS} =0V,T _J =175°C	-	-	3.5	mA
Gate- Source Leakage Current	Forward	I _{GSS}	V _{GS} =20V,V _{Ds} =0V	-	-	250	nA
	Reverse		V _{GS} = -10V,V _{Ds} =0V	-	-	-250	nA
On Characteristics							
Gate Threshold Voltage		V _{GS(TH)}	V _{Ds} =V _{GS} ,I _D =5mA	2.0	3.0	4.0	V
Static Drain-Source On-State Resistance		R _{DS(ON)}	V _{GS} =18V,I _D =30A,T _J =25°C	-	30	38	mΩ
			V _{GS} =18V,I _D =30A,T _J =175°C	-	42	-	
Gate Resisittance		R _G	f=1MHz	-	4.1	-	Ω
Dynamic Characteristics							
Input Capacitance		C _{ISS}	V _{Ds} =600V,V _{GS} =0V, f=1MHz,V _{AC} =25mV	-	2112	-	pF
Output Capacitance		C _{OSS}		-	212	-	pF
Reverse Transfer Capacitance		C _{RSS}		-	5	-	pF
Coss stored energy		E _{OSS}	V _{Ds} =400V,f=1MHz	-	12	-	μJ
Turn-on switching energy		E _{ON}	V _{Ds} =400V,I _D =30A,V _{GS} = -5/18V,	-	59	-	μJ
Turn-off switching energy		E _{OFF}	R _G =2.5Ω,Load=100μH,T _J =175°C	-	14	-	μJ
Turn-On Delay Time		td(on)	V _{Ds} =400V,I _D =30A V _{GS} = -5/18V,R _G =2.5Ω, Load=100μH	-	10	-	ns
Turn-On Rise Time		t _r		-	11	-	ns
Turn-Off Delay Time		td(off)		-	19	-	ns
Turn-Off Fall Time		t _f		-	7	-	ns
Total Gate Charge		Q _G	V _{DD} =400V,I _D =30A, V _{GS} = -5/18V	-	128	-	nC
Gate-Source Charge		Q _{GS}		-	32	-	nC
Gate-Drain Charge		Q _{GD}		-	24	-	nC
Drain-Source Diode Characteristics and Maximum Ratings(Note 2)							
Drain-Source Diode Forward Voltage		V _{SD}	V _{GS} =0V,I _s =15A	-	3.5	-	V
Continuous Diode Forward Current		I _s	V _{GS} =0V	-	55	-	A
Reverse Recovery Time		t _{rr}	V _R =400V,di/dt=2400A/μs; I _{SD} =15A,V _{GS} = -5V,T _J =175°C	-	18	-	ns
Recovered charge		Q _{rr}		-	160	-	nC
Peak reverse recovery current		I _{rrm}		-	8.5	-	A

Notes: 1 RepetitiveRating Pulse width limited by maximum junction temperature

2 Pulse Test: Pulse width ≤300μS, Duty cycle≤2%

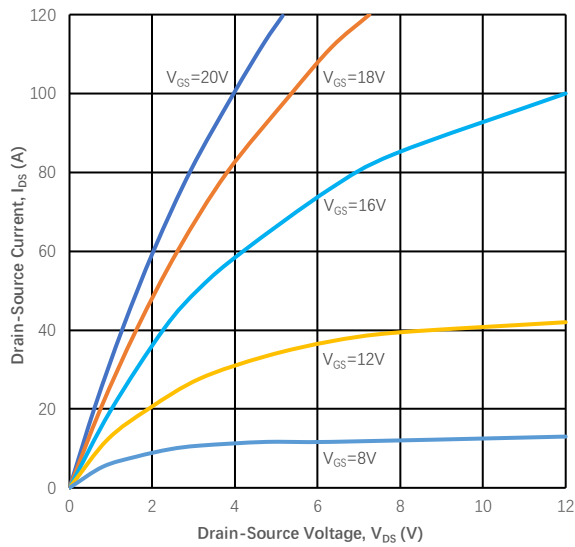


Figure 1

Output Characteristics ($T_j = 25^\circ\text{C}$)

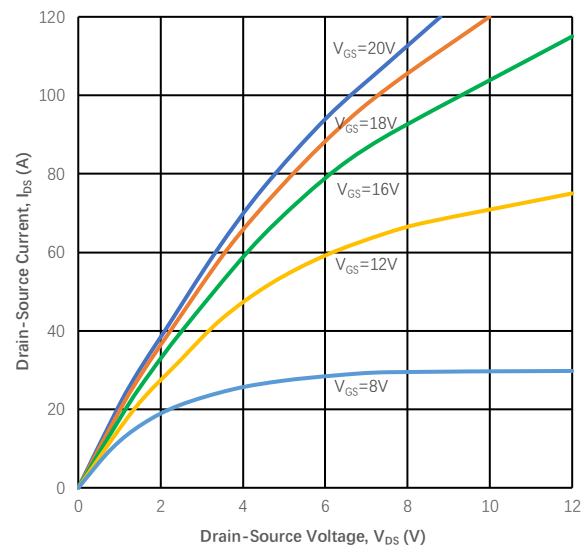


Figure 2

Output Characteristics ($T_j = 175^\circ\text{C}$)

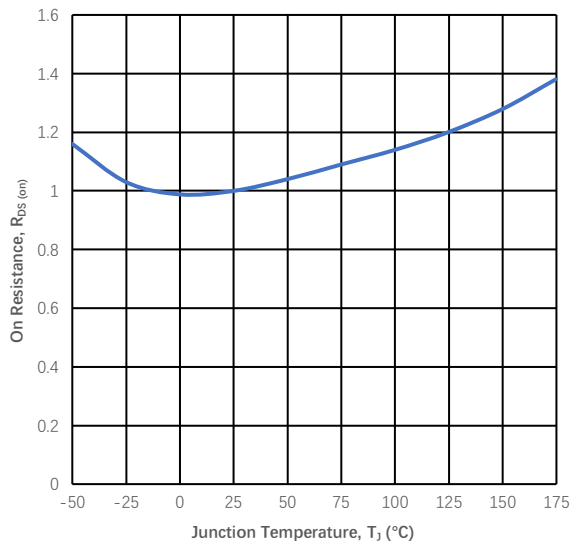


Figure 3

Normalized On-Resistance vs. Temperature

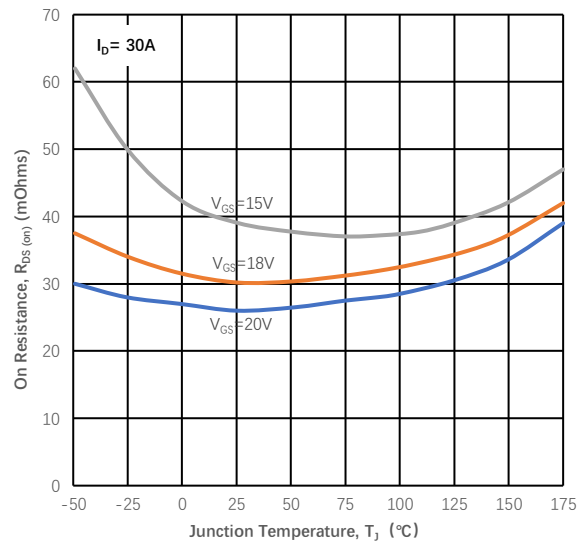


Figure 4

On-Resistance vs. Temperature

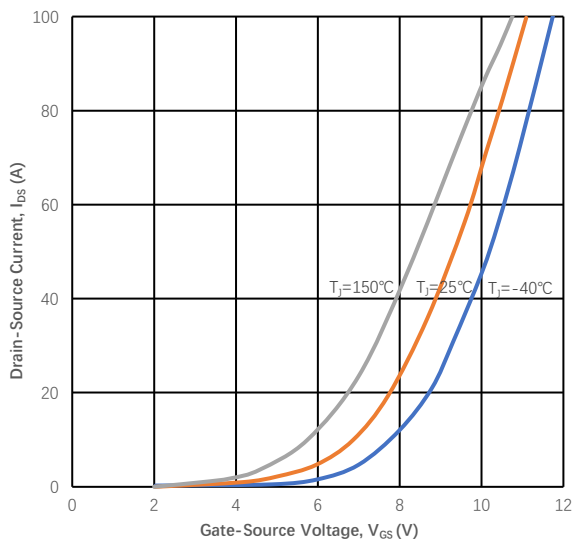


Figure 5

Transfer Characteristic

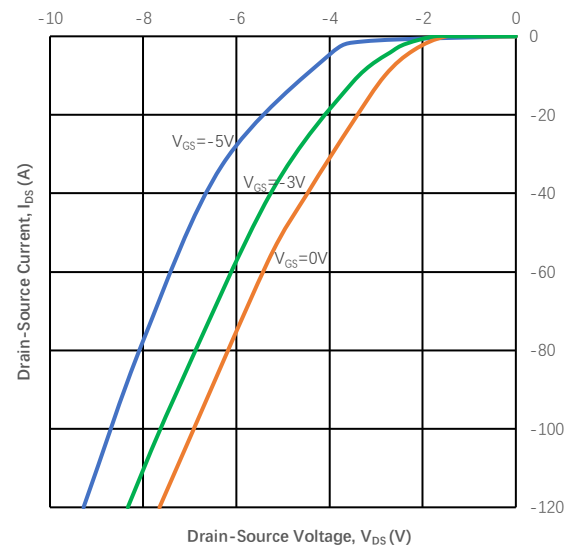


Figure 6

Body Diode Characteristic at 25°C

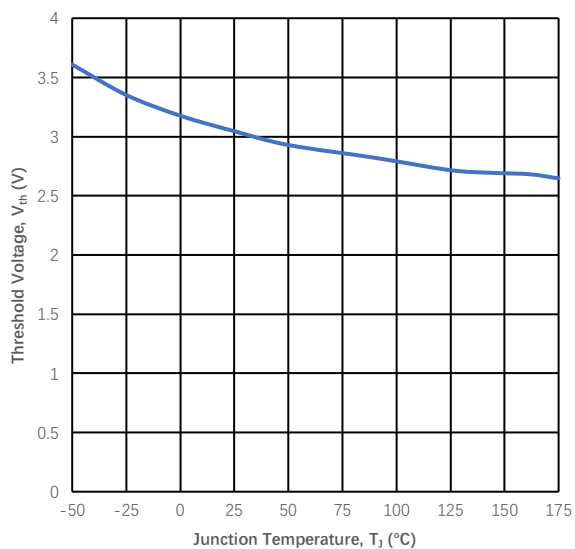


Figure 7

Threshold Voltage vs. Temperature

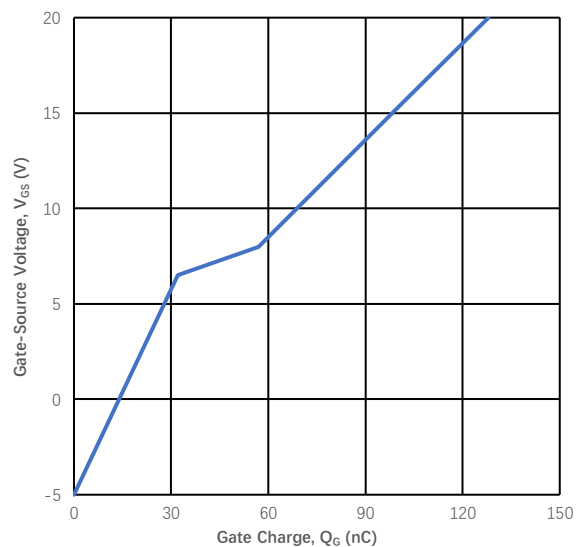


Figure 8

Gate Charge Characteristics

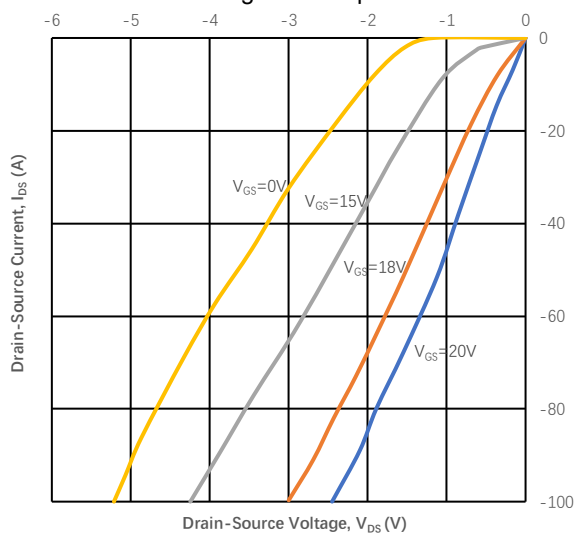


Figure 9

3rd Quadrant Characteristic at 25°C

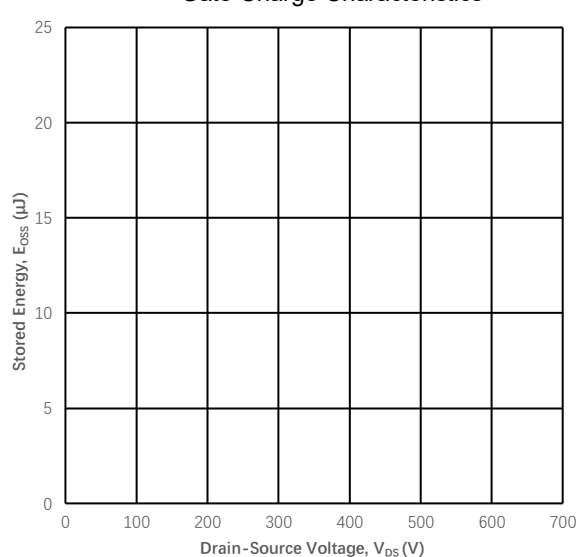


Figure 10

Output Capacitor Stored Energy

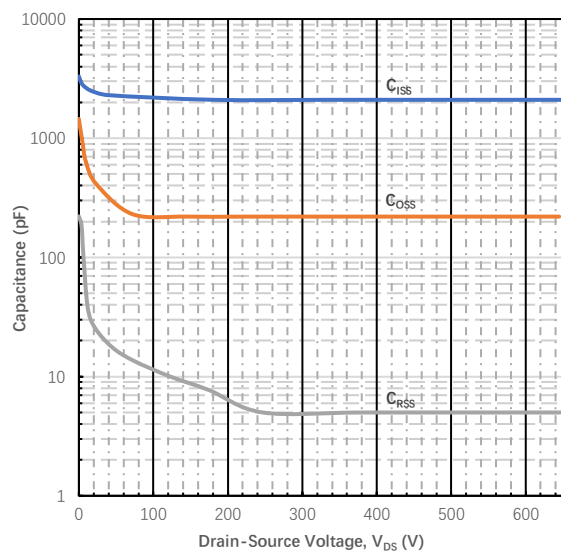


Figure 11

Capacitances vs. Drain-Source

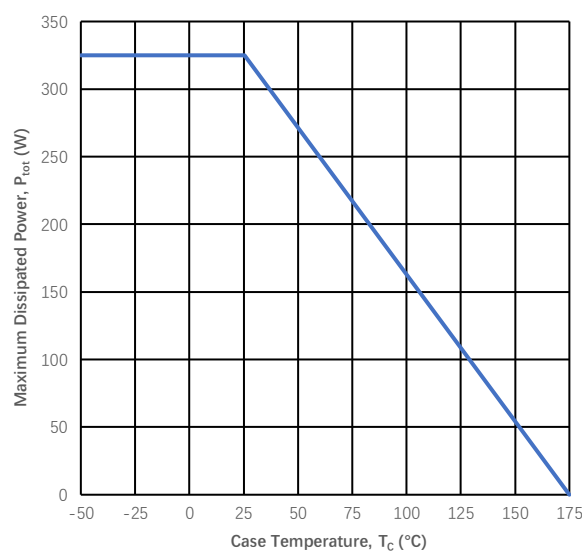


Figure 12

Max Power Dissipation Derating vs T_c

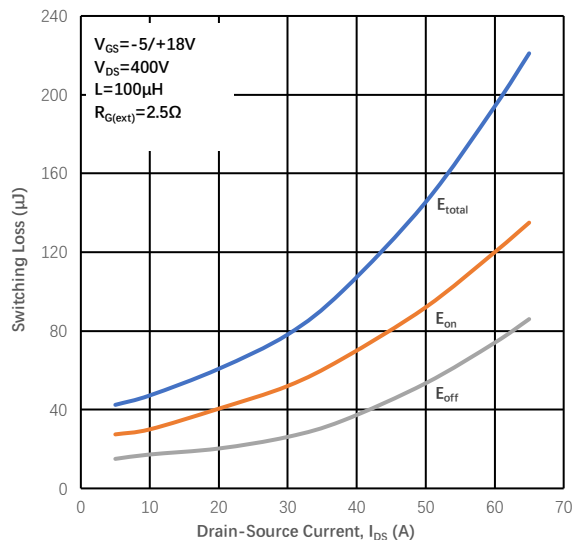


Figure 13

Switching Energy vs. Drain Current

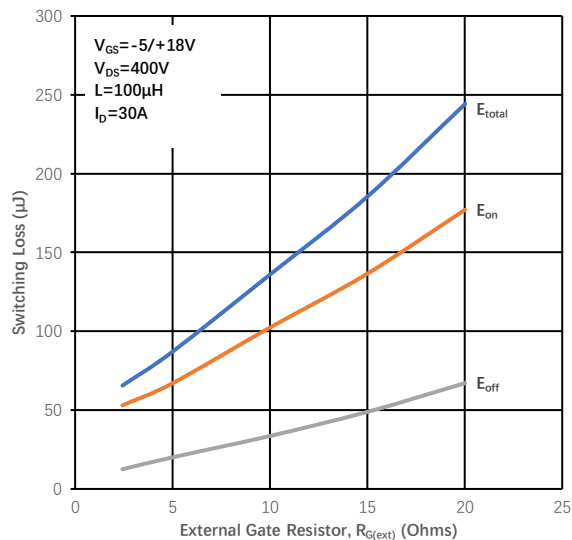


Figure 14

Switching Energy vs. $R_{G(ext)}$

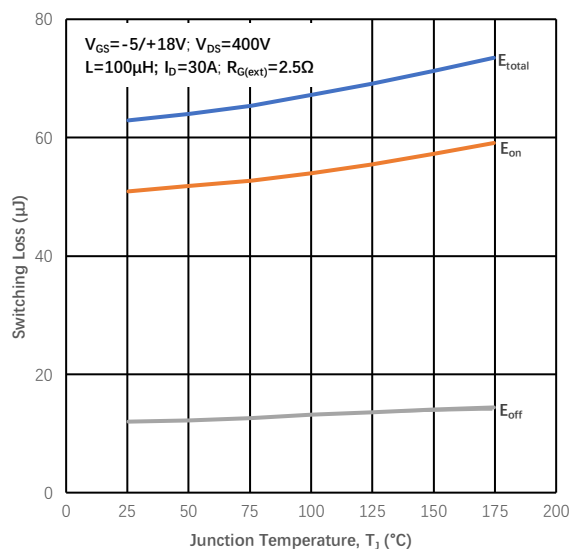


Figure 15

Switching Energy vs. Temperature

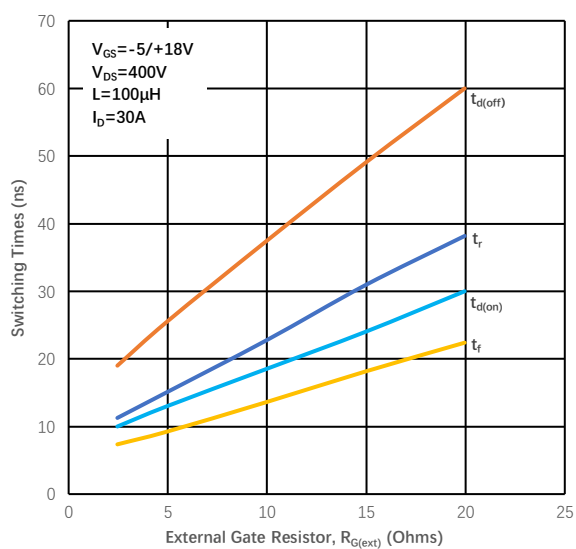


Figure 16

Switching Times vs. $R_{G(ext)}$

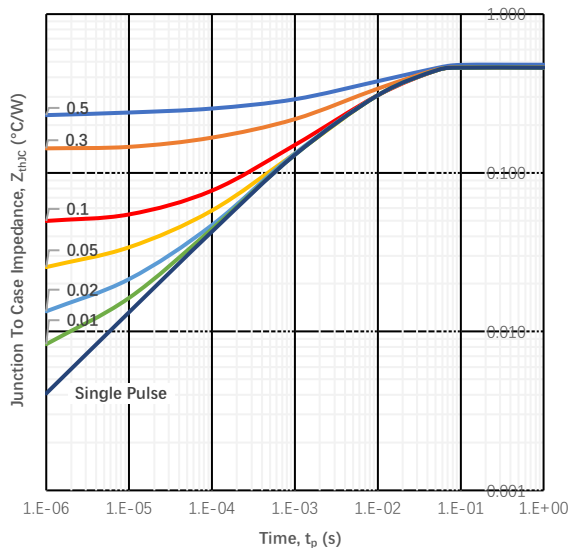


Figure 17

Transient Thermal Impedance

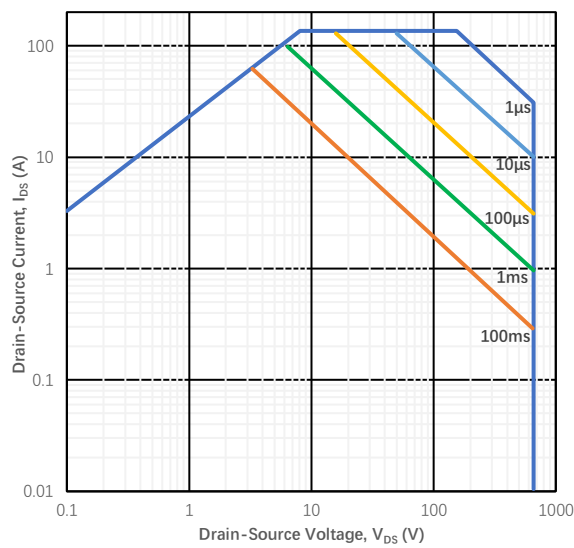
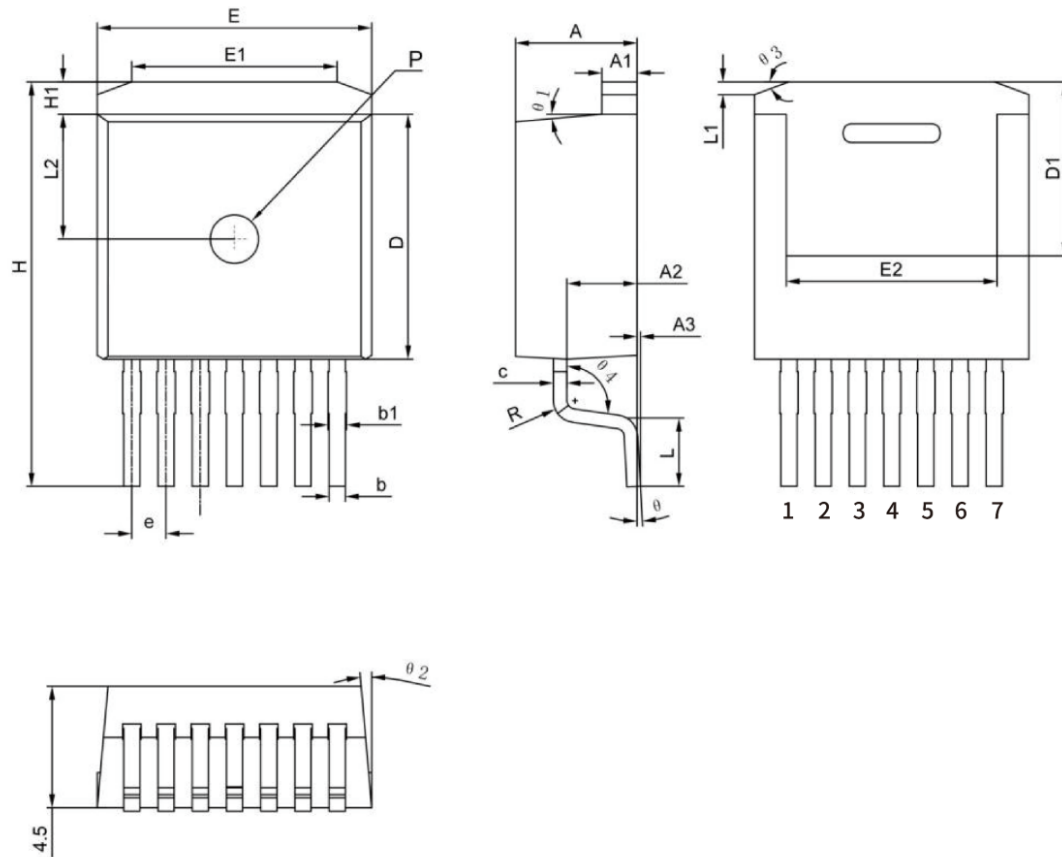


Figure 18

Safe Operating Area

Dimensions

TO-263-7L package



Symbol	Millimeters			Symbol	Millimeters		
	Min.	Type.	Max.		Min.	Type.	Max.
A	4.40	4.50	4.60	e	1.17	1.27	1.37
A1	1.25	1.30	1.40	H	14.75	15.00	15.25
A2	2.45	2.60	2.70	H1	1.10	1.20	1.30
A3	0.05	0.13	0.20	L	2.35	2.55	2.75
b	0.50	0.60	0.70	L1	0.37	0.57	0.77
b1	0.60	0.70	0.85	L2	4.48	4.63	4.78
C	0.45	0.50	0.60	θ	0°	3°	5°
D	8.88	9.08	9.28	θ_1	3°	5°	7°
D1	6.25	6.45	6.65	θ_2	3°	5°	7°
E	9.88	10.18	10.28	θ_3	15°	20°	25°
E1	6.67	7.07	7.47	R	0.75	0.80	0.85
E2	7.67	7.82	7.97	P	1.70	1.80	1.90

Pin	Symbol	Description
1	G	Gate Drain
2	S	Driver Source
3-7	S	Power Source
mb	D	Mounting Base; Connected to Drain

Note:

1. All metal surfaces are Sn plated (matte), except area of cut.
2. Burr or mold flash size (0.5 mm) is not included in the dimensions.

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