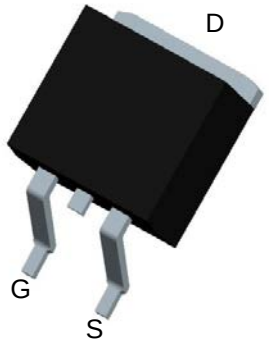
Features

- 40V/120A,
  $R_{DS\ (ON)}$ =3.5mΩ(Typ.)@V_{GS}=10V
- Super High Dense Cell Design
- Ultra Low On-Resistance
- 100% avalanche tested
- Lead Free and Green Devices Available (RoHS Compliant)

Pin Description



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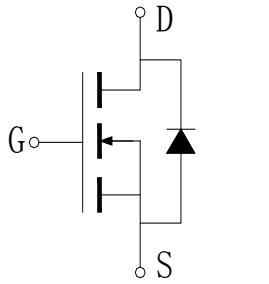


N-Channel MOSFET

Applications

- DC-DC Converters

Absolute Maximum Ratings

Symbol	Parameter		Rating	Unit
Common Ratings (T_C=25°C Unless Otherwise Noted)				
V_{DSS}	Drain-Source Voltage		40	V
V_{GSS}	Gate-Source Voltage		±20	
T_J	Maximum Junction Temperature		175	°C
T_{STG}	Storage Temperature Range		-55 to 175	°C
I_S	Diode Continuous Forward Current	T_C=25°C	120	A
Mounted on Large Heat Sink				
I_{DP} ①	300μs Pulse Drain Current Tested	T_C=25°C	480	A
I_D ②	Continuous Drain Current(V_{GS}=10V)	T_C=25°C	120	A
		T_C=100°C	103	
P_D	Maximum Power Dissipation	T_C=25°C	150	W
		T_C=100°C	75	
$R_{\theta JC}$	Thermal Resistance-Junction to Case		1	°C/W
$R_{\theta JA}$	Thermal Resistance-Junction to Ambient		62.5	°C/W
Drain-Source Avalanche Ratings				
E_{AS} ③	Avalanche Energy, Single Pulsed		400	mJ

Electrical Characteristics (T_C=25°C Unless Otherwise Noted)

Symbol	Parameter	Test Condition	RU40120S			Unit
			Min.	Typ.	Max.	
Static Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_{DS}=250μA	40			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=40V, V_{GS}=0V			1	μA
		T_J=125°C			30	
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_{DS}=250μA	2		4	V
I_{GSS}	Gate Leakage Current	V_{GS}=±20V, V_{DS}=0V			±100	nA
$R_{DS(ON)}$④	Drain-Source On-state Resistance	V_{GS}=10V, I_{DS}=60A		3.5	4.5	mΩ
Diode Characteristics						
V_{SD}④	Diode Forward Voltage	I_{SD}=60A, V_{GS}=0V			1.2	V
t_{rr}	Reverse Recovery Time	I_{SD}=60A, dI_{SD}/dt=100A/μs		33		ns
Q_{rr}	Reverse Recovery Charge			30		nC
Dynamic Characteristics⑤						
R_G	Gate Resistance	V_{GS}=0V,V_{DS}=0V,F=1MHz		1.8		Ω
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=20V, Frequency=1.0MHz		3700		pF
C_{oss}	Output Capacitance			680		
C_{rss}	Reverse Transfer Capacitance			345		
$t_{d(ON)}$	Turn-on Delay Time	V_{DD}=20V, I_{DS}=60A, V_{GEN}=10V,R_G=4.7Ω		36		ns
t_r	Turn-on Rise Time			205		
$t_{d(OFF)}$	Turn-off Delay Time			85		
t_f	Turn-off Fall Time			45		
Gate Charge Characteristics⑤						
Q_g	Total Gate Charge	V_{DS}=32V, V_{GS}=10V, I_{DS}=60A		90		nC
Q_{gs}	Gate-Source Charge			32		
Q_{gd}	Gate-Drain Charge			37		

Notes:

①Pulse width limited by safe operating area.

②Calculated continuous current based on maximum allowable junction temperature. The package limitation current is 75A.

③Limited by T_{Jmax}, I_{AS} =40A, V_{DD} = 32V, R_G = 50Ω , Starting T_J = 25°C.

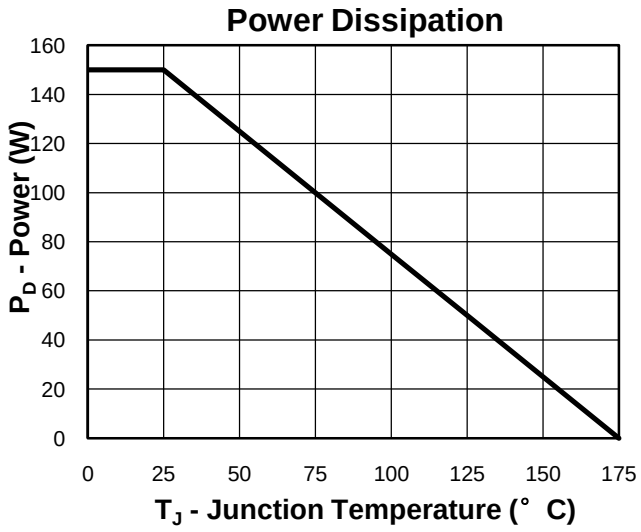
④Pulse test;Pulse width≤300μs, duty cycle≤2%.

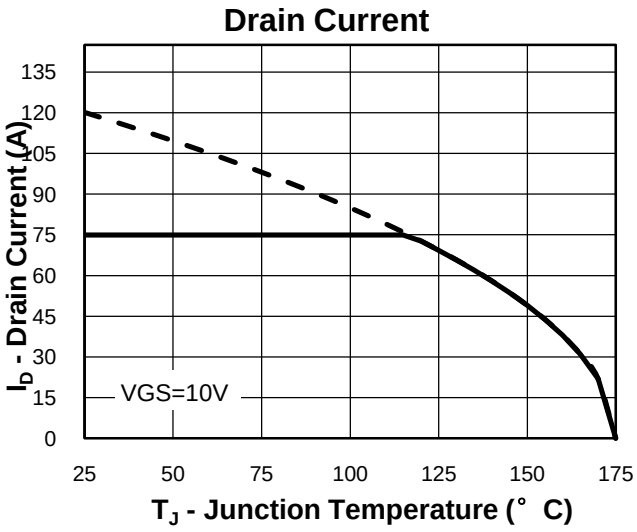
⑤Guaranteed by design, not subject to production testing.

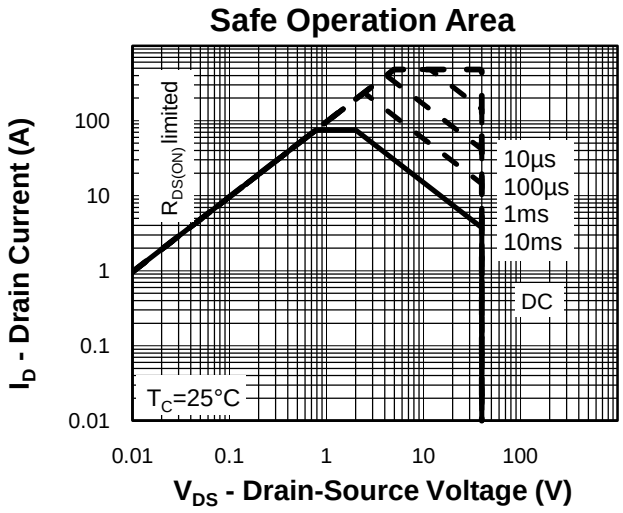
Ordering and Marking Information

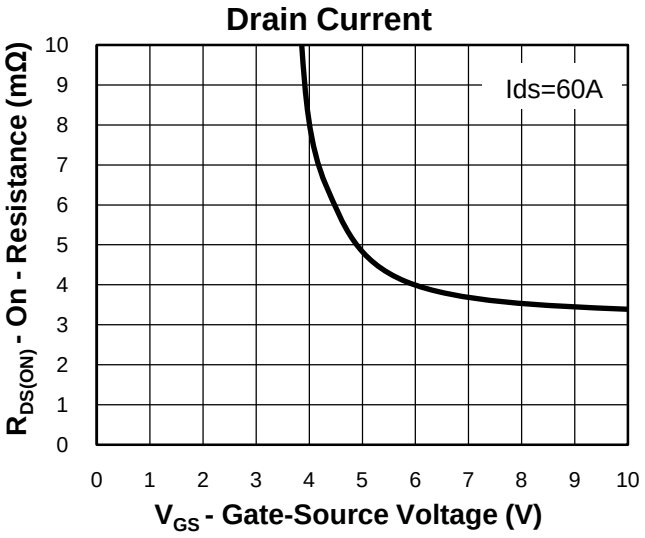
Device	Marking	Package	Packaging	Quantity	Reel Size	Tape width
RU40120S	RU40120S	TO263	Tube	50	-	-

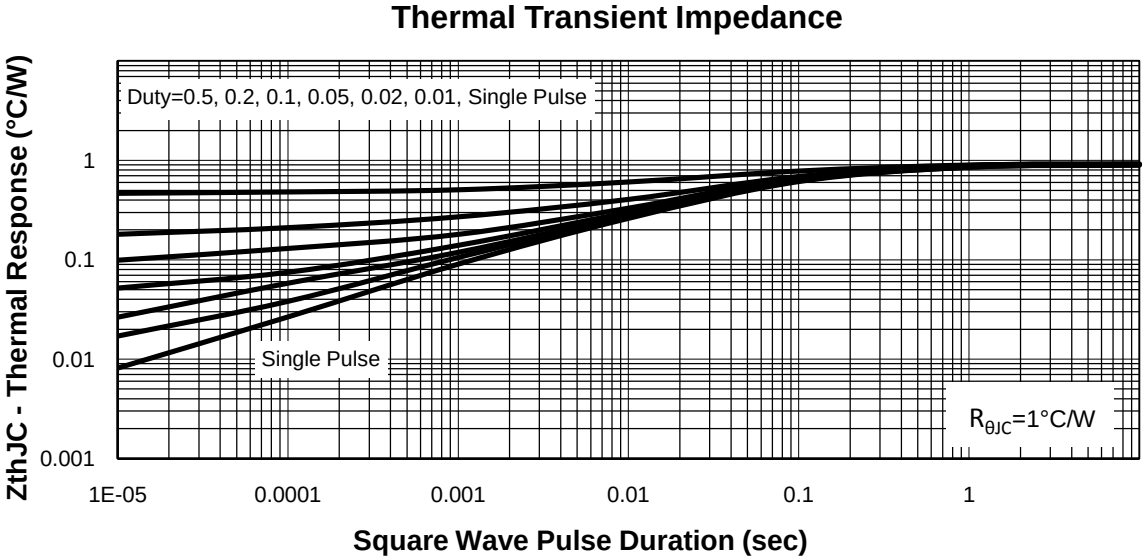
Typical Characteristics



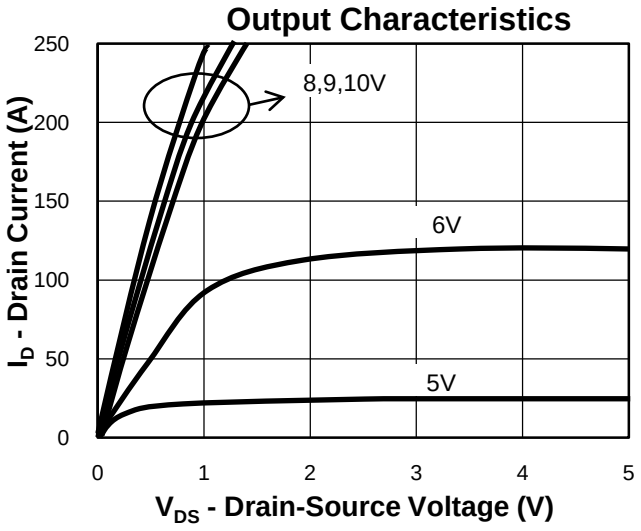


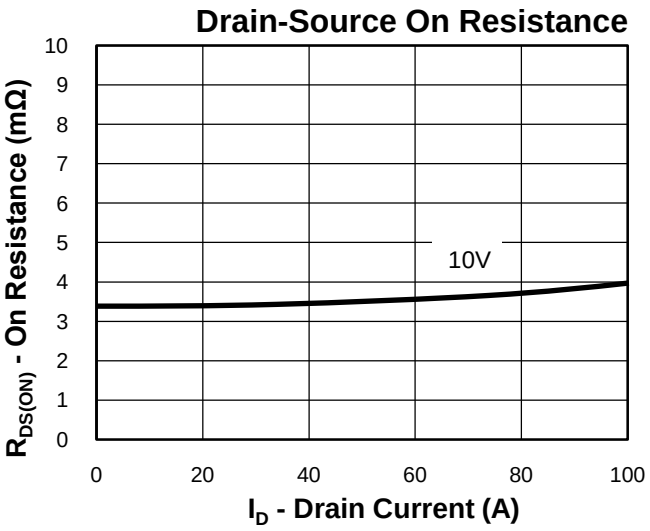


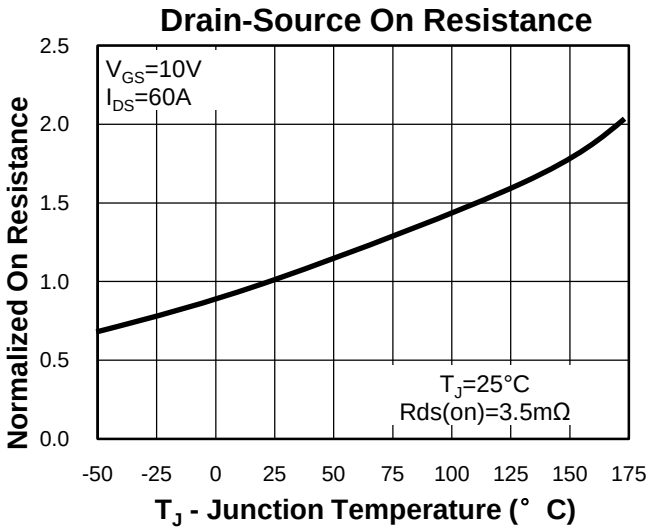


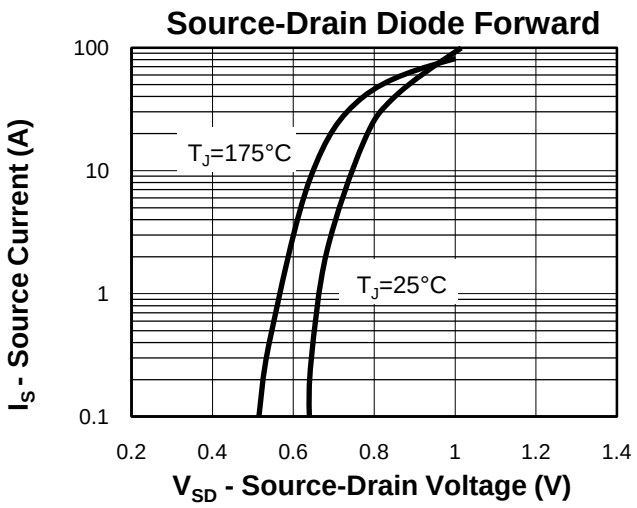


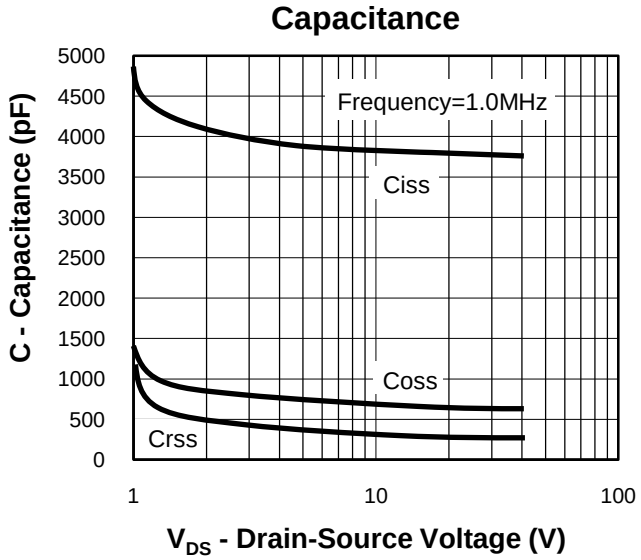
Typical Characteristics

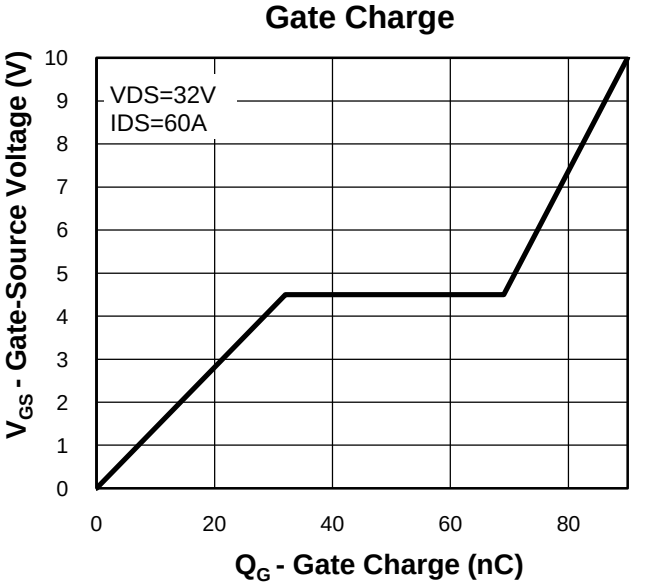




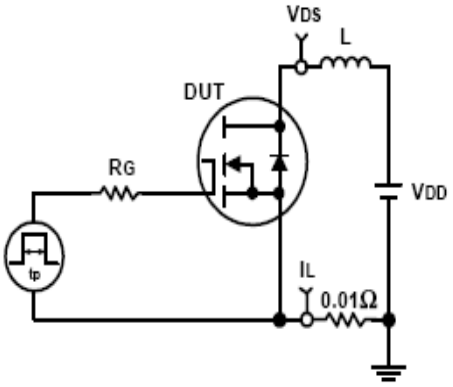


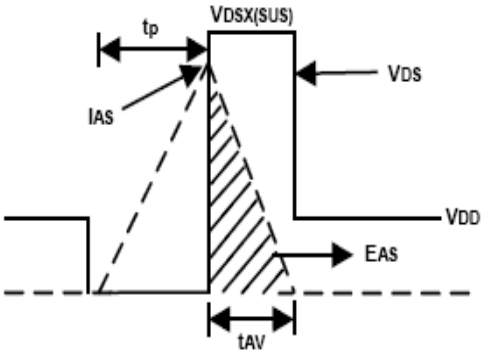




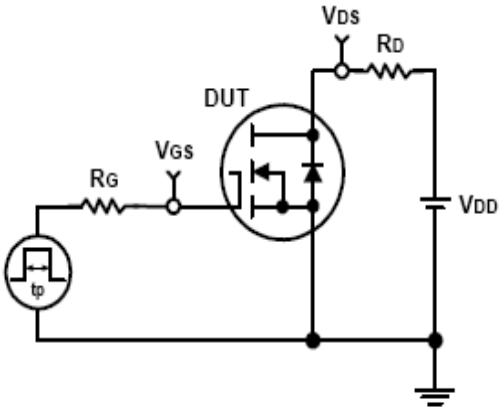


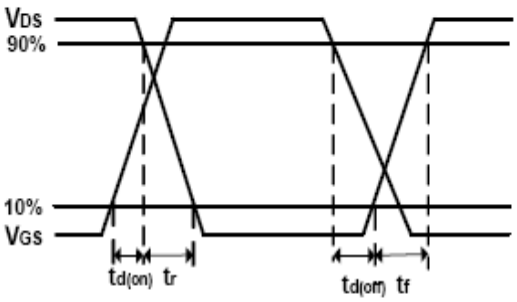
Avalanche Test Circuit and Waveforms





Switching Time Test Circuit and Waveforms





Package Information

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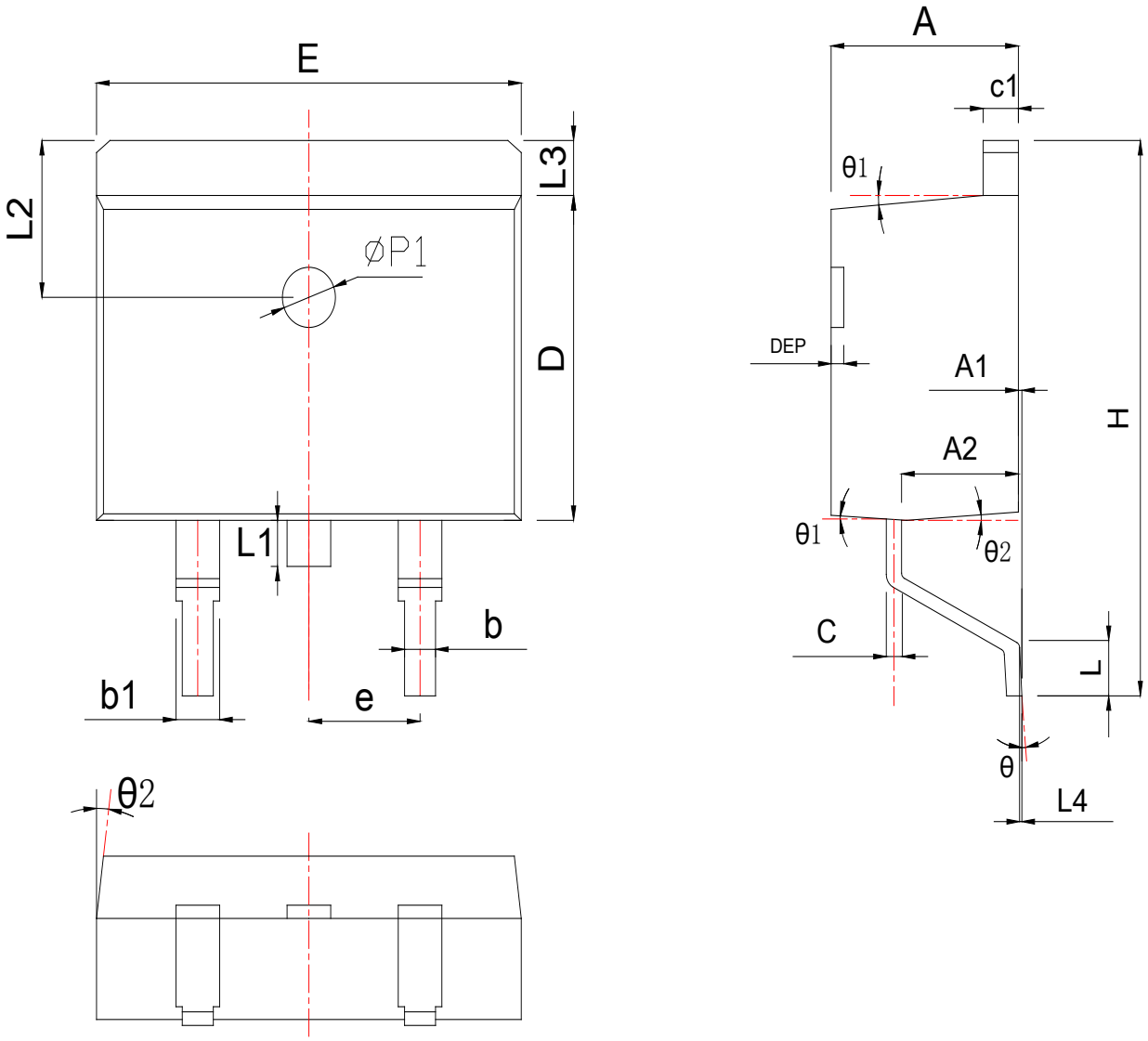

SYMBOL	MM			INCH			SYMBOL	MM			INCH		
	MIN	NOM	MAX	MIN	NOM	MAX		MIN	NOM	MAX	MIN	NOM	MAX
A	4.40	4.55	4.70	0.173	0.179	0.185	L	2.00	2.30	2.60	0.079	0.091	0.102
A1	0.00	0.10	0.25	0.000	0.005	0.010	L3	1.17	1.29	1.40	0.046	0.051	0.055
A2	2.59	2.69	2.79	0.102	0.106	0.110	L1	*	*	1.70	*	*	0.067
b	0.77	*	0.90	0.030		0.035	L4	0.25 BSC			0.01 BSC		
b1	1.23	*	1.36	0.048		0.054	L2	2.50 REF			0.098 REF		
c	0.34	*	0.47	0.013		0.019	θ	0°	*	8°	0°	*	8°
c1	1.22	*	1.32	0.048		0.052	θ1	5°	7°	9°	5°	7°	9°
D	8.60	8.70	8.80	0.339	0.343	0.346	θ2	1°	3°	5°	1°	3°	5°
E	10.00	10.13	10.26	0.394	0.399	0.404	DEP	0.05	0.10	0.20	0.002	0.004	0.008
e	2.54BSC			0.100BSC			Φp1	1.40	1.50	1.60	0.055	0.059	0.063
H	14.70	15.10	15.50	0.579	0.594	0.610							

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