

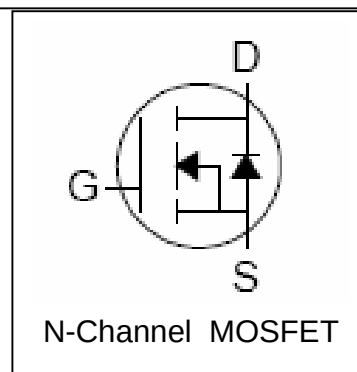
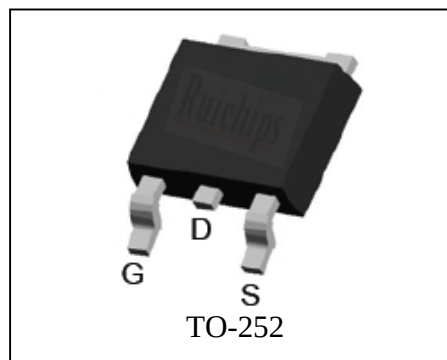
Features

- 40V/90A,
 $R_{DS(ON)} = 4m\Omega(\text{typ.}) @ V_{GS} = 10V$
- Super High Dense Cell Design
- Ultra Low On-Resistance
- 100% avalanche tested
- Lead Free and Green Devices Available
(RoHS Compliant)

Applications

- Motor Drivers
- Switch Systems

Pin Description



Absolute Maximum Ratings

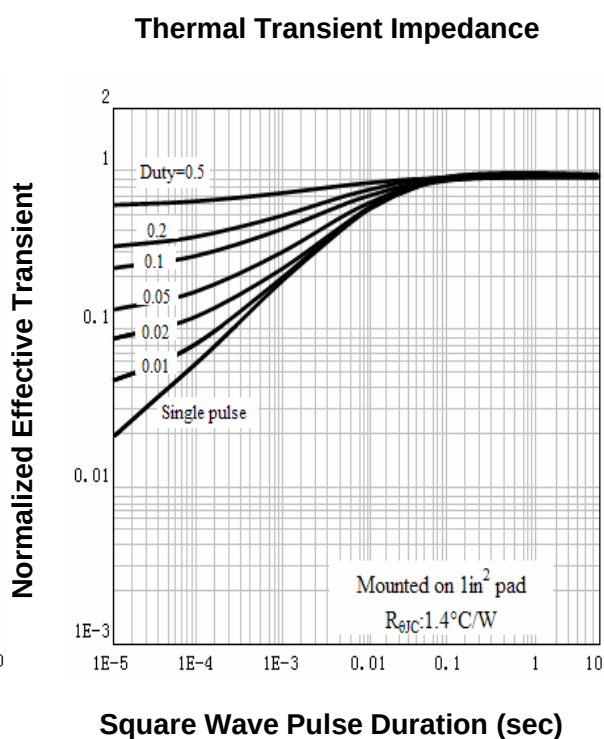
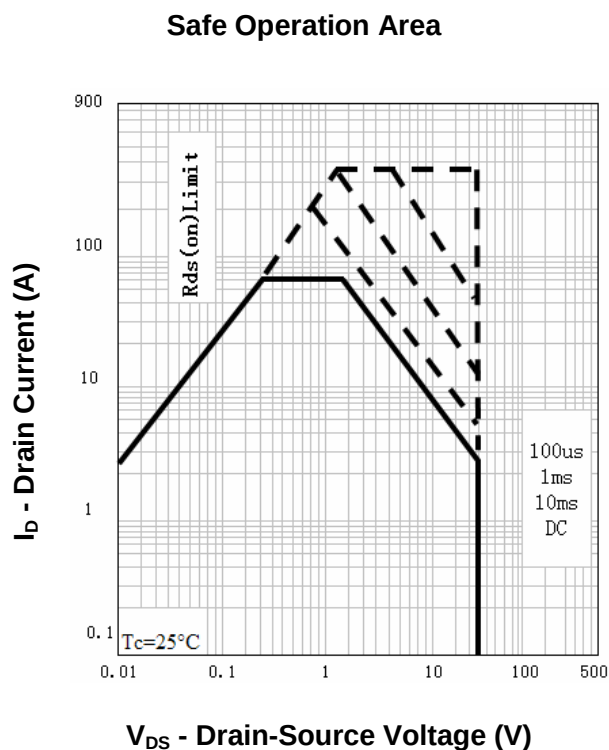
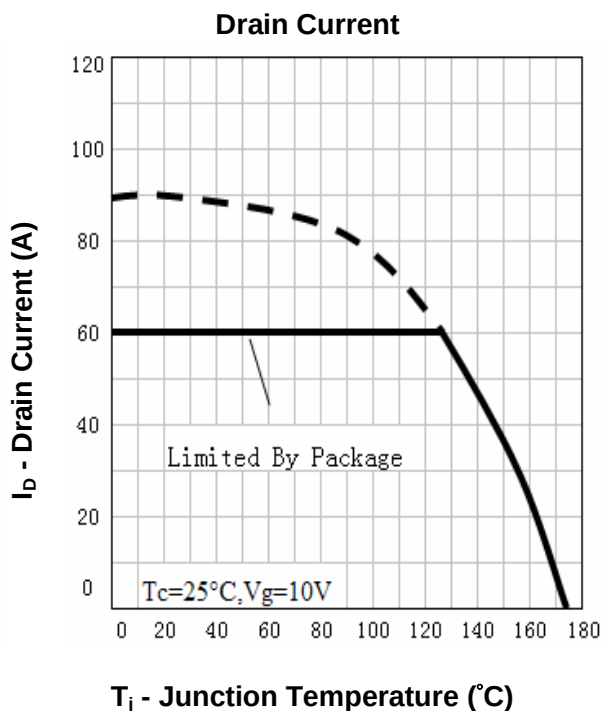
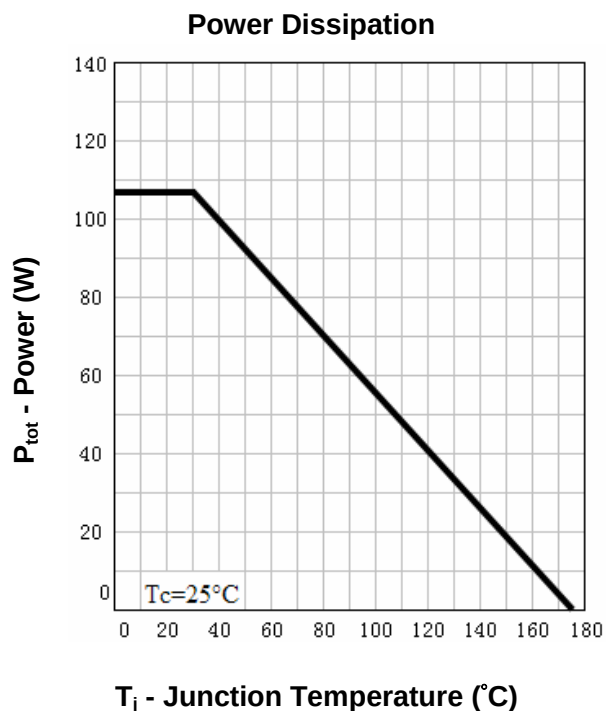
Symbol	Parameter		Rating	Unit
Common Ratings (T _C =25°C Unless Otherwise Noted)				
V _{DSS}	Drain-Source Voltage		40	V
V _{GSS}	Gate-Source Voltage		±20	
T _J	Maximum Junction Temperature		175	°C
T _{STG}	Storage Temperature Range		-55 to 175	°C
I _S	Diode Continuous Forward Current	T _C =25°C	90 ^①	A
Mounted on Large Heat Sink				
I _{DP}	300μs Pulse Drain Current Tested	T _C =25°C	360 ^②	A
I _D	Continuous Drain Current(V _{GS} =10V)	T _C =25°C	90 ^①	A
		T _C =100°C	73 ^①	
P _D	Maximum Power Dissipation	T _C =25°C	107	W
		T _C =100°C	53.5	W
R _{θJC}	Thermal Resistance-Junction to Case		1.4	°C/W
Drain-Source Avalanche Ratings				
E _{AS} ^③	Avalanche Energy, Single Pulsed		380	mJ

Electrical Characteristics ($T_C=25^{\circ}\text{C}$ Unless Otherwise Noted)

Symbol	Parameter	Test Condition	RU4090L			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 =85°C			30	
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =250μA	2	3	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} =45A		4	5	mΩ
Diode Characteristics						
V _{SD} ^④	Diode Forward Voltage	I _{SD} =45A, V _{GS} =0V			1.2	V
t _{rr}	Reverse Recovery Time	I _{SD} =45A, dI _{SD} /dt=100A/μs		39		ns
Q _{rr}	Reverse Recovery Charge			46		nC
Dynamic Characteristics ^⑤						
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		3250		pF
C _{oss}	Output Capacitance			360		
C _{rss}	Reverse Transfer Capacitance			195		
t _{d(ON)}	Turn-on Delay Time	V _{DD} =20V, R _L =0.5Ω, I _{DS} =45A, V _{GEN} =10V, R _G =4.7Ω		13		ns
t _r	Turn-on Rise Time			38		
t _{d(OFF)}	Turn-off Delay Time			54		
t _f	Turn-off Fall Time			21		
Gate Charge Characteristics ^⑤						
Q _g	Total Gate Charge	V _{DS} =32V, V _{GS} =10V, I _{DS} =45A		55		nC
Q _{gs}	Gate-Source Charge			11		
Q _{gd}	Gate-Drain Charge			18		

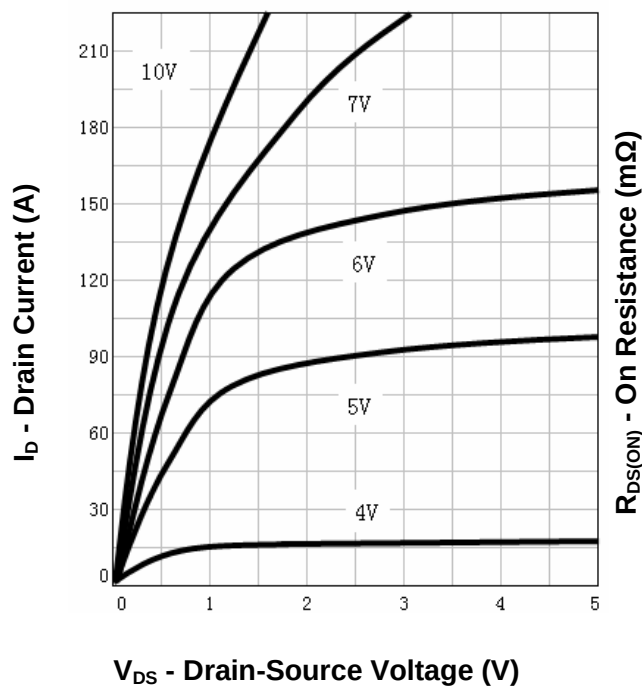
- Notes: ① Calculated continuous current based on maximum allowable junction temperature. Package limitation current is 60A.
 ② Pulse width limited by safe operating area.
 ③ Limited by $T_{Jmax}, I_{AS}=39A, V_{DD}=32V, R_G=50\Omega$, Starting $T_J=25^{\circ}\text{C}$.
 ④ Pulse test; Pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
 ⑤ Guaranteed by design, not subject to production testing.

Typical Characteristics

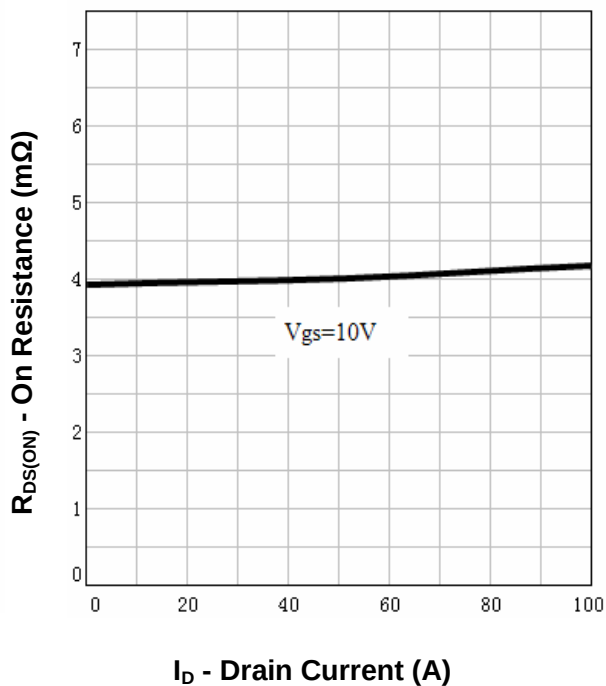


Typical Characteristics

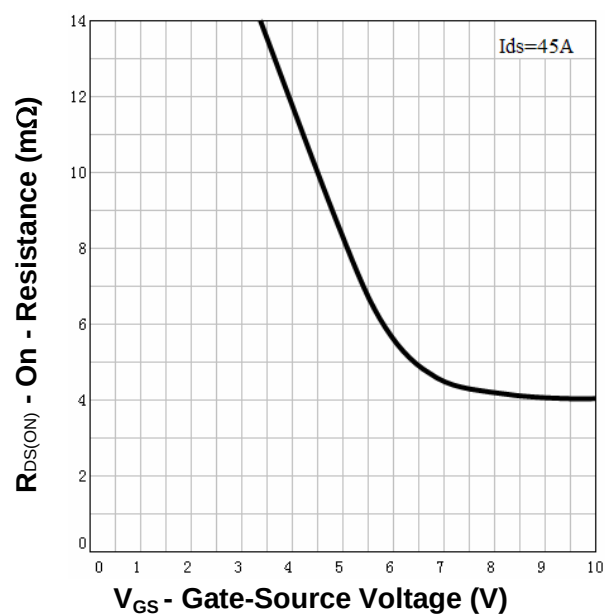
Output Characteristics



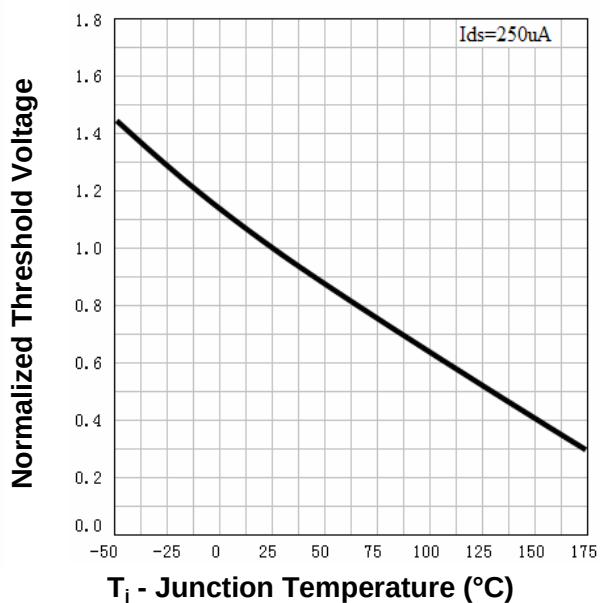
Drain-Source On Resistance



Drain-Source On Resistance

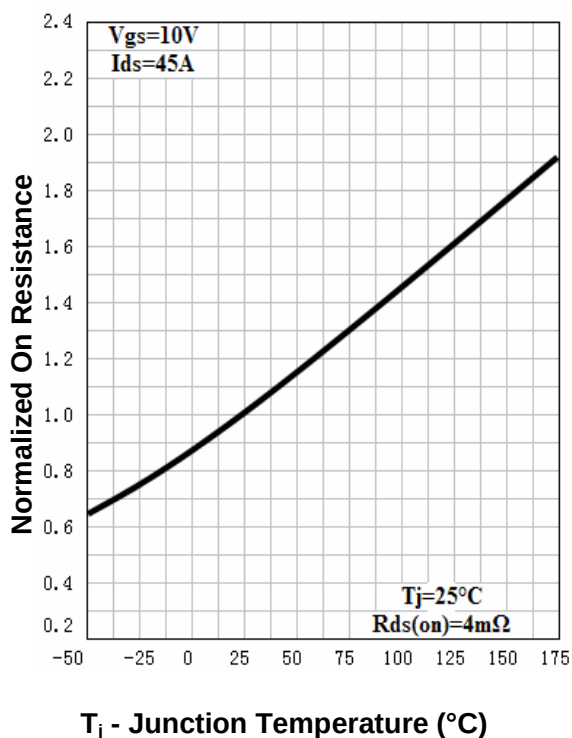


Gate Threshold Voltage

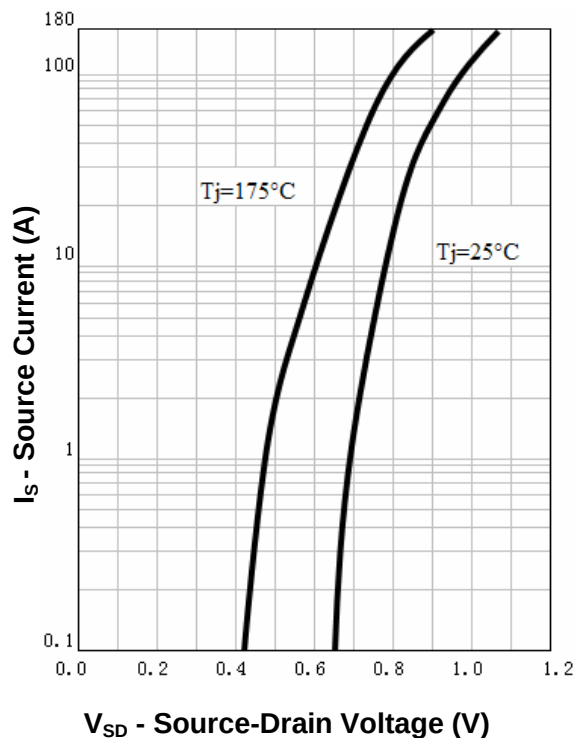


Typical Characteristics

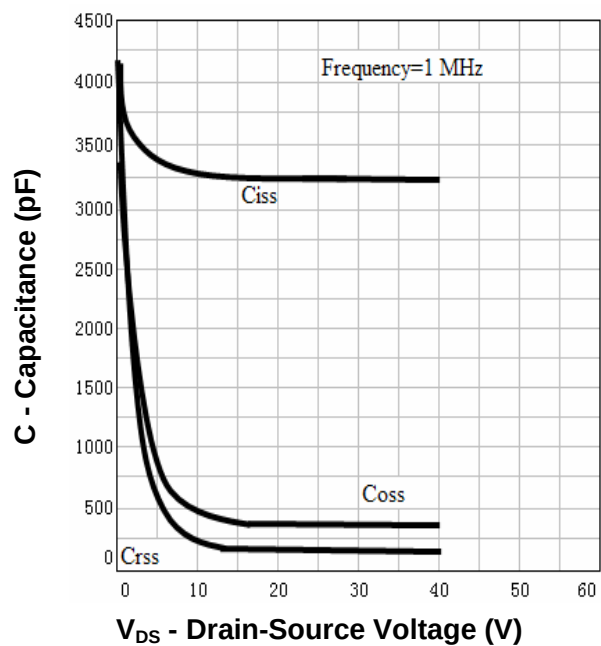
Drain-Source On Resistance



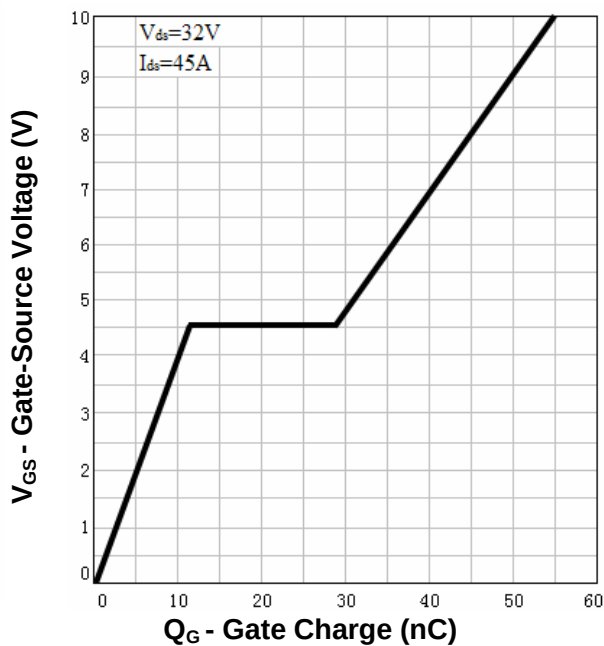
Source-Drain Diode Forward



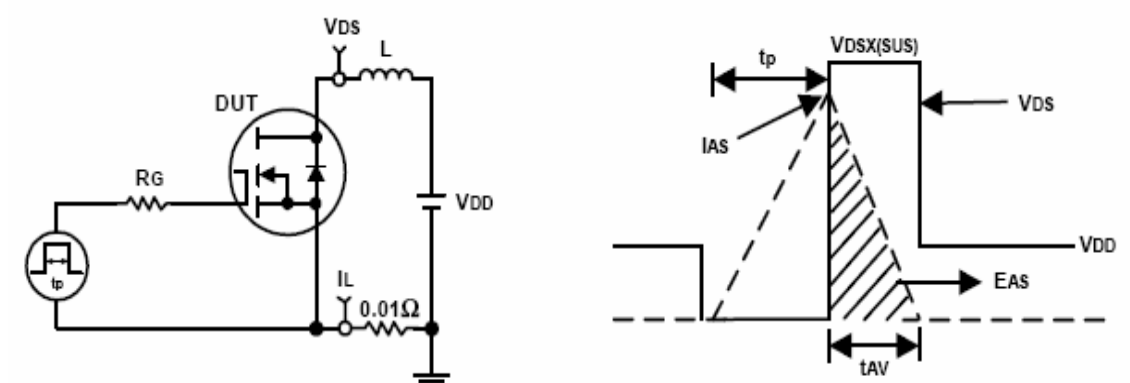
Capacitance



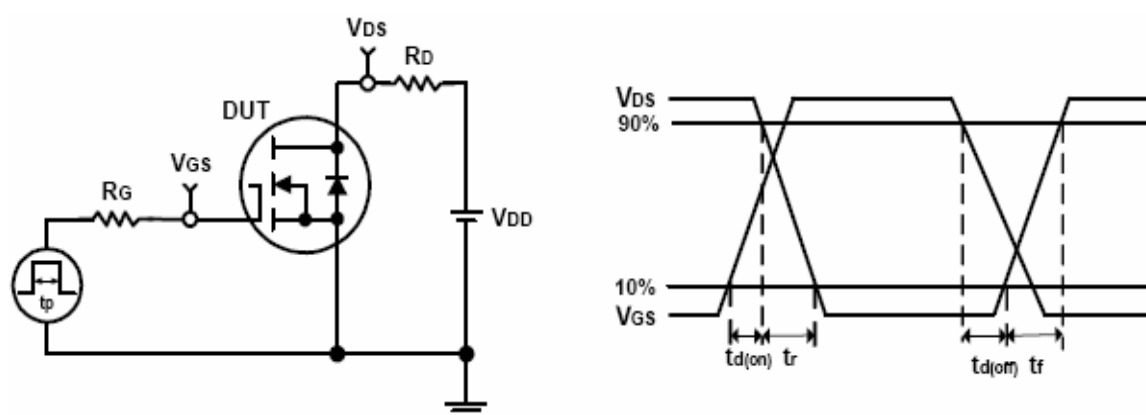
Gate Charge



Avalanche Test Circuit and Waveforms



Switching Time Test Circuit and Waveforms

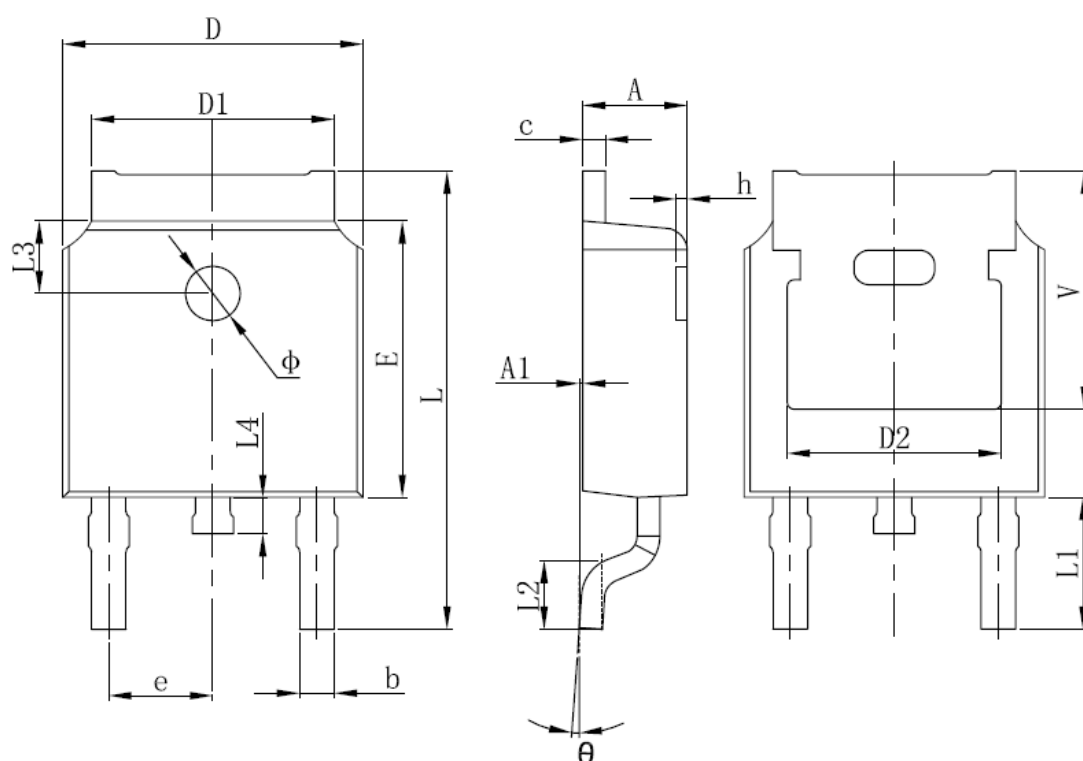


Ordering and Marking Information

Device	Marking	Package	Packaging	Quantity	Reel Size	Tape width
RU4090L	RU4090L	TO-252	Tape&Reel	2500	13''	16mm

Package Information

TO252-2L



SYMBOL	MM		INCH		SYMBOL	MM		INCH	
	MIN	MAX	MIN	MAX		MIN	MAX	MIN	MAX
A	2.200	2.400	0.087	0.094	L	9.800	10.400	0.386	0.409
A1	0.000	0.127	0.000	0.005	L1	2.900 REF.		0.114 REF.	
b	0.660	0.860	0.026	0.034	L2	1.400	1.700	0.055	0.067
C	0.460	0.580	0.018	0.023	L3	1.600 REF.		0.063 REF.	
D	6.500	6.700	0.256	0.264	L4	0.600	1.000	0.024	0.039
D1	5.100	5.460	0.201	0.215	Φ	1.100	1.300	0.043	0.051
D2	4.830 REF.		0.190 REF.		θ	0°	8°	0°	8°
E	6.000	6.200	0.236	0.244	h	0.000	0.300	0.000	0.012
e	2.186	2.386	0.086	0.094	V	5.350 REF.		0.211 REF.	

ALL DIMENSIONS REFER TO JEDEC STANDARD
DO NOT INCLUDE MOLD FLASH OR PROTRUSIONS

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