RUH3051L

N-Channel Advanced Power MOSFET

Features

- 30V/50A

$R_{DS\ (ON)}$ =4.8mΩ(Typ.)@VGS=10V

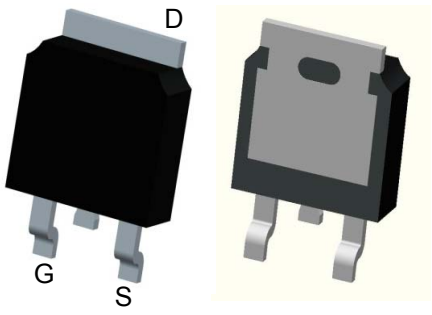
$R_{DS\ (ON)}$ =6.8mΩ(Typ.)@VGS=4.5V

- Super High Dense Cell Design
- Ultra Low On-Resistance
- Fast Switching Speed
- 100% avalanche tested
- Lead Free and Green Devices Available (RoHS Compliant)

Applications

- DC/DC Converters
- On board power for server
- Synchronous rectification

Pin Description



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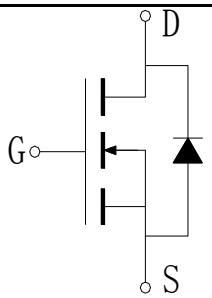


N-Channel MOSFET

Absolute Maximum Ratings

Symbol	Parameter		Rating	Unit
Common Ratings (T_C=25°C Unless Otherwise Noted)				
V_{DSS}	Drain-Source Voltage		30	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	50	A
Mounted on Large Heat Sink				
I_{DP} ①	300μs Pulse Drain Current Tested	T_C=25°C	200	A
I_D ②	Continuous Drain Current(V_{GS}=10V)	T_C=25°C	50	A
		T_C=100°C	35	
P_D	Maximum Power Dissipation	T_C=25°C	51	W
		T_C=100°C	25	
$R_{\theta JC}$	Thermal Resistance-Junction to Case		2.92	°C/W
$R_{\theta JA}$	Thermal Resistance-Junction to Ambient		100	°C/W
Drain-Source Avalanche Ratings				
E_{AS} ③	Avalanche Energy, Single Pulsed		81	mJ

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

Symbol	Parameter	Test Condition	RUH3051L			Unit
			Min.	Typ.	Max.	
Static Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_{DS}=250μA	30			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=30V, V_{GS}=0V			1	μA
		T_J=125°C			30	
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_{DS}=250μA	1		3	V
I_{GSS}	Gate Leakage Current	V_{GS}=±20V, V_{DS}=0V			±100	nA
$R_{DS(ON)}$ ③	Drain-Source On-state Resistance	V_{GS}=4.5V, I_{DS}=35A		6.8	8	mΩ
		V_{GS}=10V, I_{DS}=50A		4.8	5.5	mΩ
Diode Characteristics						
V_{SD} ③	Diode Forward Voltage	I_{SD}=50A, V_{GS}=0V			1.2	V
t_{rr}	Reverse Recovery Time	I_{SD}=50A, dI_{SD}/dt=100A/μs		9		ns
Q_{rr}	Reverse Recovery Charge			15		nC
Dynamic Characteristics ⑤						
R_G	Gate Resistance	V_{GS}=0V,V_{DS}=0V,F=1MHz		1.3		Ω
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=15V, Frequency=1.0MHz		580		pF
C_{oss}	Output Capacitance			130		
C_{rss}	Reverse Transfer Capacitance			65		
$t_{d(ON)}$	Turn-on Delay Time	V_{DD}=15V,I_{DS}=50A, V_{GEN}=10V,R_G=4.7Ω		6		ns
t_r	Turn-on Rise Time			12		
$t_{d(OFF)}$	Turn-off Delay Time			16		
t_f	Turn-off Fall Time			5		
Gate Charge Characteristics ⑤						
Q_g	Total Gate Charge	V_{DS}=24V, V_{GS}=10V, I_{DS}=50A		14		nC
Q_{gs}	Gate-Source Charge			4		
Q_{gd}	Gate-Drain Charge			5		

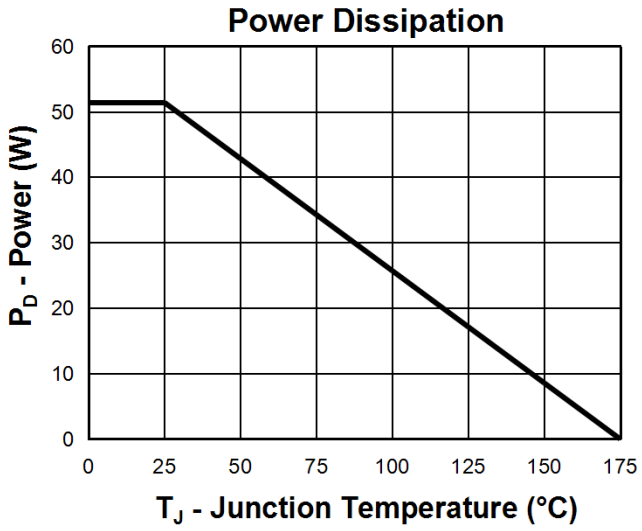
Notes:

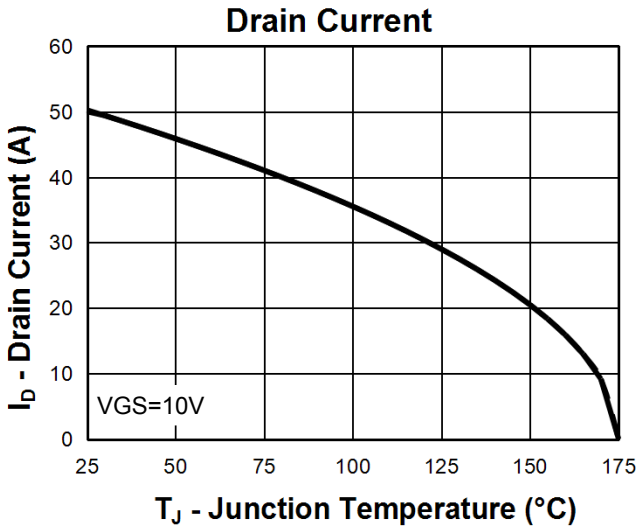
①Pulse width limited by safe operating area.
②Limited by TJmax, IAS =18A, VDD = 24V, RG = 50Ω , Starting TJ = 25° C.
③Pulse test ; Pulse width300s, duty cycle2%.
④Guaranteed by design, not subject to production testing.

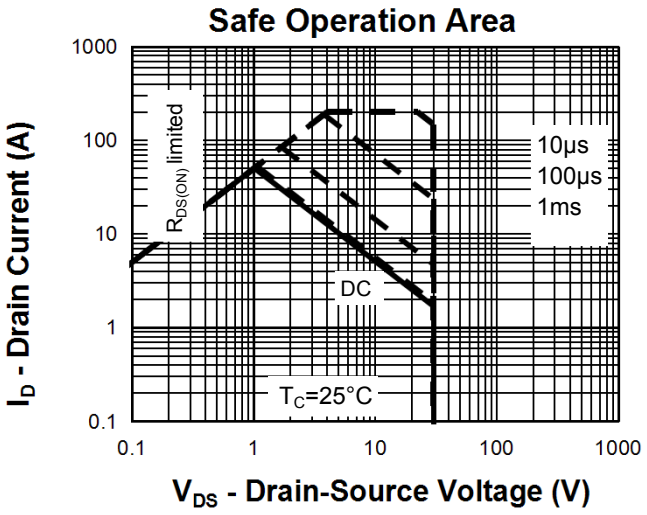
Ordering and Marking Information

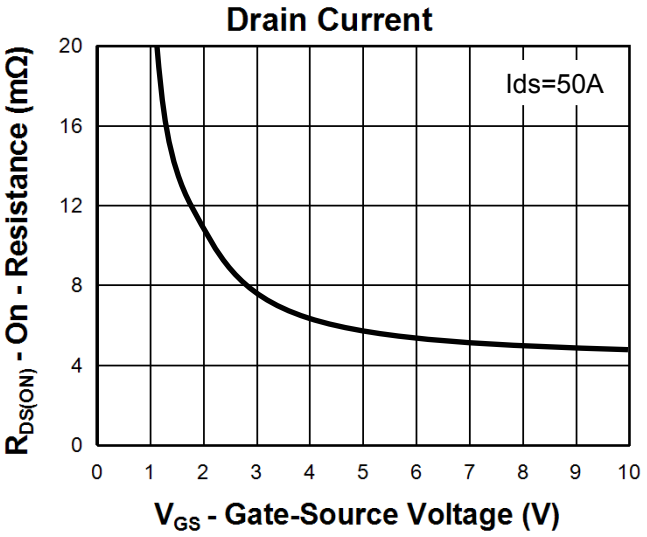
Device	Marking	Package	Packaging	Quantity	Reel Size	Tape width
RUH3051L	RUH3051L	TO252	Tape&Reel	2500	13"	16mm

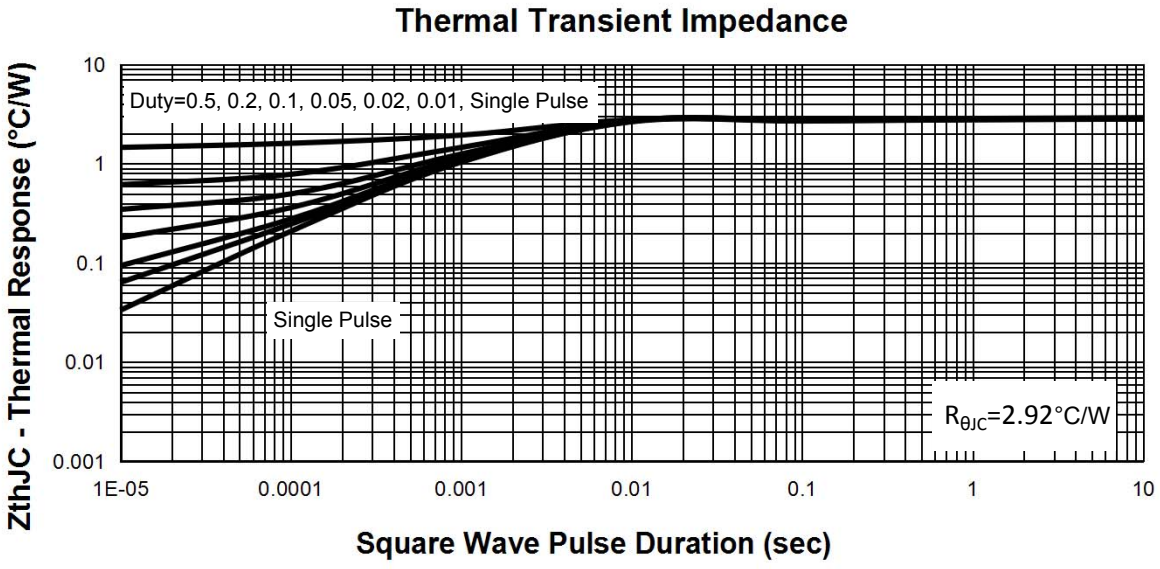
Typical Characteristics











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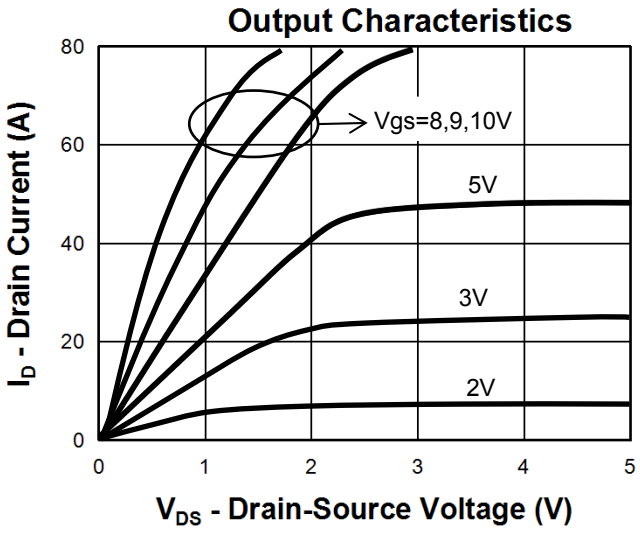
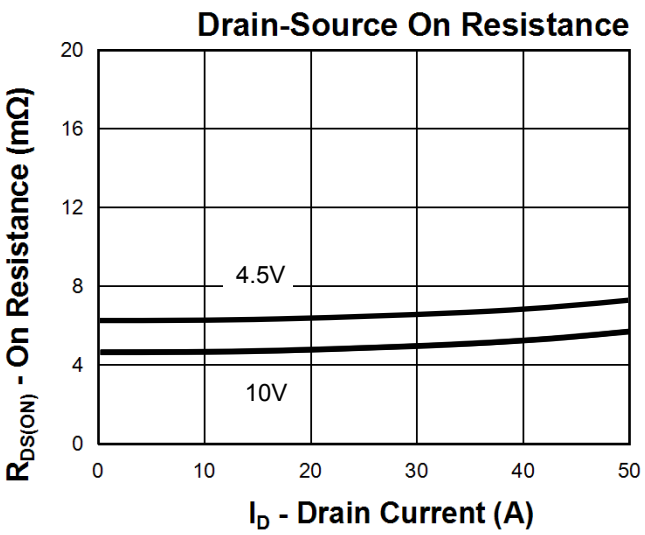
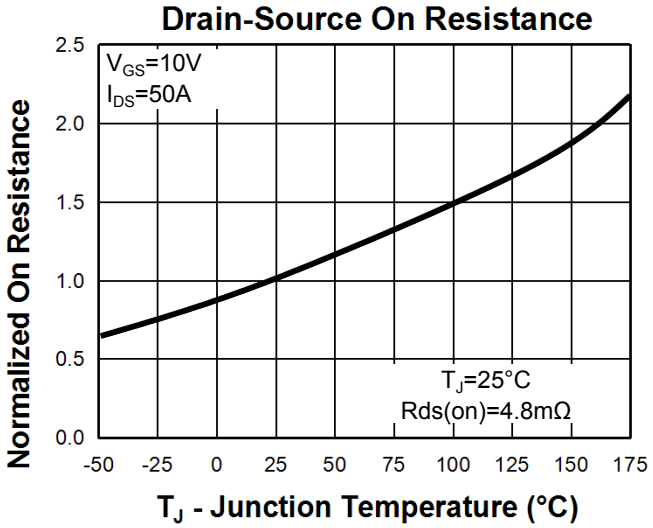
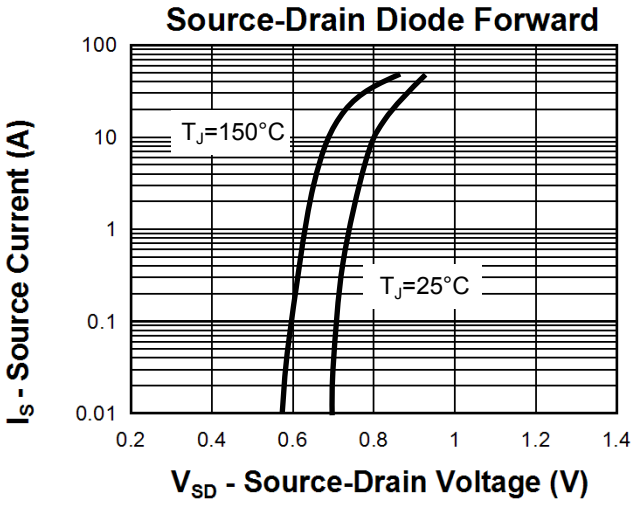
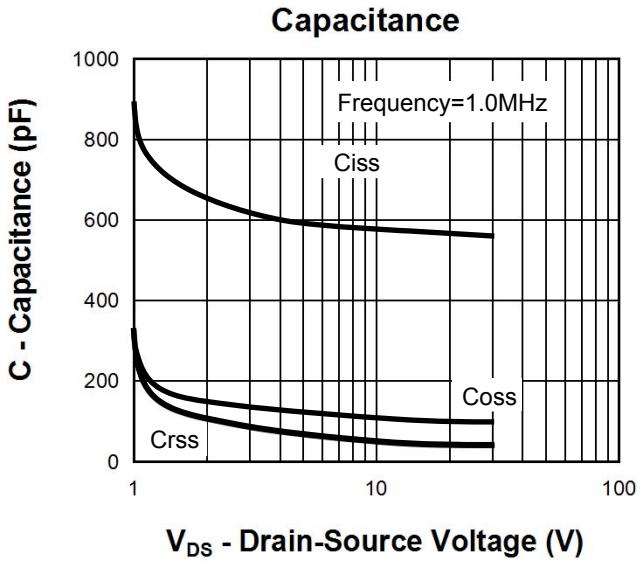
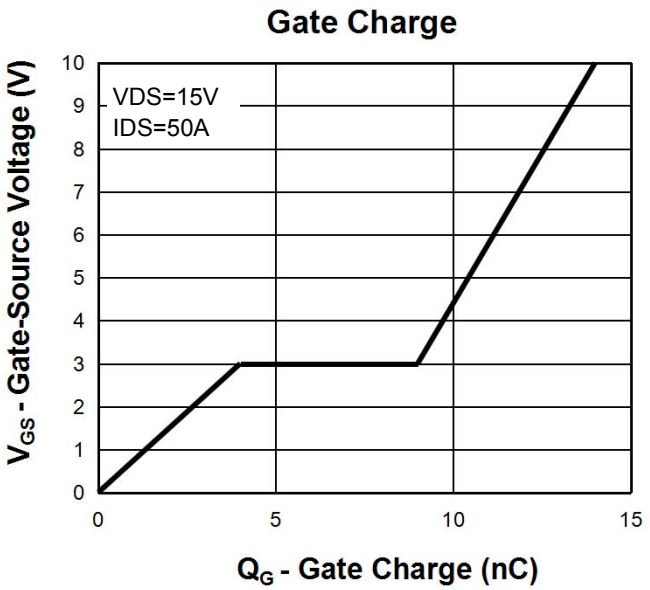




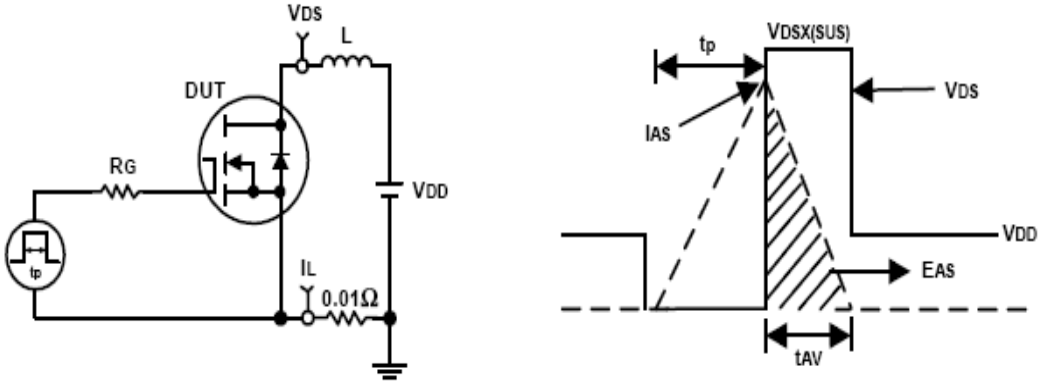




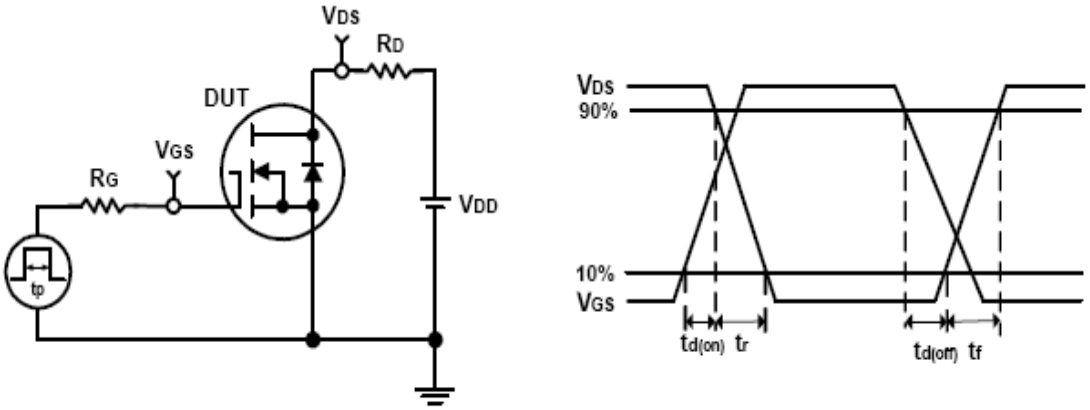




Avalanche Test Circuit and Waveforms

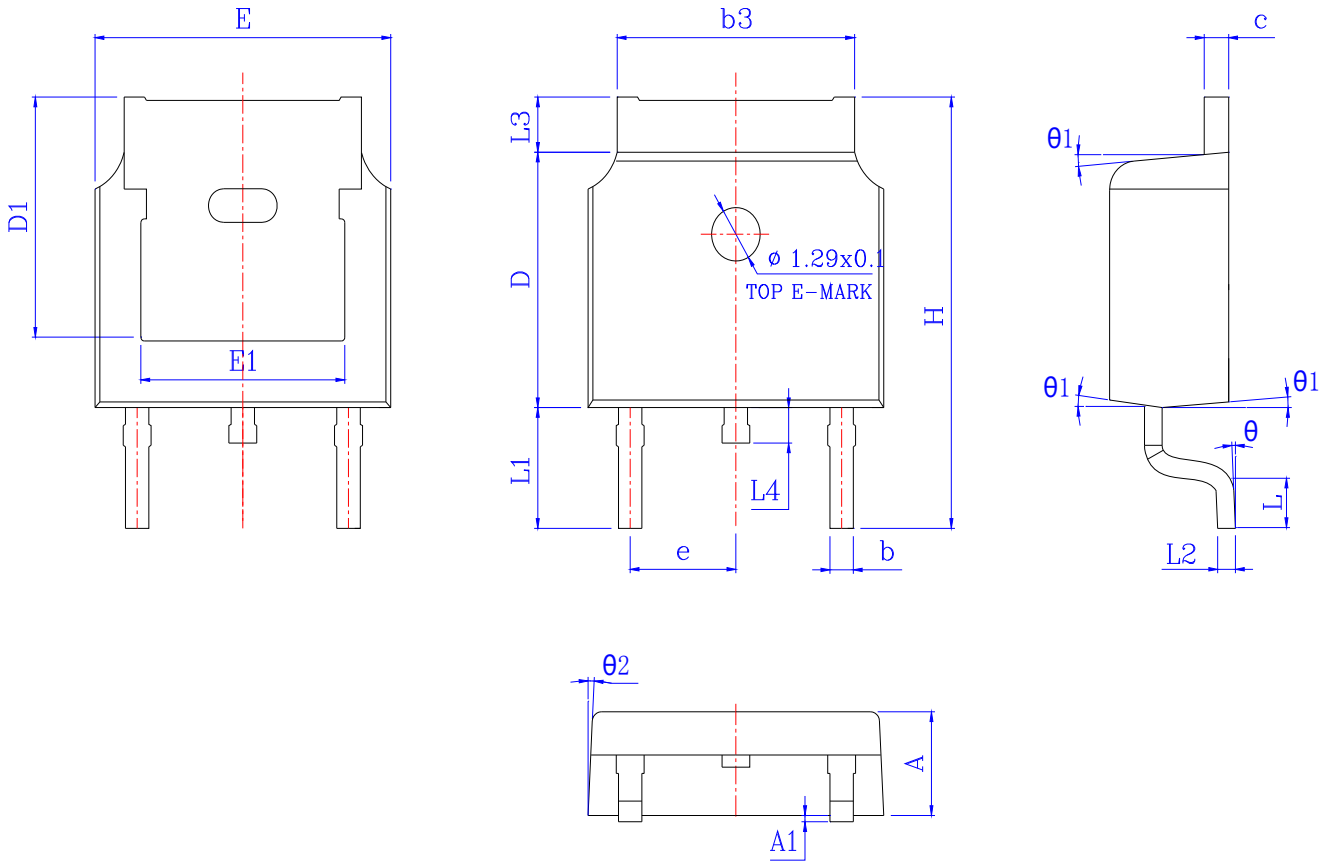


Switching Time Test Circuit and Waveforms



Package Information

TO252



SYMBOL	MM			INCH		
	MIN	NOM	MAX	MIN	NOM	MAX
A	2.200	2.300	2.400	0.087	0.091	0.094
A1	*	*	0.100	*	*	0.004
b	0.660	0.760	0.860	0.026	0.030	0.034
b3	5.130	5.295	5.460	0.202	0.208	0.215
c	0.470	0.535	0.600	0.019	0.021	0.024
D	6.000	6.100	6.200	0.236	0.240	0.244
D1		5.30 REF			0.20 REF	
E	6.500	6.600	6.700	0.256	0.260	0.264
E1	4.700	4.810	4.920	0.185	0.189	0.194
e		2.28 REF			0.09 REF	
H	9.800	10.100	10.400	0.386	0.398	0.409
L	1.400	1.550	1.700	0.055	0.061	0.067
L1		2.743 REF			0.108 REF	
L2		0.510 BSC			0.020 BSC	
L3	0.900	1.075	1.250	0.035	0.042	0.049
L4	0.600	0.800	1.000	0.024	0.031	0.039
θ	0°	*	8°	0°	*	8°
θ1	5°	7°	9°	5°	7°	9°
θ2	5°	7°	9°	5°	7°	9°

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