

## Description

### N-channel Enhancement Mode Power MOSFET

#### Features

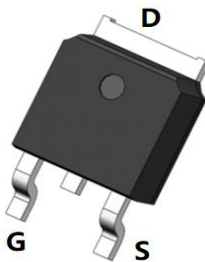
- 30V, 100A  
 $R_{DS(ON)} < 4.4m\Omega @ V_{GS} = 10V$   
 $R_{DS(ON)} < 6.5m\Omega @ V_{GS} = 4.5V$
- Advanced Trench Technology
- Excellent  $R_{DS(ON)}$  and Low Gate Charge

#### Applications

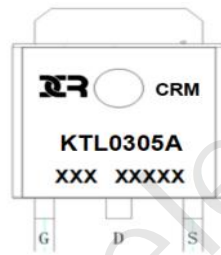
- Load Switch
- PWM Application
- Power Management



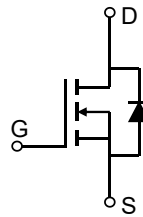
*100% UIS TESTED!*  
*100%  $\Delta V_{ds}$  TESTED!*



TO-252-3L



Marking and Pin Assignment



Schematic Diagram

### Package Marking and Ordering Information

Device Marking	Device	Outline	Package	Reel Size	Reel(pcs)	Per Carton (pcs)
CRMKTL0305A	CRMKTL0305A	TAPING	TO-252-3L	13"	2500	25000

### Absolute Maximum Ratings (@ $T_C = 25^\circ C$ unless otherwise specified)

Symbol	Parameter	Value	Units
$V_{DS}$	Drain-to-Source Voltage	30	V
$V_{GS}$	Gate-to-Source Voltage	$\pm 20$	V
$I_D$	Continuous Drain Current	$T_C = 25^\circ C$	A
		$T_C = 100^\circ C$	
$I_{DM}$	Pulsed Drain Current <sup>(1)</sup>	400	A
$E_{AS}$	Single Pulsed Avalanche Energy <sup>(2)</sup>	110	mJ
$P_D$	Power Dissipation	$T_C = 25^\circ C$	W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient <sup>(3)</sup>	33	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance, Junction to Case	2.4	
$T_J, T_{STG}$	Junction & Storage Temperature Range	-55 to 150	$^\circ C$



## Electrical Characteristics ( $T_J = 25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
V <sub>(BR)DSS</sub>	Drain-Source Breakdown Voltage	I <sub>D</sub> = 250μA, V <sub>GS</sub> = 0V	30	-	-	V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> = 30V, V <sub>GS</sub> = 0V	-	-	1.0	μA
I <sub>GSS</sub>	Gate-Body Leakage Current	V <sub>DS</sub> = 0V, V <sub>GS</sub> = ±20V	-	-	±100	nA
On Characteristics						
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA	1.0	1.6	2.1	V
R <sub>DS(ON)</sub>	Static Drain-Source ON-Resistance <sup>(4)</sup>	V <sub>GS</sub> = 10V, I <sub>D</sub> = 30A	-	3.4	4.4	mΩ
		V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 20A	-	5.0	6.5	mΩ
Dynamic Characteristics						
C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> = 0V, V <sub>DS</sub> = 15V, f = 1MHz	-	2180	-	pF
C <sub>oss</sub>	Output Capacitance		-	290	-	pF
C <sub>rss</sub>	Reverse Transfer Capacitance		-	250	-	pF
Q <sub>g</sub>	Total Gate Charge	V <sub>GS</sub> = 0 to 10V V <sub>DS</sub> = 15V, I <sub>D</sub> = 30A	-	42	-	nC
Q <sub>gs</sub>	Gate Source Charge		-	9	-	nC
Q <sub>gd</sub>	Gate Drain("Miller") Charge		-	10	-	nC
Switching Characteristics						
t <sub>d(on)</sub>	Turn-On DelayTime	V <sub>GS</sub> = 10V, V <sub>DD</sub> = 15V I <sub>D</sub> = 30A, R <sub>GEN</sub> = 3Ω	-	9	-	ns
t <sub>r</sub>	Turn-On Rise Time		-	15	-	ns
t <sub>d(off)</sub>	Turn-Off DelayTime		-	36	-	ns
t <sub>f</sub>	Turn-Off Fall Time		-	11	-	ns
Drain-Source Diode Characteristics and Max Ratings						
I <sub>S</sub>	Maximum Continuous Drain to Source Diode Forward Current		-	-	100	A
I <sub>SM</sub>	Maximum Pulsed Drain to Source Diode Forward Current		-	-	400	A
V <sub>SD</sub>	Drain to Source Diode Forward Voltage	V <sub>GS</sub> = 0V, I <sub>S</sub> = 30A	-	-	1.2	V
trr	Body Diode Reverse Recovery Time	I <sub>F</sub> = 20A, di/dt = 100A/us	-	11	-	ns
Qrr	Body Diode Reverse Recovery Charge		-	2.5	-	nC

- Notes:
1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.
  2.  $E_{AS}$  condition: Starting  $T_J = 25^\circ\text{C}$ ,  $V_{DD} = 15\text{V}$ ,  $V_G = 10\text{V}$ ,  $R_G = 25\text{ohm}$ ,  $L = 0.5\text{mH}$ ,  $I_{AS} = 21\text{A}$
  3.  $R_{\theta JA}$  is measured with the device mounted on a 1inch<sup>2</sup> pad of 2oz copper FR4 PCB
  4. Pulse Test: Pulse Width  $\leq 300\mu\text{s}$ , Duty Cycle  $\leq 0.5\%$ .

## Typical Performance Characteristics

Figure 1: Output Characteristics

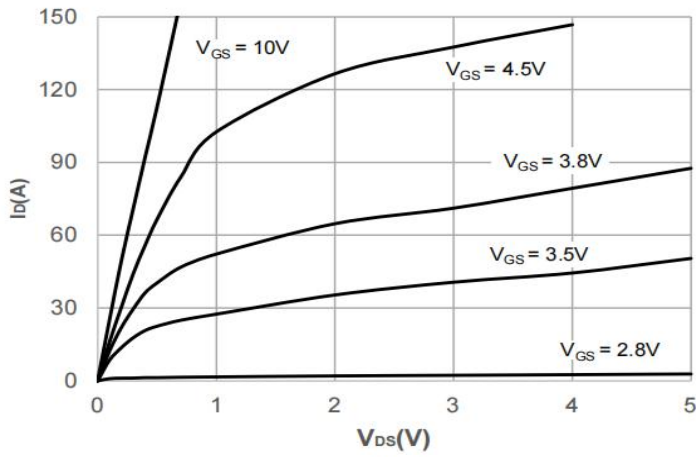


Figure 2: Typical Transfer Characteristics

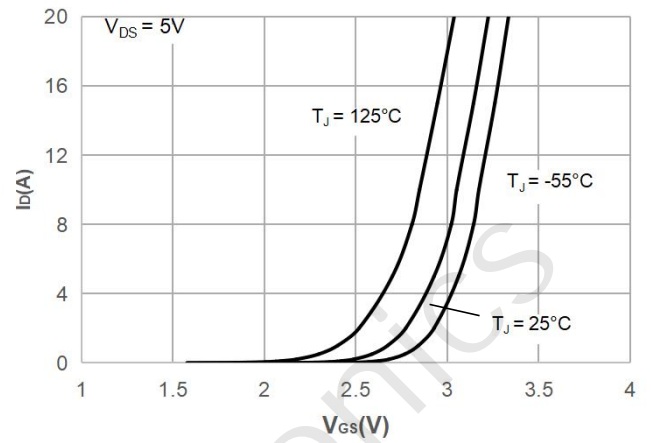


Figure 3: On-resistance vs. Drain Current

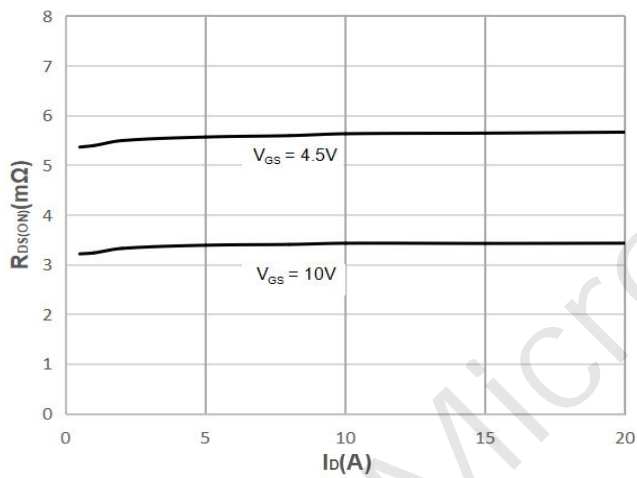


Figure 4: Body Diode Characteristics

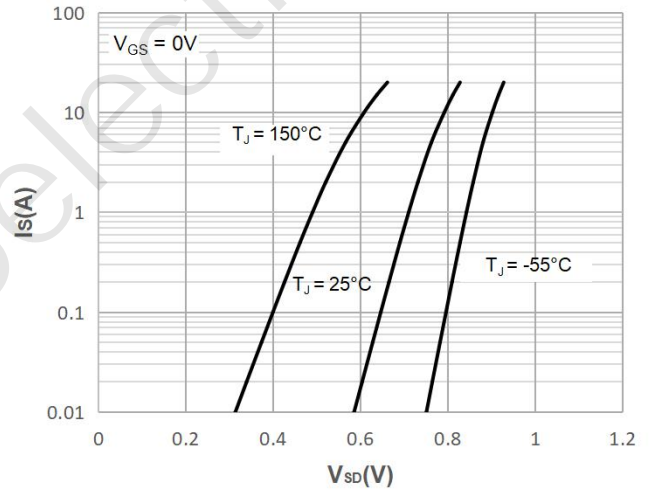


Figure 5: Gate Charge Characteristics

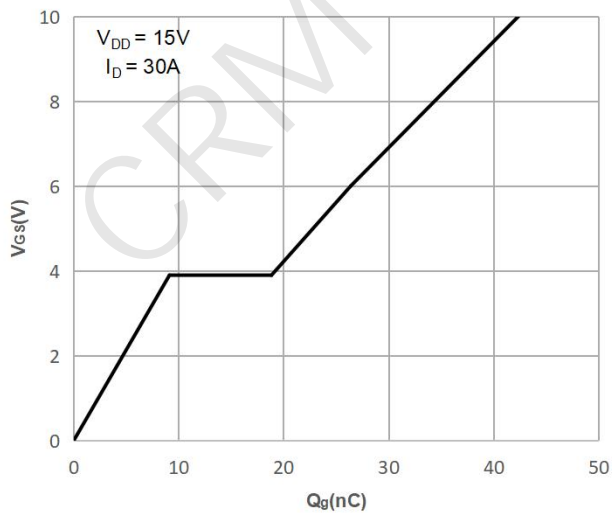
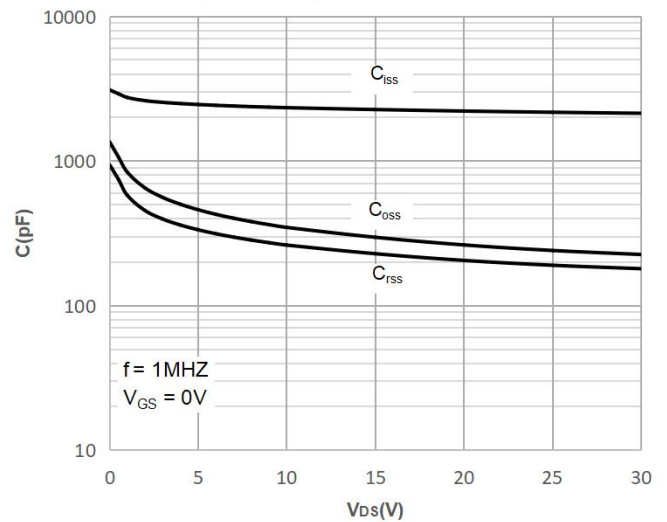


Figure 6: Capacitance Characteristics



## Typical Performance Characteristics

Figure 7: Normalized Breakdown voltage vs. Junction Temperature

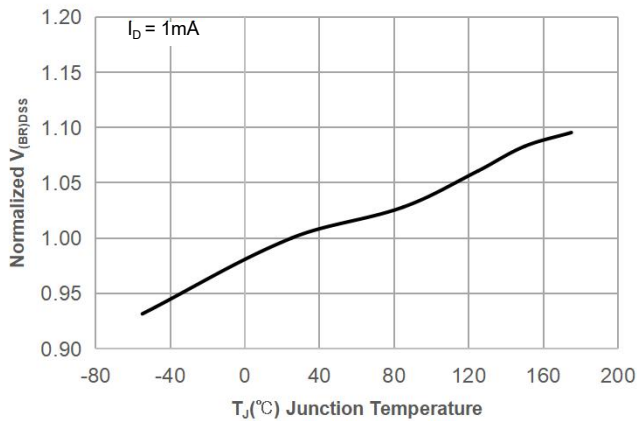


Figure 8: Normalized on Resistance vs. Junction Temperature

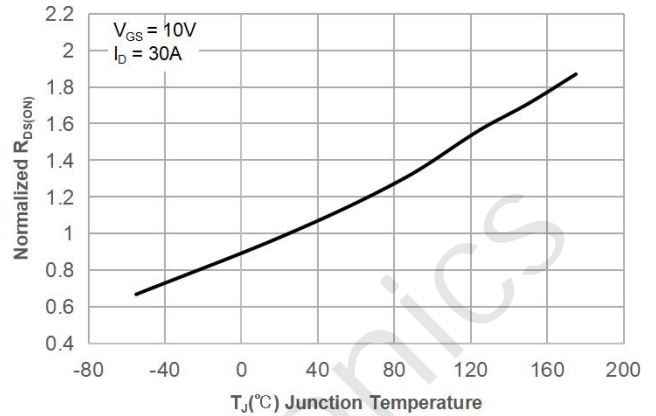


Figure 9: Maximum Safe Operating Area

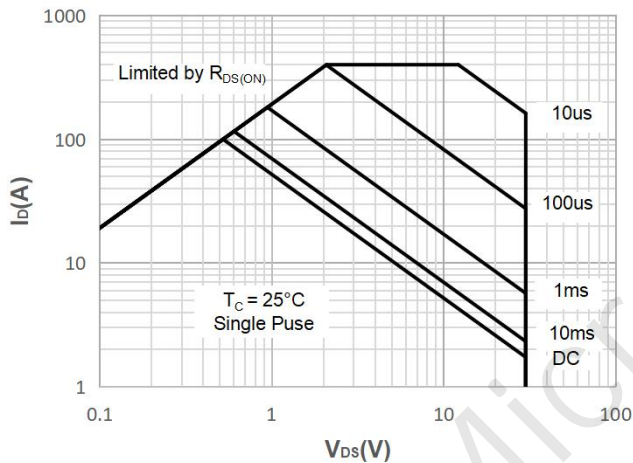


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

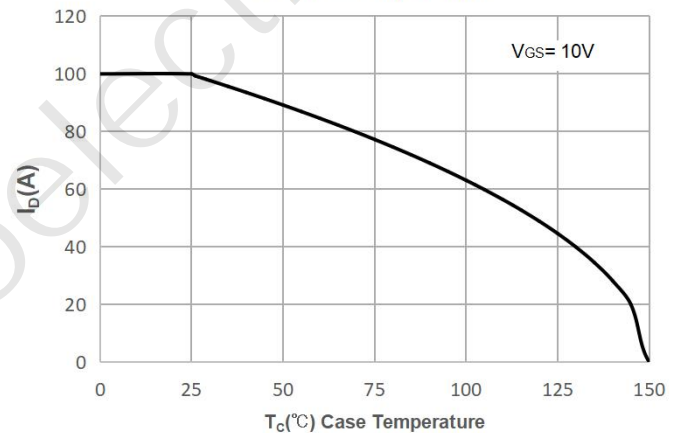


Figure 11: Normalized Maximum Transient Thermal Impedance

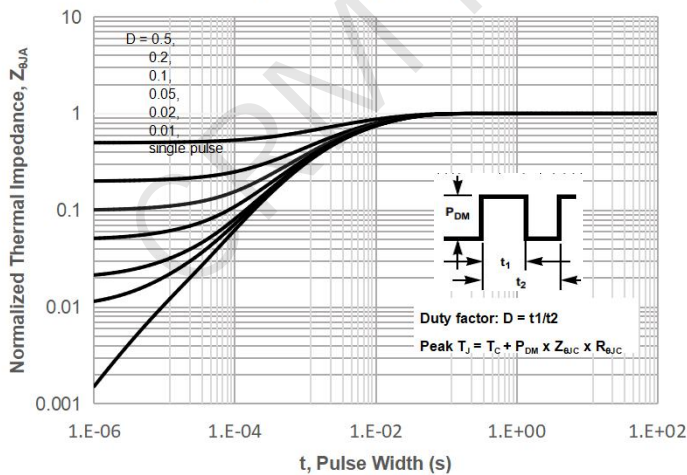
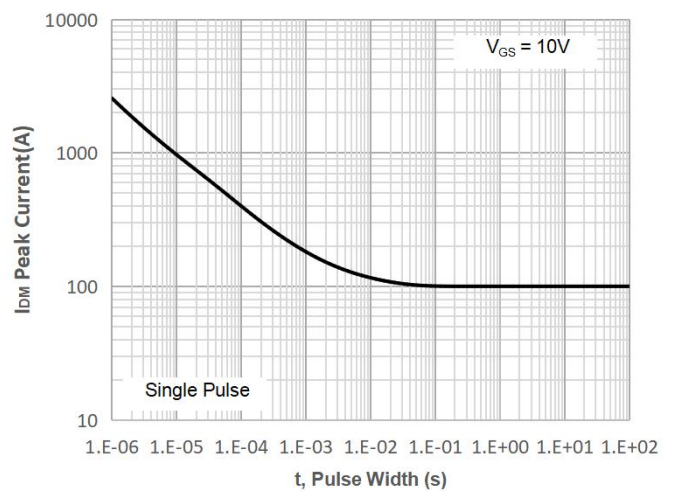
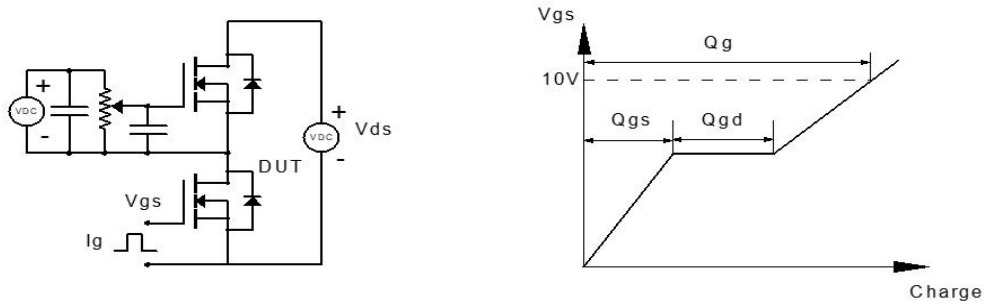


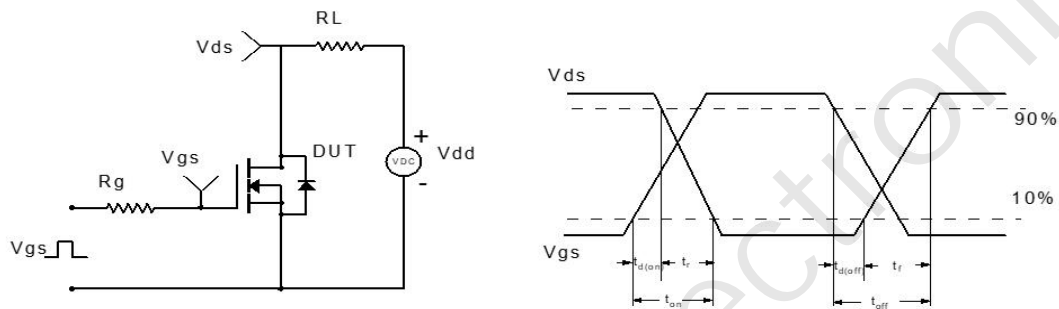
Figure 12: Peak Current Capacity



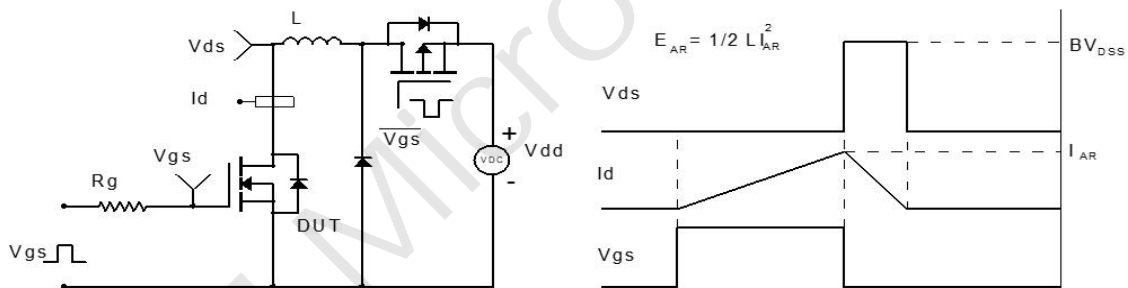
## Test Circuit



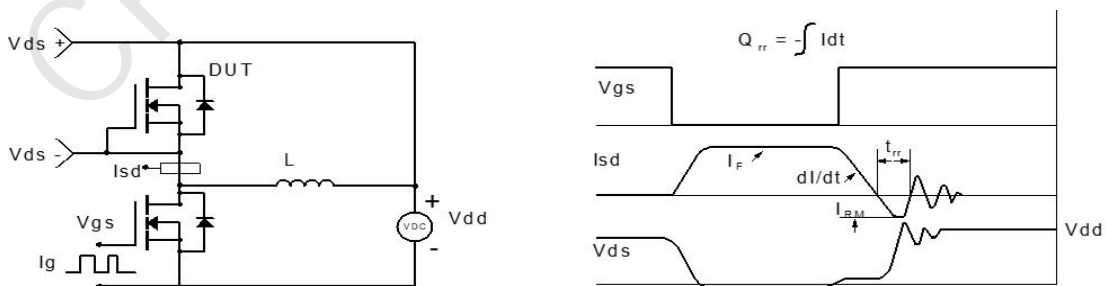
**Figure 1: Gate Charge Test Circuit & Waveform**



**Figure 2: Resistive Switching Test Circuit & Waveform**

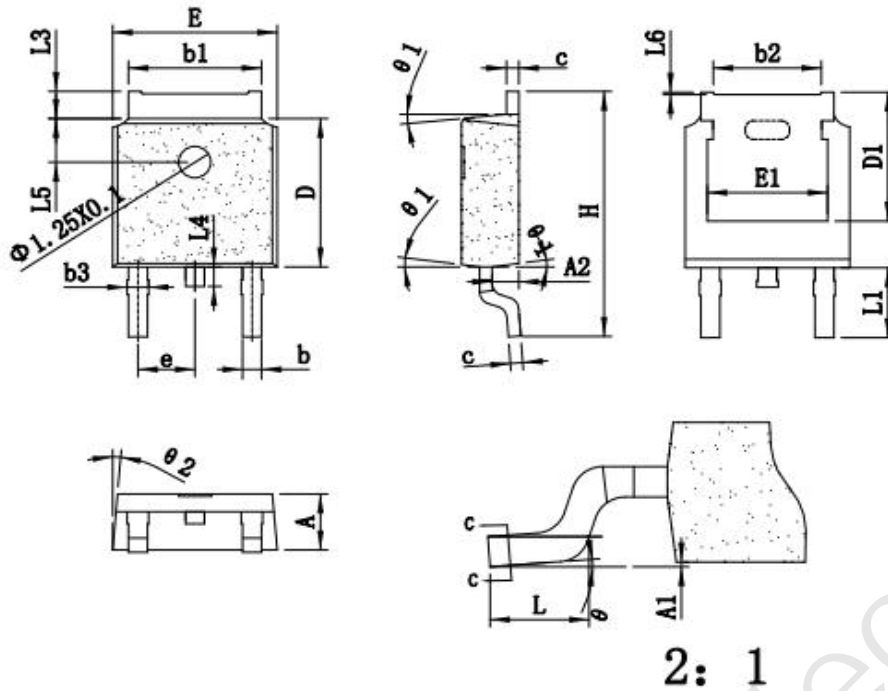


**Figure 3: Unclamped Inductive Switching Test Circuit & Waveform**



**Figure 4: Diode Recovery Test Circuit & Waveform**

## Package Mechanical Data(TO-252-3L)



SYMBOL	mm		
	MIN	NOM	MAX
*A	2.20	2.30	2.38
*A1	0.00	—	0.15
*A2	0.90	1.00	1.10
*b	0.72	0.78	0.85
b1	5.23	5.33	5.46
b2	4.05	4.20	4.35
*b3	0.78	0.85	0.90
*c	0.47	0.52	0.55
*D	6.00	6.10	6.20
D1	5.40REF		
*E	6.50	6.60	6.70
E1	4.70	4.83	4.92
*e	2.286BSC		
*H	9.90	10.10	10.20
*L	1.40	1.55	1.70
L1	2.90REF		
L3	0.90	—	1.20
L4	0.75	0.85	0.95
L5	1.70	1.80	1.90
L6	0.00	0.06	0.12
*θ	0°	—	5°
θ1	5°	7°	9°
θ2	5°	7°	9°

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