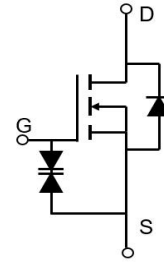


Description

Features

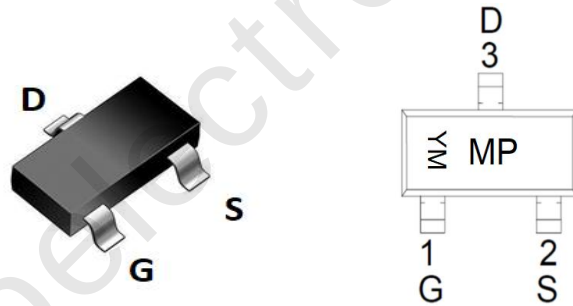
- 60V, 0.3A
- $R_{DS(ON)}$ Typ = 1.7Ω @ $V_{GS} = 10V$
- $R_{DS(ON)}$ Typ = 2 Ω @ $V_{GS} = 4.5V$
- Advanced Trench Technology
- Excellent $R_{DS(ON)}$ and Low Gate Charge
- Lead Free
- ESD Protected: 2KV



Schematic Diagram

Application

- Load Switch
- PWM Application
- Power Management



Marking and Pin Assignment

Package Marking and Ordering Information

Device	Marking	Package	Outline	Reel Size	Reel (pcs)	Per Carton (pcs)
CRMLCTL2N7002K	MP	SOT-523-3L	TAPING	7"	3000	120000

Absolute Maximum Ratings (@ $T_J = 25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Value	Units	
V _{DS}	Drain-to-Source Voltage	60	V	
V _{GS}	Gate-to-Source Voltage	±20	V	
I _D	Continuous Drain Current	T _A = 25°C	0.3	A
		T _A = 100°C	0.18	A
I _{DM}	Pulsed Drain Current ⁽¹⁾	1.2	A	
P _D	Power Dissipation	T _A = 25°C	0.17	W
R _{θJA}	Thermal Resistance, Junction to Ambient ⁽²⁾	735	°C/W	
T _J , T _{STG}	Junction & Storage Temperature Range	-55 to 150	°C	

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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
--------	-----------	------------	------	------	------	------

Off Characteristics

$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	$I_D = 250\mu\text{A}, V_{GS} = 0\text{V}$	60	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 60\text{V}, V_{GS} = 0\text{V}$	-	-	1.0	μA
I_{GSS}	Gate-Body Leakage Current	$V_{DS} = 0\text{V}, V_{GS} = \pm 20\text{V}$	-	-	± 10	μA

On Characteristics

$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$	1	1.6	2	V
$R_{DS(ON)}$	Static Drain-Source ON-Resistance ⁽³⁾	$V_{GS} = 10\text{V}, I_D = 0.3\text{A}$	-	1.7	2.1	Ω
		$V_{GS} = 4.5\text{V}, I_D = 0.2\text{A}$	-	2.0	2.4	Ω

Dynamic Characteristics

C_{iss}	Input Capacitance	$V_{GS} = 0\text{V}, V_{DS} = 25\text{V},$ $f = 1\text{MHz}$	-	28	-	pF
C_{oss}	Output Capacitance		-	11	-	pF
C_{rss}	Reverse Transfer Capacitance		-	4	-	pF
Q_g	Total Gate Charge	$V_{GS} = 0 \text{ to } 4.5\text{V}$ $V_{DS} = 10\text{V}, I_D = 0.3\text{A}$	-	1.7	-	nC
Q_{gs}	Gate Source Charge		-	0.3	-	nC
Q_{gd}	Gate Drain("Miller") Charge		-	0.6	-	nC

Switching Characteristics

$t_{d(on)}$	Turn-On DelayTime	$V_{GS} = 10\text{V}, V_{DD} = 10\text{V}$ $I_D = 0.2\text{A}, R_{GEN} = 10\Omega$	-	2	-	ns
t_r	Turn-On Rise Time		-	15	-	ns
$t_{d(off)}$	Turn-Off DelayTime		-	7	-	ns
t_f	Turn-Off Fall Time		-	20	-	ns

Drain-Source Diode Characteristics and Max Ratings

I_S	Maximum Continuous Drain to Source Diode Forward Current		-	-	0.3	A
I_{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	1.2	A
V_{SD}	Drain to Source Diode Forward Voltage	$V_{GS} = 0\text{V}, I_S = 0.3\text{A}$	-	-	1.2	V

- Notes:
1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.
 2. $R_{\theta JA}$ is measured with the device mounted on a 1inch² pad of 2oz copper FR4 PCB
 3. Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 0.5\%$.

Typical Performance Characteristics

Figure 1: Output Characteristics

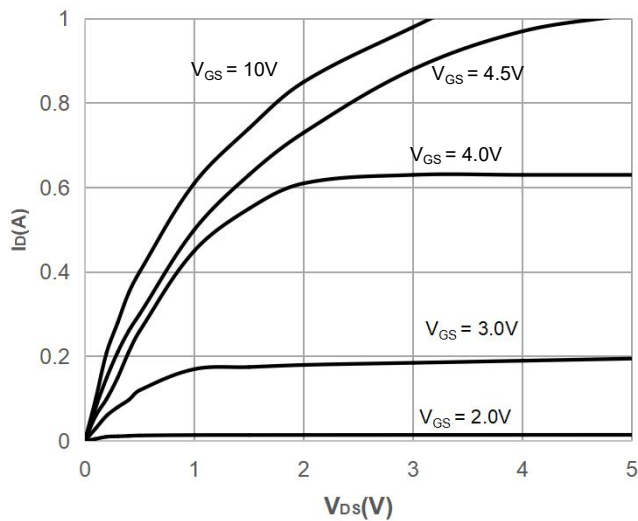


Figure 2: Typical Transfer Characteristics

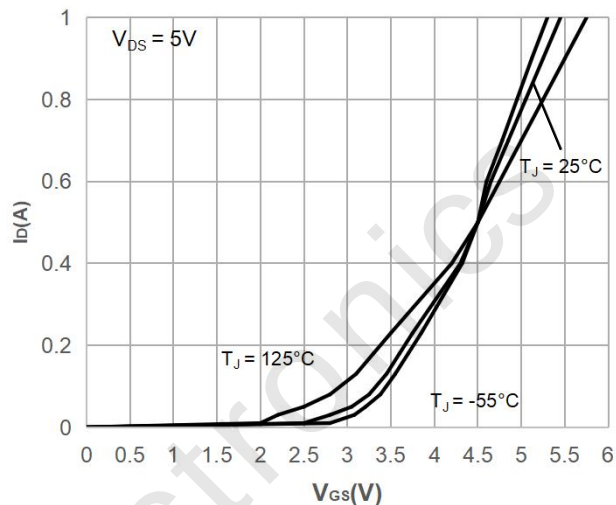


Figure 3: On-resistance vs. Drain Current

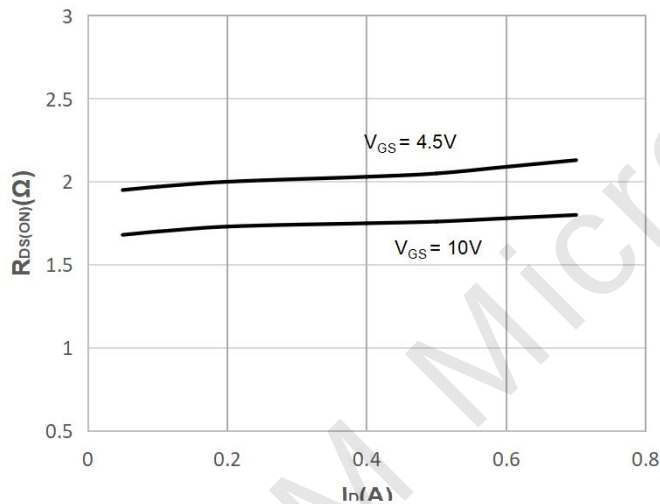


Figure 4: Body Diode Characteristics

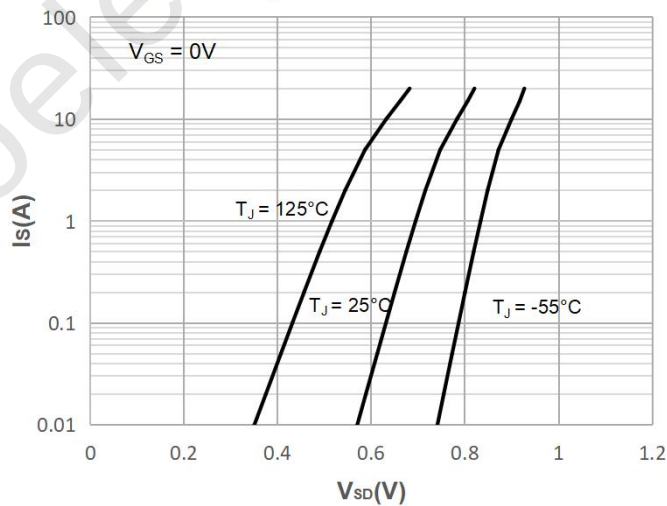


Figure 5: Gate Charge Characteristics

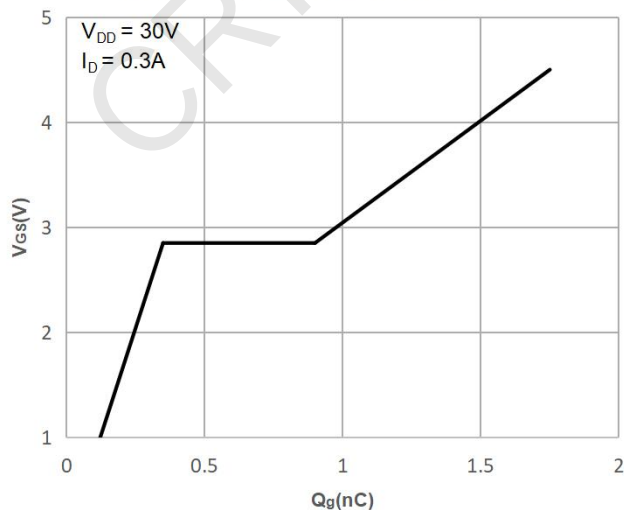
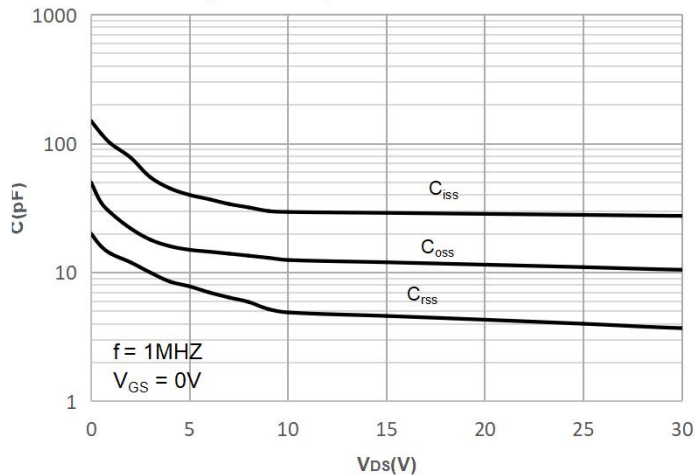


Figure 6: Capacitance Characteristics



Typical Performance Characteristics

Figure 7: Normalized Breakdown voltage vs. Junction Temperature

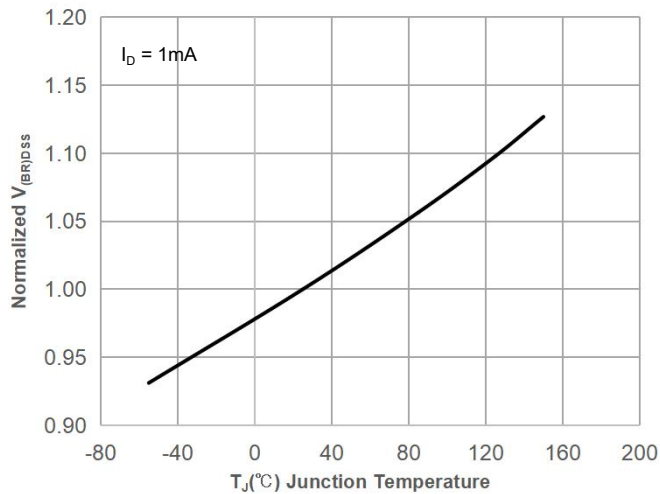


Figure 8: Normalized on Resistance vs. Junction Temperature

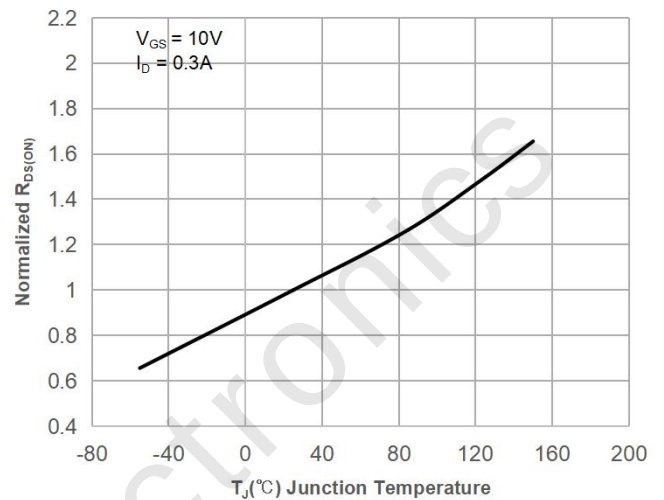


Figure 9: Maximum Safe Operating Area

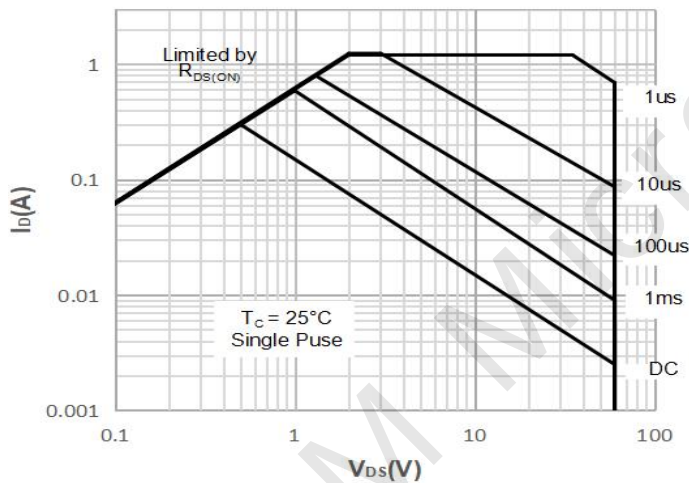


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

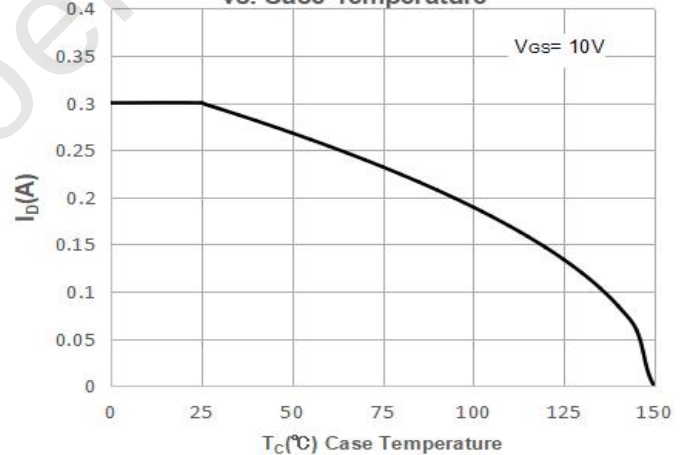


Figure 11: Normalized Maximum Transient Thermal Impedance

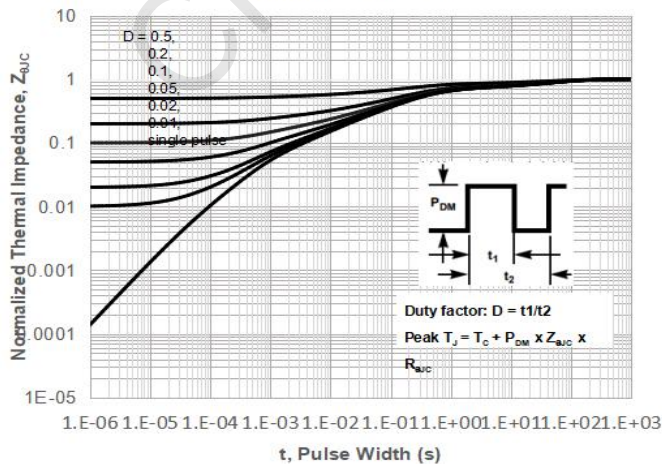
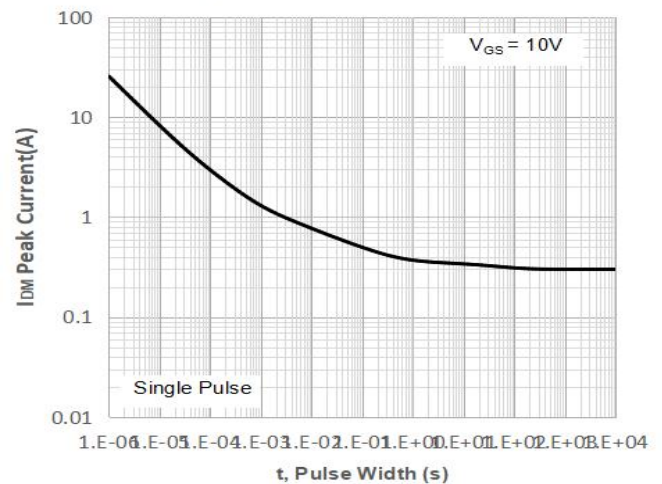


Figure 12: Peak Current Capacity



Test Circuit

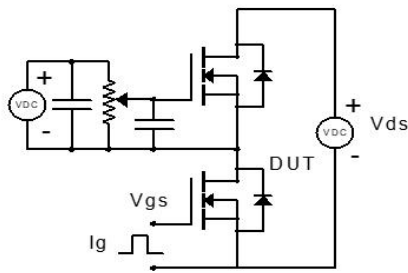


Figure 1: Gate Charge Test Circuit & Waveform

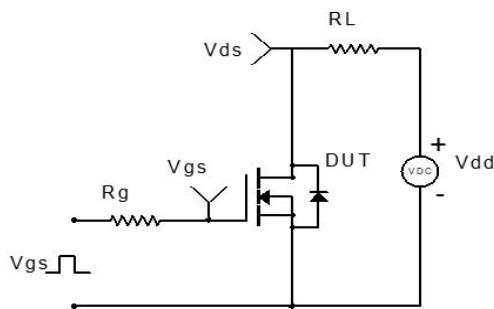


Figure 2: Resistive Switching Test Circuit & Waveform

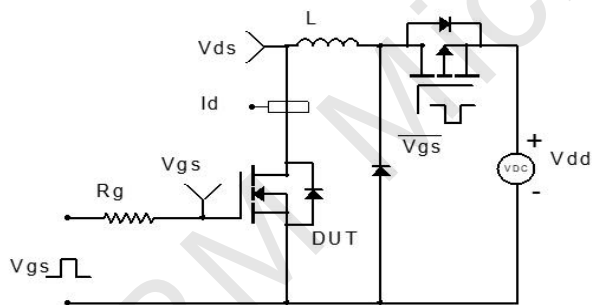


Figure 3: Unclamped Inductive Switching Test Circuit & Waveform

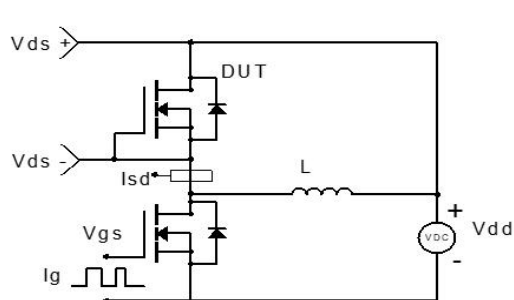
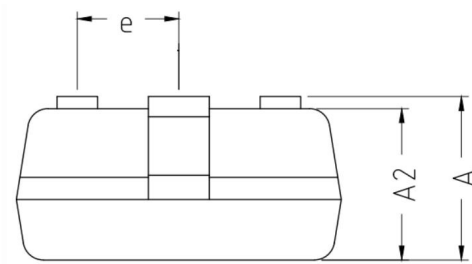
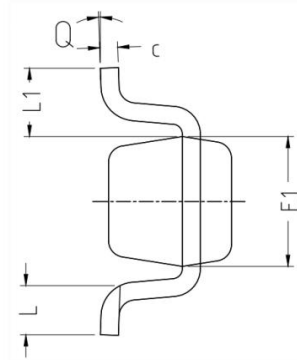
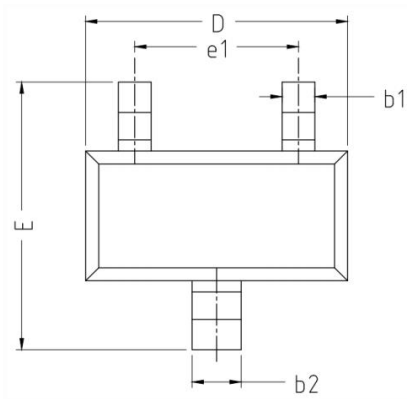


Figure 4: Diode Recovery Test Circuit & Waveform

Package Mechanical Data(SOT-523-3L)



COMMON IN DIMENSION (MM)			
PKG	SOT-523-3L		
Symbol	MIN	NOM	MAX
A	0.700	0.800	0.900
A2	0.700	0.750	0.800
b1	0.150	0.200	0.250
b2	0.250	0.300	0.350
c	0.100	0.130	0.200
D	1.550	1.600	1.700
E	1.450	1.600	1.750
E1	0.700	0.800	0.900
e	0.500 TYP		
e1	0.900	1.000	1.100
L	0.260	0.360	0.460
L1	0.400REF		
Q	0°	4°	8°

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