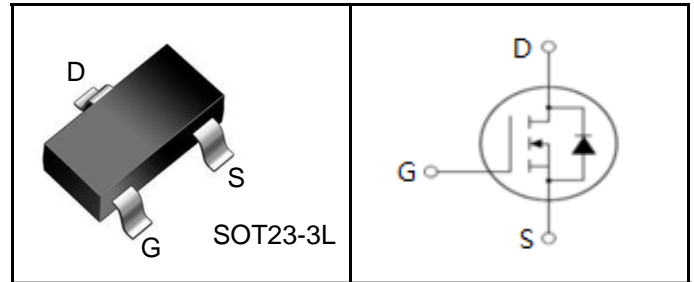


## Features

- $BV_{DSS}=60\text{ V}$ ,  $I_D=3\text{ A}$
- $R_{DS(on)}:80\text{ m}\Omega$  (Max) @  $V_{GS}=10\text{ V}$
- $R_{DS(on)}:100\text{ m}\Omega$  (Max) @  $V_{GS}=4.5\text{ V}$
- N-Channel, 5V Logic Level Control
- Enhancement mode
- Low on-resistance  $R_{DS(on)}$  @  $V_{GS}=4.5\text{ V}$
- Fast Switching



## Device Marking and Package Information

Ordering code	Package	Marking
MPTO3N60	SOT23-3L	MPTO3N60

## Maximum ratings, at $T_j=25\text{ }^\circ\text{C}$ , unless otherwise specified

Symbol	Parameter	Rating	Unit
$V_{(BR)DSS}$	Drain-Source breakdown voltage	60	V
$I_S$	Diode continuous forward current	$T_A=25^\circ\text{C}$ 1.0	A
$I_D$	Continuous drain current @ $V_{GS}=10\text{ V}$	$T_A=25^\circ\text{C}$ 3.0	A
		$T_A=100^\circ\text{C}$ 2.0	A
$I_{DM}$	Pulse drain current tested ①	$T_A=25^\circ\text{C}$ 12.5	A
$P_D$	Maximum power dissipation	$T_A=25^\circ\text{C}$ 1.25	W
$V_{GS}$	Gate-Source voltage	$\pm 20$	V
$T_{STG}$ $T_J$	Storage and operating temperature range	-55 to 150	$^\circ\text{C}$

## Thermal Characteristics

Symbol	Parameter	Typical	Unit
$R_{\theta JL}$	Thermal Resistance-Junction to Lead	60	$^\circ\text{C/W}$
$R_{\theta JA}$	Thermal Resistance-Junction to Ambient	100	$^\circ\text{C/W}$



Symbol	Parameter	Condition	Min.	Typ.	Max.	Unit
<b>Static Electrical Characteristics @ T<sub>j</sub> = 25°C (unless otherwise stated)</b>						
V <sub>(BR)DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	60	--	--	V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =60V, V <sub>GS</sub> =0V	--	--	1	μA
	Zero Gate Voltage Drain Current(T <sub>j</sub> =125°C)	V <sub>DS</sub> =60V, V <sub>GS</sub> =0V	--	--	100	μA
I <sub>GSS</sub>	Gate-Body Leakage Current	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V	--	--	±100	nA
V <sub>GS(TH)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	1.3	1.5	2.4	V
R <sub>DS(ON)</sub>	Drain-Source On-State Resistance②	V <sub>GS</sub> =10V, I <sub>D</sub> =3A	--	65	80	mΩ
R <sub>DS(ON)</sub>	Drain-Source On-State Resistance②	V <sub>GS</sub> =4.5V, I <sub>D</sub> =2A	--	85	100	mΩ
<b>Dynamic Electrical Characteristics @ T<sub>j</sub>= 25°C (unless otherwise stated)</b>						
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =30V, V <sub>GS</sub> =0V, f=1MHz	--	587	--	pF
C <sub>oss</sub>	Output Capacitance		--	39	--	pF
C <sub>rss</sub>	Reverse Transfer Capacitance		--	16	--	pF
R <sub>g</sub>	Gate Resistance	f=1MHz	--	5.8	--	Ω
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =30V, I <sub>D</sub> =3A, V <sub>GS</sub> =10V	--	16	--	nC
Q <sub>gs</sub>	Gate-Source Charge		--	1.6	--	nC
Q <sub>gd</sub>	Gate-Drain Charge		--	3.8	--	nC
<b>Switching Characteristics</b>						
t <sub>d(on)</sub>	Turn-on Delay Time	V <sub>DD</sub> =30V, I <sub>D</sub> =3A, R <sub>G</sub> =3Ω, V <sub>GS</sub> =10V	--	7.5	--	nS
t <sub>r</sub>	Turn-on Rise Time		--	4.5	--	nS
t <sub>d(off)</sub>	Turn-Off Delay Time		--	22.5	--	nS
t <sub>f</sub>	Turn-Off Fall Time		--	9	--	nS
<b>Source- Drain Diode Characteristics @ T<sub>j</sub>= 25°C (unless otherwise stated)</b>						
V <sub>SD</sub>	Forward on voltage	I <sub>SD</sub> =3A, V <sub>GS</sub> =0V	--	0.8	1.2	V
t <sub>rr</sub>	Reverse Recovery Time	T <sub>j</sub> =25°C, I <sub>sd</sub> =3A, di/dt=500A/μs	--	10	--	nS
Q <sub>rr</sub>	Reverse Recovery Charge		--	15	--	nC

NOTE:

- ① Repetitive rating; pulse width limited by max. junction temperature.
- ② Pulse width ≤ 300μs; duty cycle ≤ 2%.

## Typical Characteristics

Figure 1. Output Characteristics( $T_J=25^\circ\text{C}$ )

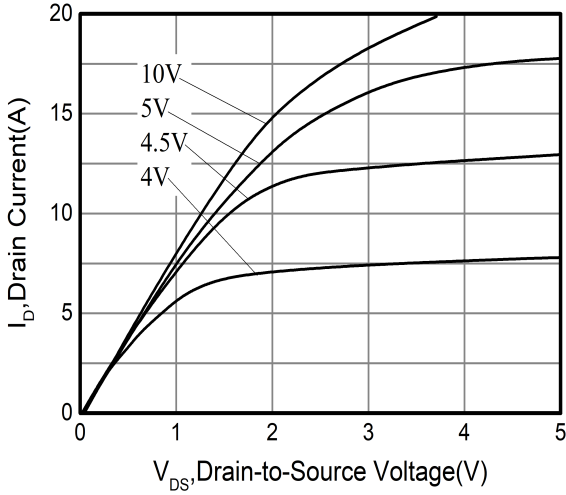


Figure 2. Transfer Characteristics

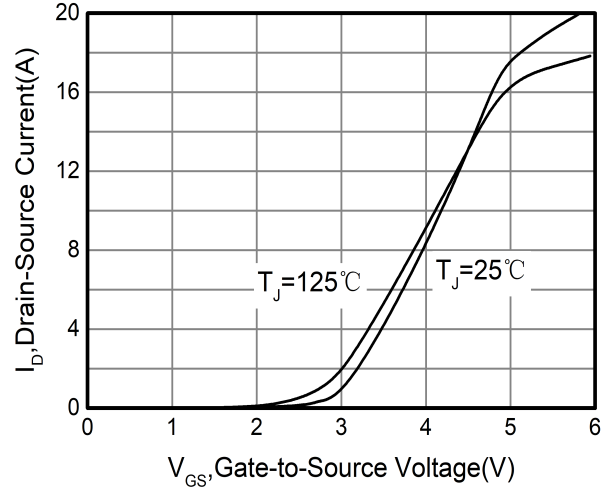


Figure 3. On-Resistance vs Drain Current

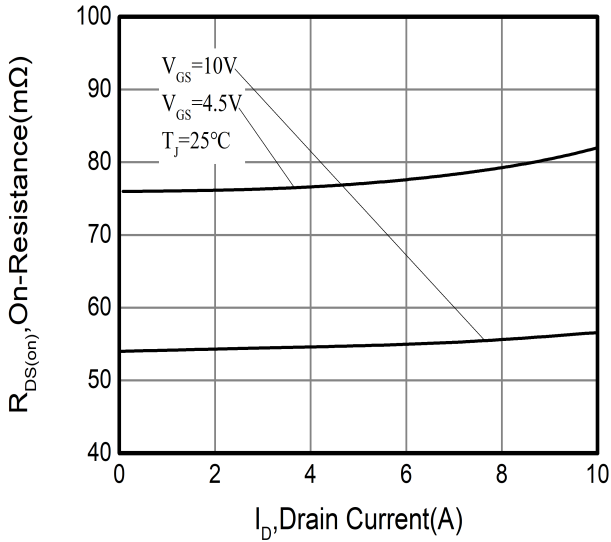


Figure 4. Capacitance

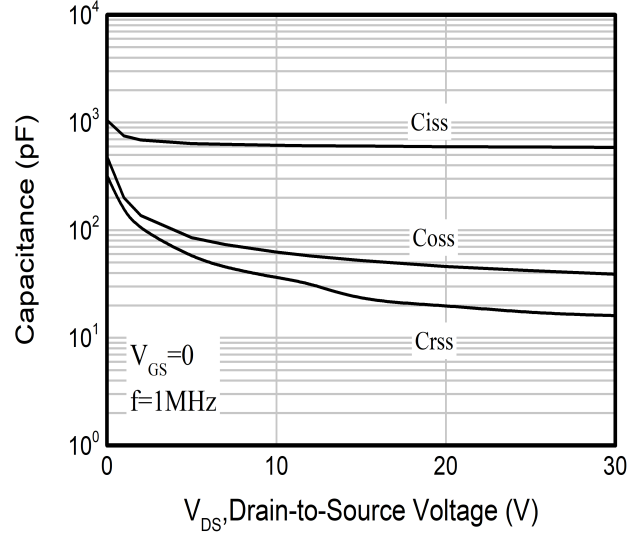


Figure 5. Gate Charge

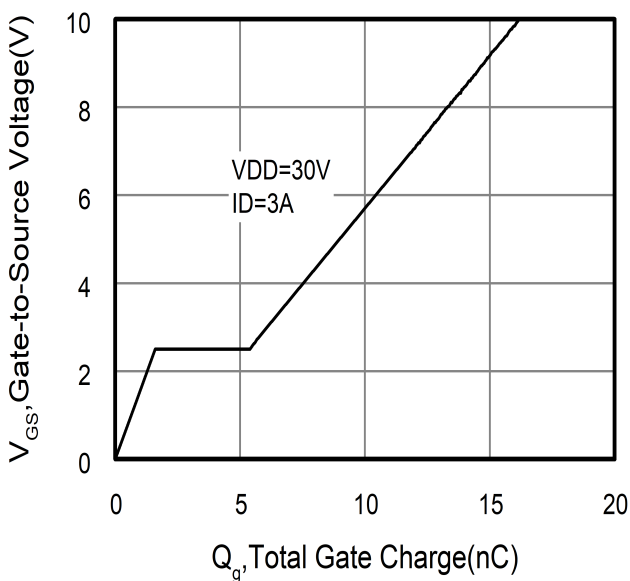
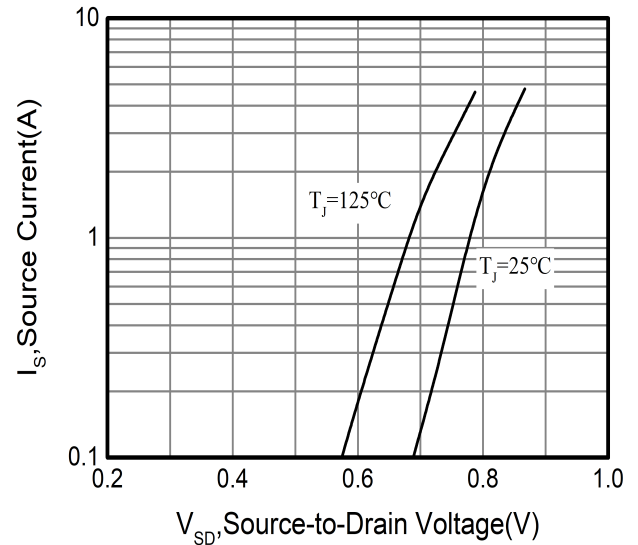


Figure 6. Body Diode Forward



## Typical Characteristics

Figure 7. On-Resistance vs Junction Temperature

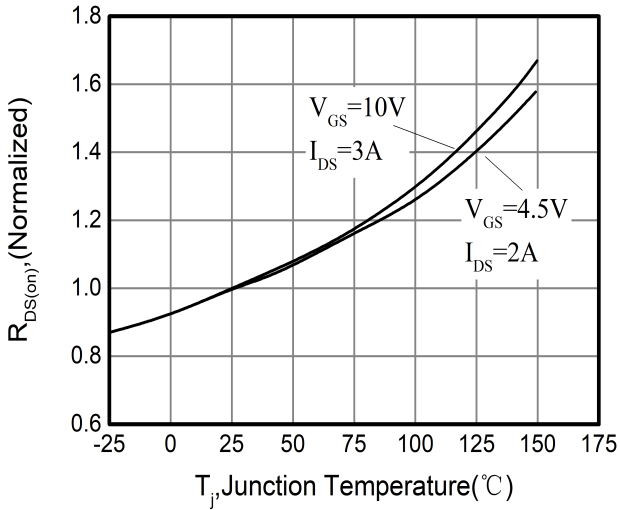


Figure 8. Threshold Voltage vs Junction Temperature

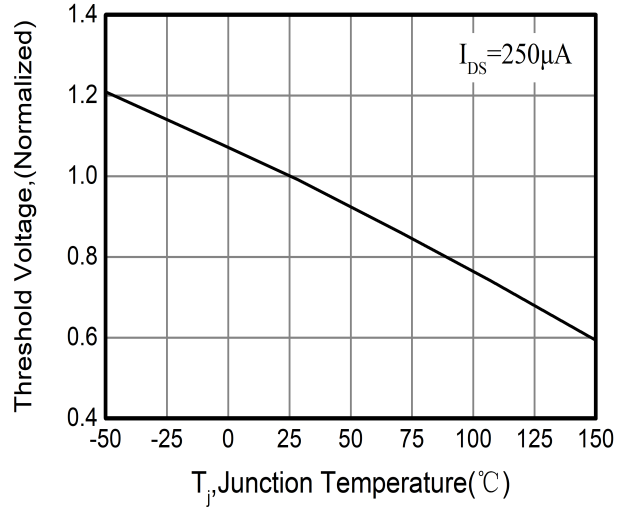


Figure 9. Thermal Transient Impedance

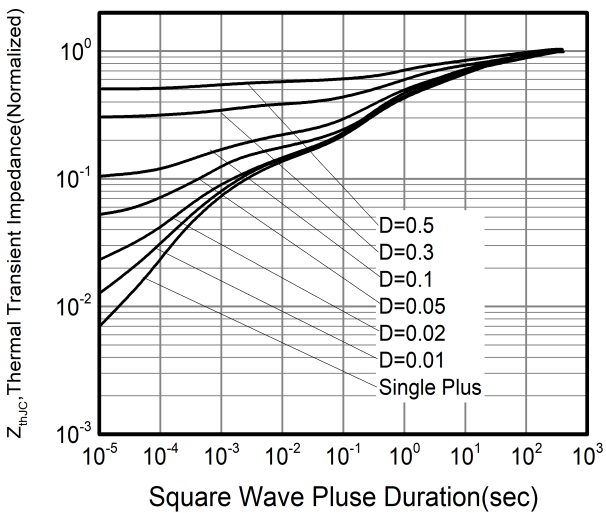
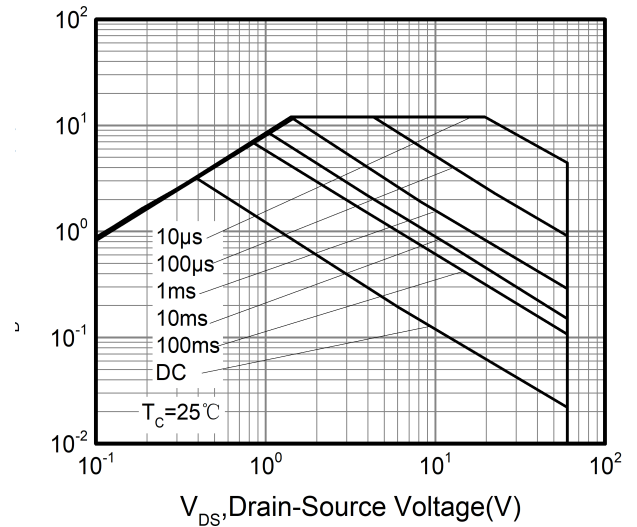
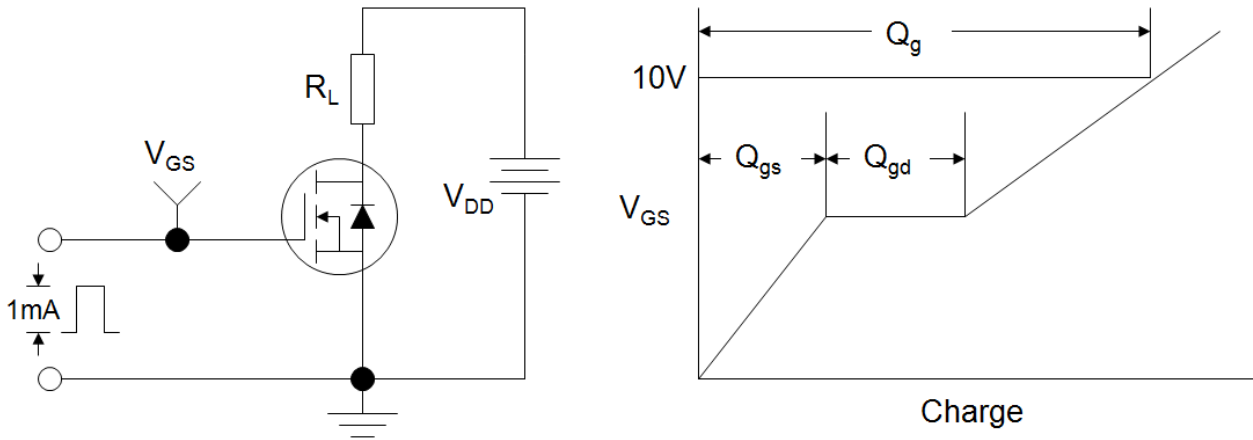


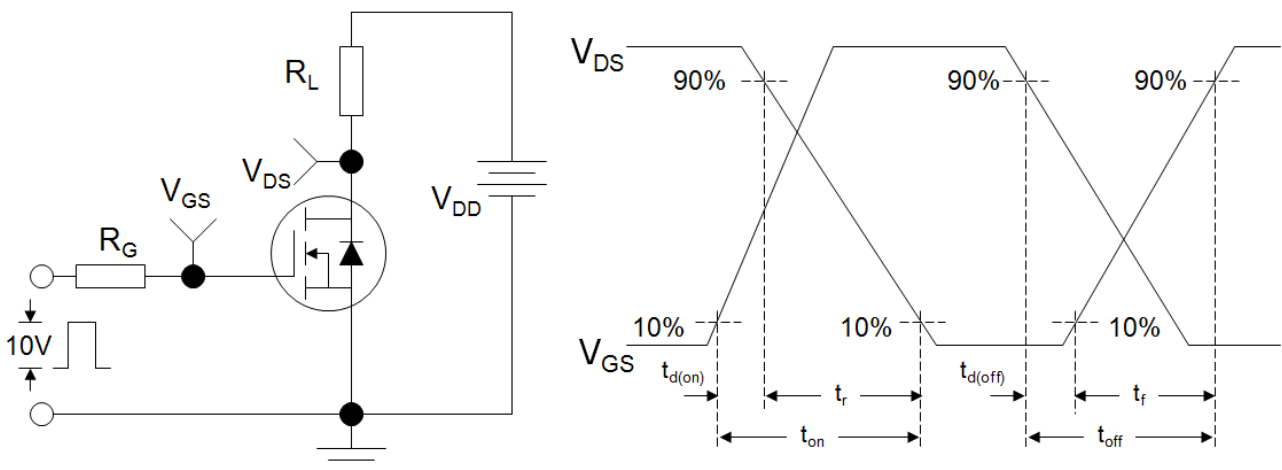
Figure 10. Safe Operation Area



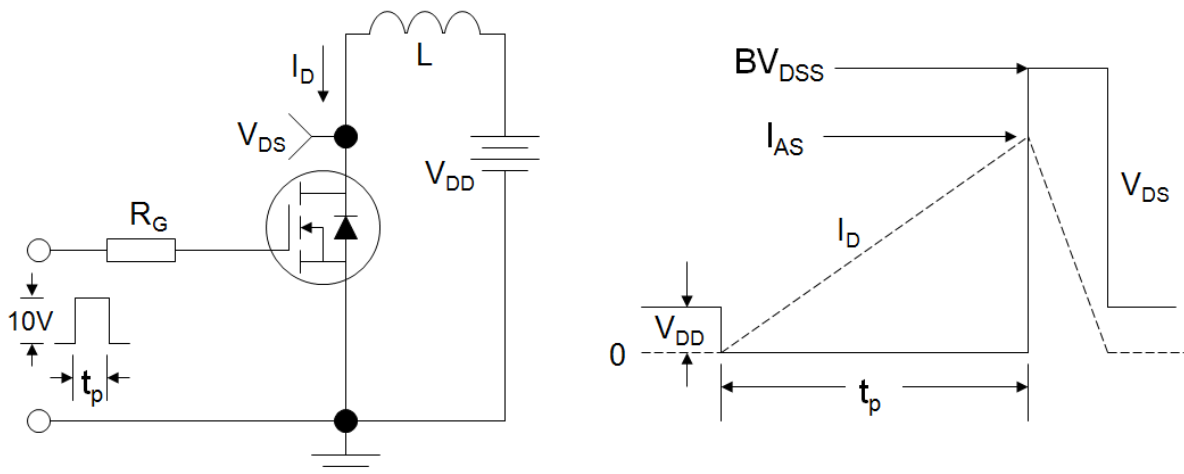
**Figure A: Gate Charge Test Circuit and Waveform**



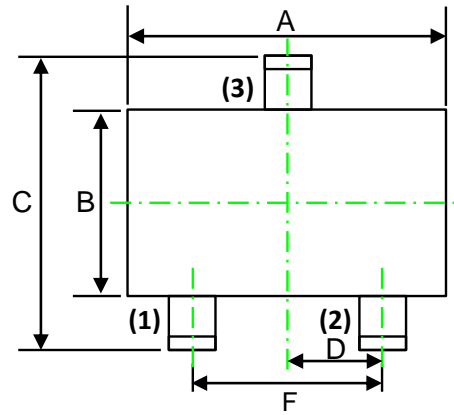
**Figure B: Resistive Switching Test Circuit and Waveform**



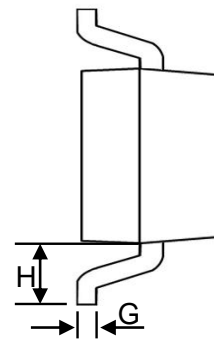
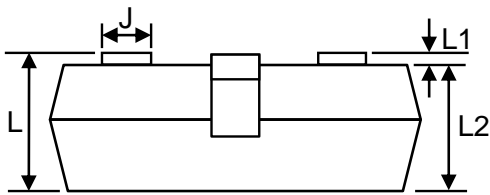
**Figure C: Unclamped Inductive Switching Test Circuit and Waveform**



## SOT-23 PACKAGE OUTLINE DIMENSIONS



**TOP VIEW**  
[顶视图]



**SIDE VIEW**  
[侧视图]

Symbol	Dimensions In Millimeters (mm)		
	Min.	Typ.	Max.
A	2.80	2.90	3.00
B	1.20	1.30	1.40
C	2.10	2.30	2.55
D	-	0.95	-
F	1.78	1.90	2.04
G	0.08	0.13	0.18
H	-	0.55	-
J	0.30	0.40	0.50
L	0.90	1.00	1.15
L1	0.00	0.05	0.10
L2	0.89	1.00	1.11