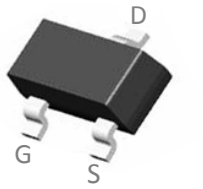
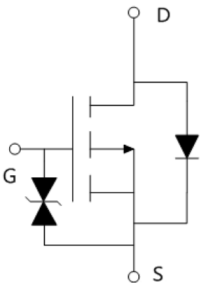
## Description：

This P-Channel MOSFET uses advanced trench technology and design to provide excellent $R_{DS(on)}$ with low gate charge.

It can be used in a wide variety of applications.




## Features：

1) $V_{DS}$=-20V,$I_D$=-0.5A,$R_{DS(ON)}$<420m Ω @$V_{GS}$=-4.5V
2) Low gate charge.
3) Green device available.
4) Advanced high cell denity trench technology for ultra low $R_{DS(ON)}$.
5) Excellent package for good heat dissipation.
6) ESD Protection
7) MSL3

## Package Marking and Ordering Information：

| Part NO. | Marking | Package | Packing |
|---|---|---|---|
| DOY3139A | 3139A | SOT-523 | 3000 pcs/Reel |

## Absolute Maximum Ratings： ($T_A$=25℃ unless otherwise noted)

| Symbol | Parameter | Ratings | Units |
|---|---|---|---|
| $V_{DS}$ | Drain-Source Voltage | -20 | V |
| $V_{GS}$ | Gate-Source Voltage | ±10 | V |
| $I_D$ | Continuous Drain Current-$T_A$=25℃ | -0.5 | A |
| | Continuous Drain Current-$T_A$=70℃ | -0.3 | |
| $I_{DM}$ | Pulsed Drain Current[1] | -2 | |
| $P_D$ | Power Dissipation | 0.15 | W |
| $T_J$, $T_{STG}$ | Operating and Storage Junction Temperature Range | -55-+150 | ℃ |

## Thermal Characteristics：

| Symbol | Parameter | Max | Units |
|---|---|---|---|
| $R_{\theta JA}$ | Thermal Resistance,Junction to Ambient | 833 | ℃/W |

## Electrical Characteristics: ($T_A$=25℃ unless otherwise noted)

| Symbol | Parameter | Conditions | Min | Typ | Max | Units |
|---|---|---|---|---|---|---|
| **Off Characteristics** | | | | | | |
| $BV_{DSS}$ | Drain-Sourtce Breakdown Voltage | $V_{GS}$=0V,$I_D$=-250μA | -20 | --- | --- | V |
| $I_{DSS}$ | Zero Gate Voltage Drain Current | $V_{GS}$=0V, $V_{DS}$=-20V | --- | --- | -1 | μA |
| $I_{GSS}$ | Gate-Source Leakage Current | $V_{GS}$=±10V, $V_{DS}$=0A | --- | --- | ±10 | μA |
| **On Characteristics** | | | | | | |
| $V_{GS(th)}$ | Gate-Source Threshold Voltage | $V_{GS}$=$V_{DS}$, $I_D$=-250μA | -0.4 | -0.65 | -1 | V |
| $R_{DS(ON)}$ | Drain-Source On Resistance[3] | $V_{GS}$=-4.5V,$I_D$=-0.5A | --- | 320 | 420 | mΩ |
| | | $V_{GS}$=-2.5V,$I_D$=-0.4A | --- | 430 | 560 | mΩ |
| **Dynamic Characteristics** | | | | | | |
| $C_{iss}$ | Input Capacitance | $V_{DS}$=-10V, $V_{GS}$=0V, f=1MHz | --- | 65.3 | --- | pF |
| $C_{oss}$ | Output Capacitance | | --- | 14 | --- | |
| $C_{rss}$ | Reverse Transfer Capacitance | | --- | 8 | --- | |
| | | | | | | |
| $t_{d(on)}$ | Turn-On Delay Time | $V_{DS}$=-10V, $I_D$=-0.5A, $R_{ENG}$=3Ω,$V_{GS}$=-4.5V | --- | 4 | --- | ns |
| $t_r$ | Rise Time | | --- | 19 | --- | ns |
| $t_{d(off)}$ | Turn-Off Delay Time | | --- | 16.08 | --- | ns |
| $t_f$ | Fall Time | | --- | 25.1 | --- | ns |
| $Q_g$ | Total Gate Charge | $V_{GS}$=-4.5V, $V_{DS}$=-10V, $I_D$=-0.5A | --- | 1.14 | --- | nC |
| $Q_{gs}$ | Gate-Source Charge | | --- | 0.37 | --- | nC |
| $Q_{gd}$ | Gate-Drain “Miller” Charge | | --- | 0.25 | --- | nC |
| **Drain-Source Diode Characteristics** | | | | | | |
| $V_{SD}$ | Diode Forward Voltage | $V_{GS}$=0V, $I_{SD}$=-0.5A | --- | --- | -1.2 | V |
| $I_S$ | Continuous Drain Curren | $V_D$=$V_G$=0V | --- | --- | -0.5 | A |
| $I_{SM}$ | Pulsed Drain Current | | --- | --- | -2 | A |

**Notes:**

1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
2. EAS condition : TJ=25℃,VDD=50V,VG=10V,L=0.5mH
3. Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%

## Test Circuit

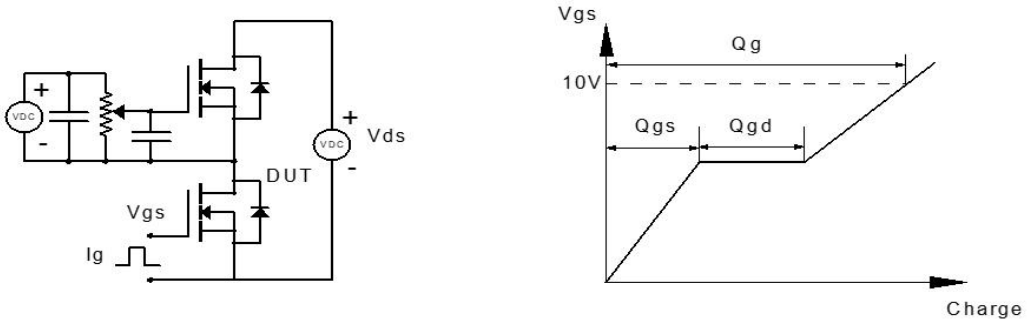



**Figure 1: Gate Charge Test Circuit & Waveform**

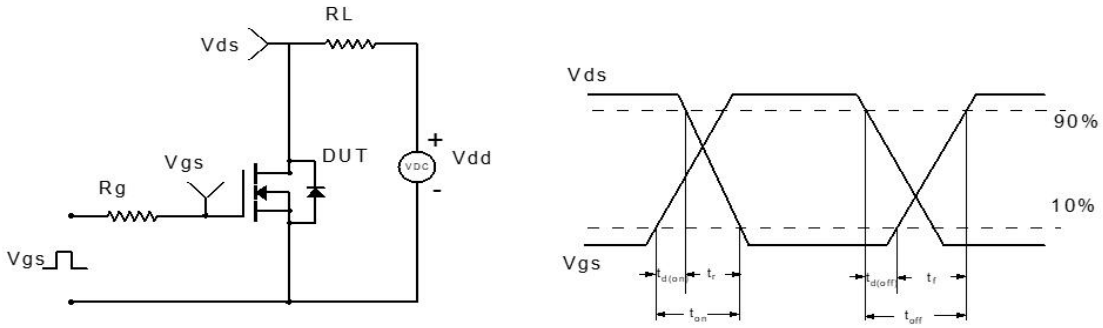



**Figure 2: Resistive Switching Test Circuit & Waveform**

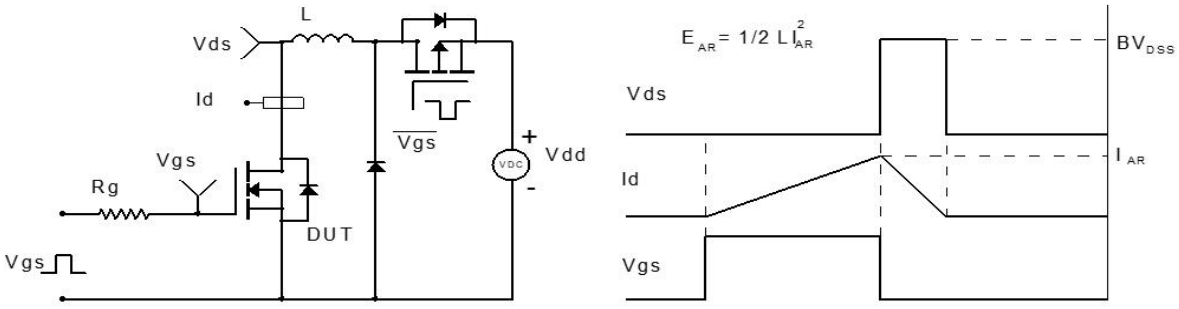



**Figure 3: Unclamped Inductive Switching Test Circuit& Waveform**

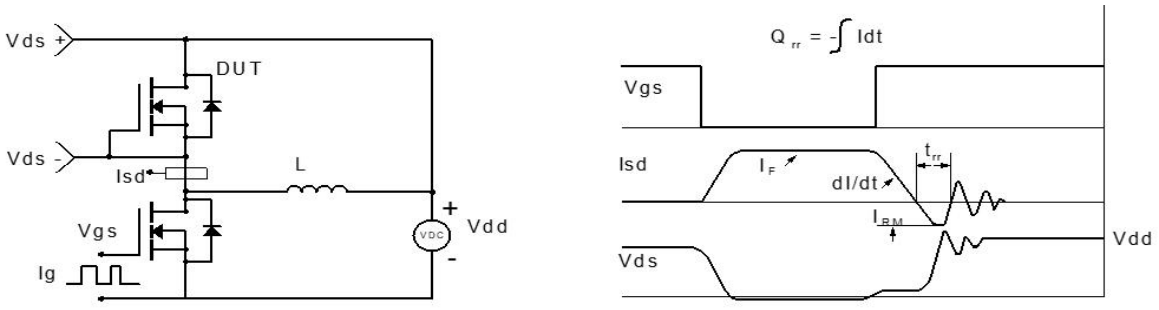
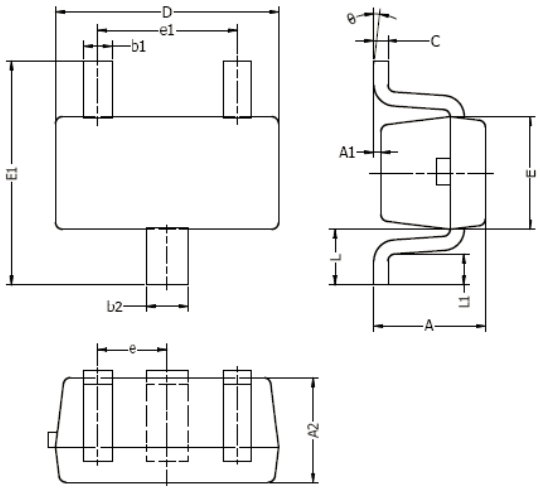



**Figure 4: Diode Recovery Test Circuit & Waveform**

## SOT523 Package Outline Data

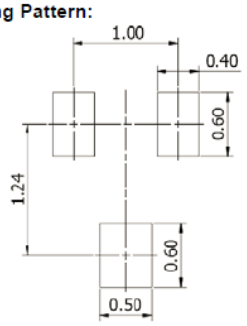
Unit:mm



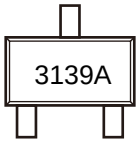

| DIM | MILLIMETERS | | INCHES | |
|---|---|---|---|---|
| | MIN | MAX | MIN | MAX |
| A | 0.70 | 0.90 | 0.028 | 0.035 |
| A1 | 0.00 | 0.10 | 0.000 | 0.004 |
| A2 | 0.70 | 0.80 | 0.028 | 0.031 |
| b1 | 0.15 | 0.25 | 0.006 | 0.010 |
| b2 | 0.25 | 0.35 | 0.010 | 0.014 |
| c | 0.10 | 0.20 | 0.004 | 0.008 |
| D | 1.50 | 1.70 | 0.059 | 0.067 |
| E | 0.70 | 0.90 | 0.028 | 0.035 |
| E1 | 1.45 | 1.75 | 0.057 | 0.069 |
| e | 0.50 TYP. | | 0.020 TYP. | |
| e1 | 0.90 | 1.10 | 0.035 | 0.043 |
| L | 0.40 REF. | | 0.016 REF. | |
| L1 | 0.10 | 0.30 | 0.004 | 0.012 |
| θ | 0° | 8° | 0° | 8° |

NOTES:
1. Above package outline conforms to JEITA EAIJ ED-7500A SC-75A.
2. Dimensions are exclusive of Burrs, Mold Flash & Tie Bar extrusions.

**Typical Soldering Pattern:**



## Marking Information：




## Previous Version

| Version | Date | Subjects (major changes since last revision) |
|---|---|---|
| 1.0 | 2024-09-06 | Release of final version |

## Attention :

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