# 30V P-Ch Power MOSFET

| $V_{DS}$ | | -30 | V |
|---|---|---|---|
| $R_{DS(on),typ}$ | $V_{GS}$=10V | 9.2 | mΩ |
| $R_{DS(on),typ}$ | $V_{GS}$=4.5V | 10.7 | mΩ |
| $I_{D \text{ (Sillicon Limited)}}$ | | -15 | A |

## Feature
◇ High Speed Power Switching, Logic Level
◇ Enhanced Avalanche Ruggedness
◇ 100% UIS Tested, 100% Rg Tested
◇ Lead Free, Halogen Free

## Application
◇ Hard Switching and High Speed Circuit
◇ DC/DC in Telecoms and Inductrial

SOIC-8

Drain
Pin2

Gate
Pin1

Src
Pin3
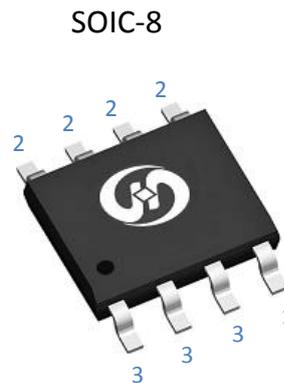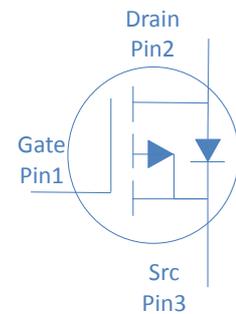
| Part Number | Package | Marking |
|---|---|---|
| HTS130P03Z | SOIC-8 | TS130P03Z |

## Absolute Maximum Ratings at $T_j$=25℃ (unless otherwise specified)

| Parameter | Symbol | Conditions | Value | Unit |
|---|---|---|---|---|
| Continuous Drain Current (Silicon Limited) | $I_D$ | $T_C$=25℃ | -15 | A |
| | | $T_C$=100℃ | -9 | |
| Drain to Source Voltage | $V_{DS}$ | - | -30 | V |
| Gate to Source Voltage | $V_{GS}$ | - | ±20 | V |
| Pulsed Drain Current | $I_{DM}$ | - | -48 | A |
| Avalanche Energy, Single Pulse | $E_{AS}$ | L=0.5mH, $T_C$=25℃ | 115 | mJ |
| Power Dissipation | $P_D$ | $T_A$=25℃ | 1.7 | W |
| Operating and Storage Temperature | $T_J$, $T_{stg}$ | - | -55 to150 | ℃ |

## Absolute Maximum Ratings

| Parameter | Symbol | Max | Unit |
|---|---|---|---|
| Thermal Resistance Junction-Ambient | $R_{\theta JA}$ | 75 | ℃/W |
| Thermal Resistance Junction-Lead | $R_{\theta JL}$ | 23 | ℃/W |

## Electrical Characteristics at $T_j$=25℃ (unless otherwise specified)

### Static Characteristics

| Parameter | Symbol | Conditions | Value | | | Unit |
| --- | --- | --- | --- | --- | --- | --- |
| | | | min | typ | max | |
| Drain to Source Breakdown Voltage | $V_{(BR)DSS}$ | $V_{GS}$=0V, $I_D$=-250μA | -30 | - | - | V |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{GS}$=$V_{DS}$, $I_D$=-250μA | -1.0 | -1.3 | -2.2 | |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{GS}$=0V, $V_{DS}$=-30V, $T_j$=25℃ | - | - | -1 | μA |
| Gate to Source Leakage Current | $I_{GSS}$ | $V_{GS}$=±20V, $V_{DS}$=0V | - | - | ±100 | nA |
| Drain to Source on Resistance | $R_{DS(on)}$ | $V_{GS}$=-10V, $I_D$=-12A | - | 9.2 | 13 | mΩ |
| | | $V_{GS}$=-6V, $I_D$=-10A | - | 10.7 | 17 | |
| Transconductance | $g_{fs}$ | $V_{DS}$=-5V, $I_D$=-15A | - | 28 | - | S |

### Dynamic Characteristics

| | | | | | | |
| --- | --- | --- | --- | --- | --- | --- |
| Input Capacitance | $C_{iss}$ | $V_{GS}$=0V, $V_{DS}$=-15V, f=1MHz | - | 2900 | - | pF |
| Output Capacitance | $C_{oss}$ | | - | 410 | - | |
| Reverse Transfer Capacitance | $C_{rss}$ | | - | 280 | - | |
| Total Gate Charge | $Q_g$ | $V_{DD}$=-15V, $I_D$=-10A, $V_{GS}$=-10V | - | 48 | - | nC |
| Gate to Source Charge | $Q_{gs}$ | | - | 12 | - | |
| Gate to Drain (Miller) Charge | $Q_{gd}$ | | - | 14 | - | |
| Turn on Delay Time | $t_{d(on)}$ | $V_{DD}$=-15V, $V_{GS}$=-10V, $R_G$=3Ω, | - | 15 | - | ns |
| Rise time | $t_r$ | | - | 11 | - | |
| Turn off Delay Time | $t_{d(off)}$ | | - | 44 | - | |
| Fall Time | $t_f$ | | - | 21 | - | |

### Reverse Diode Characteristics

| Diode Forward Voltage | $V_{SD}$ | $V_{GS}$=0V, $I_F$=-2A | - | | -1.2 | V |
| --- | --- | --- | --- | --- | --- | --- |

Prelim

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| Fig 1. Typical Output Characteristics | Figure 2. On-Resistance vs. Gate-Source Voltage |
|---|---|



| Figure 3. On-Resistance vs. Drain Current and Gate Voltage | Figure 4. Thershold Voltage vs. Junction Temperature |
|---|---|



| Figure 5. Typical Transfer Characteristics | Figure 6. Typical Source-Drain Diode Forward Voltage |
|---|---|
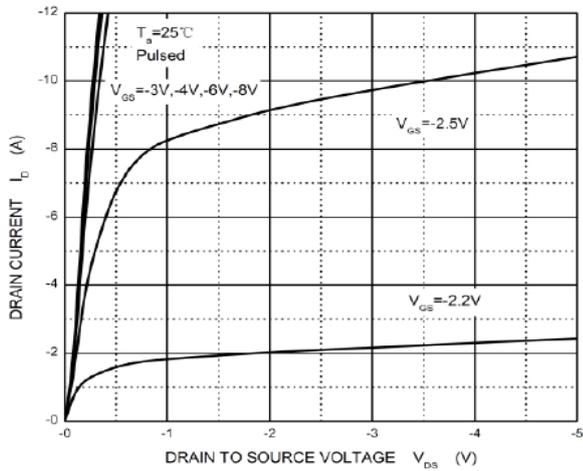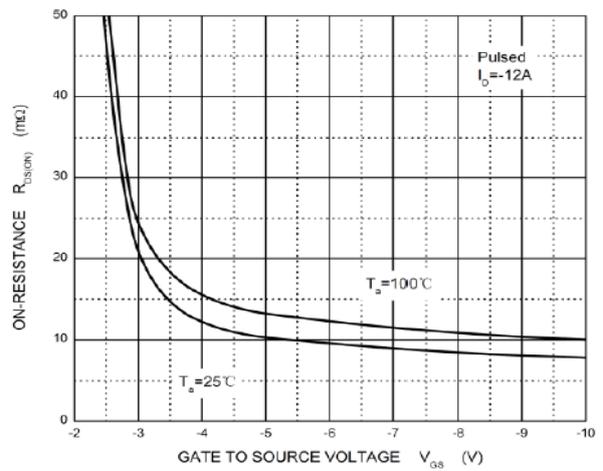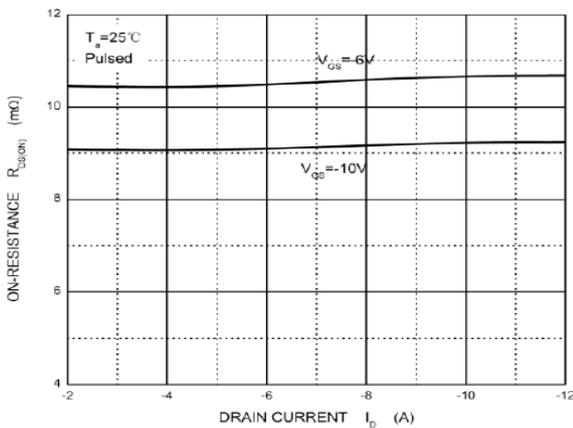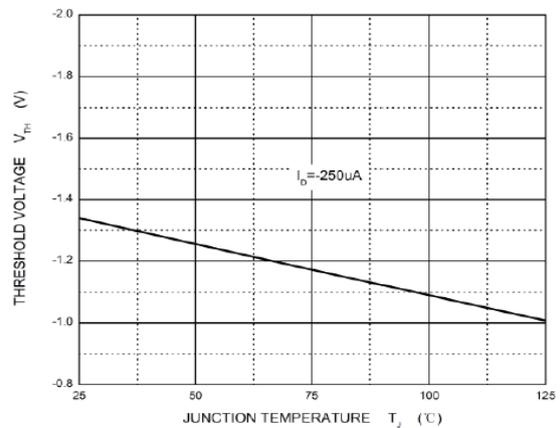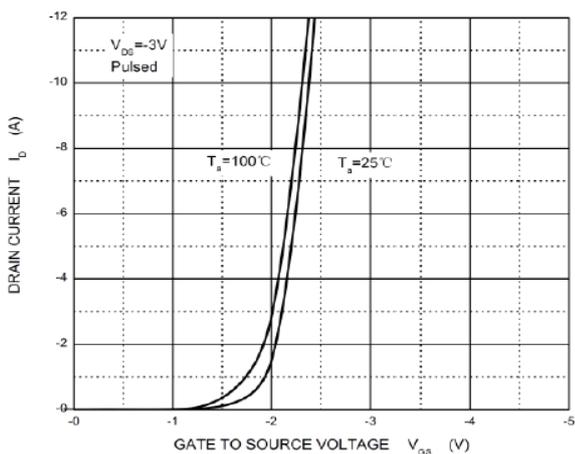


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## Inductive switching Test



Dummy same as DUT

$I_D$

DUT

$V_{GS}$

VDS

$V_{DD}$

$V_{GS}$ 90% 10%

$T_{d(on)}$ $T_r$ $T_{d(off)}$ $T_f$

90%

$V_{DS}$ 10%

$V_F$

## Gate Charge Test



$I_D$

DUT

$I_G$

$V_{DD}$

VDS

$-V_{GS}$

$-10V$

$Q_G$

$V_{DS}$

$Q_{GS}$ $Q_{GD}$

$Q_G$
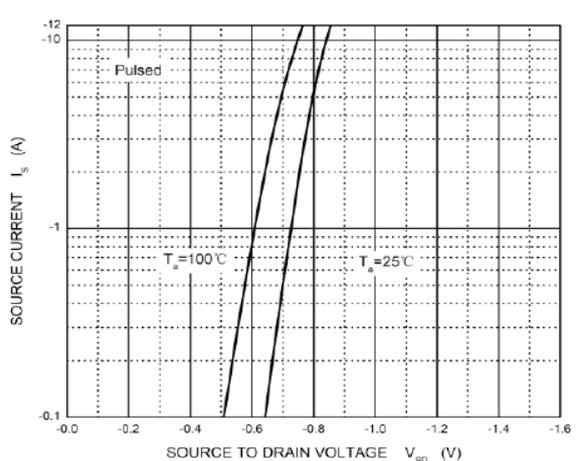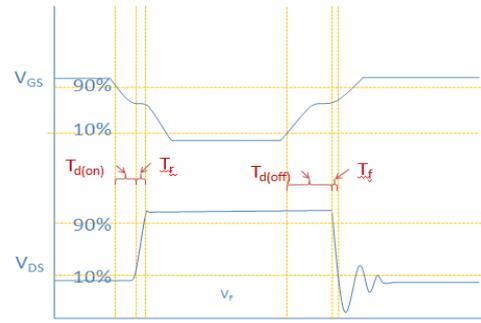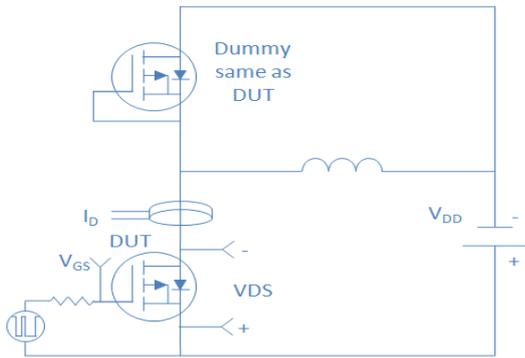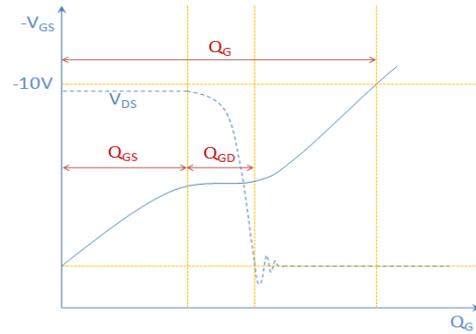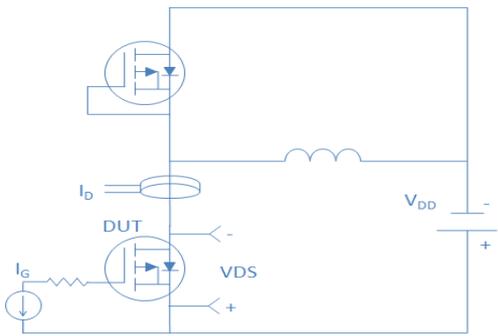
## Uclamped Inductive Switching (UIS) Test



$\overline{V_{GS}}$

VDS

$I_D$

DUT

$V_{GS}$

$V_{DD}$

$V_{GS}$

$I_D$

$I_{AS}$

$V_{DS}$

$BV_{DSS}$

## Diode Recovery Test



DUT

$I_{SD}$

DUT

$V_{GS}$

Dummy same as DUT

$V_{DD}$

$V_{GS}$

$-I_{SD}$ $-I_F$

$di/dt$ $t_{RR}$

$-I_{RRM}$

$V_{DD}$

$-V_{DS}$ $dv/dt$

$V_F$
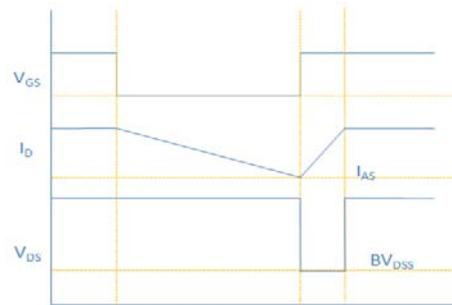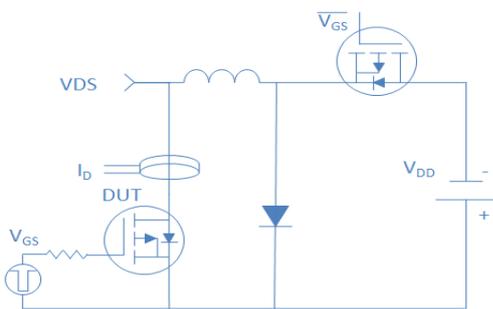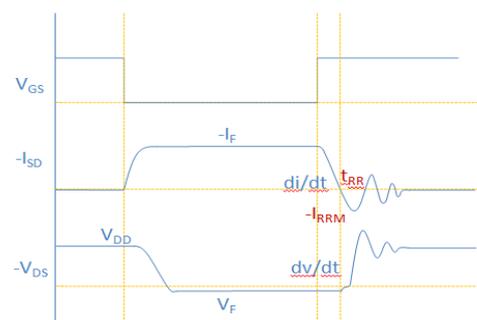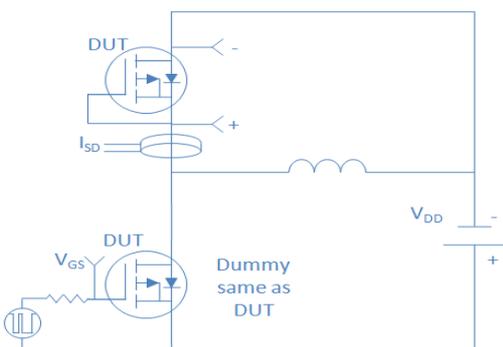
Package Outline

**SOP-8, 8leads**
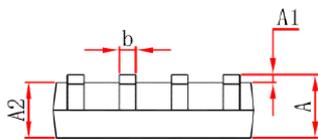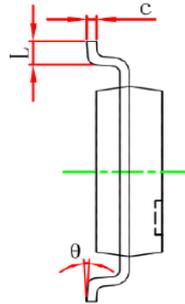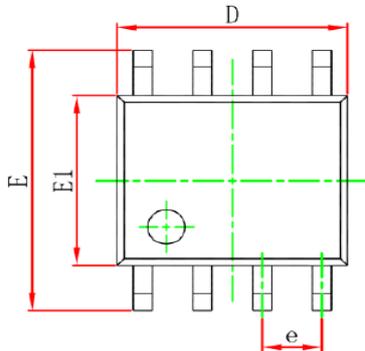


| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|---|---|---|---|---|
| | Min | Max | Min | Max |
| A | 1.350 | 1.750 | 0.053 | 0.069 |
| A1 | 0.100 | 0.250 | 0.004 | 0.010 |
| A2 | 1.350 | 1.550 | 0.053 | 0.061 |
| b | 0.330 | 0.510 | 0.013 | 0.020 |
| c | 0.170 | 0.250 | 0.007 | 0.010 |
| D | 4.800 | 5.000 | 0.189 | 0.197 |
| e | 1.270 (BSC) | | 0.050 (BSC) | |
| E | 5.800 | 6.200 | 0.228 | 0.244 |
| E1 | 3.800 | 4.000 | 0.150 | 0.157 |
| L | 0.400 | 1.270 | 0.016 | 0.050 |
| θ | 0° | 8° | 0° | 8° |