

250V N-CHANNEL ENHANCEMENT MODE MOSFET

SUMMARY

$V_{(BR)DSS}=250V$; $R_{DS(ON)}=8.5\Omega$; $I_D=230mA$

DESCRIPTION

This 250V enhancement mode N-channel MOSFET provides users with a competitive specification offering efficient power handling capability, high impedance and is free from thermal runaway and thermally induced secondary breakdown. Applications benefiting from this device include a variety of Telecom and general high voltage circuits.

SOT89 and SOT223 versions are also available.

FEATURES

- High voltage
- Low on-resistance
- Fast switching speed
- Low gate drive
- Low threshold
- Complementary P-channel Type ZVP4525E6
- SOT23-6 package

APPLICATIONS

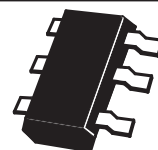
- Earth Recall and dialling switches
- Electronic hook switches
- High Voltage Power MOSFET Drivers
- Telecom call routers
- Solid state relays

ORDERING INFORMATION

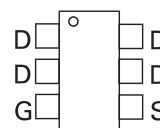
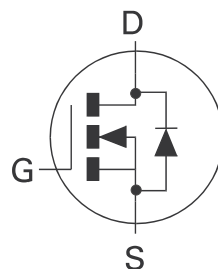
| DEVICE | REEL SIZE (inches) | TAPE WIDTH (mm) | QUANTITY PER REEL |
|-------------|--------------------|-----------------|-------------------|
| ZVN4525E6TA | 7 | 8mm embossed | 3000 units |
| ZVN4525E6TC | 13 | 8mm embossed | 10000 units |

DEVICE MARKING

- N52



SOT23-6



Top View

ZVN4525E6

ABSOLUTE MAXIMUM RATINGS.

| PARAMETER | SYMBOL | LIMIT | UNIT |
|---|----------------|-------------|---------------------|
| Drain-Source Voltage | V_{DSS} | 250 | V |
| Gate Source Voltage | V_{GS} | ± 40 | V |
| Continuous Drain Current ($V_{GS}=10V$; $T_A=25^\circ C$)(a) ($V_{GS}=10V$; $T_A=70^\circ C$)(a) | I_D I_D | 230 183 | mA mA |
| Pulsed Drain Current (c) | I_{DM} | 1.44 | A |
| Continuous Source Current (Body Diode) | I_S | 1.1 | A |
| Pulsed Source Current (Body Diode) | I_{SM} | 1.44 | A |
| Power Dissipation at $T_A=25^\circ C$ (a) Linear Derating Factor | P_D | 1.1 8.8 | W mW/ $^\circ C$ |
| Operating and Storage Temperature Range | $T_j; T_{stg}$ | -55 to +150 | $^\circ C$ |

THERMAL RESISTANCE

| PARAMETER | SYMBOL | VALUE | UNIT |
|-------------------------|-----------------|-------|--------------|
| Junction to Ambient (a) | $R_{\theta JA}$ | 113 | $^\circ C/W$ |
| Junction to Ambient (b) | $R_{\theta JA}$ | 65 | $^\circ C/W$ |

NOTES

(a) For a device surface mounted on 25mm x 25mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions

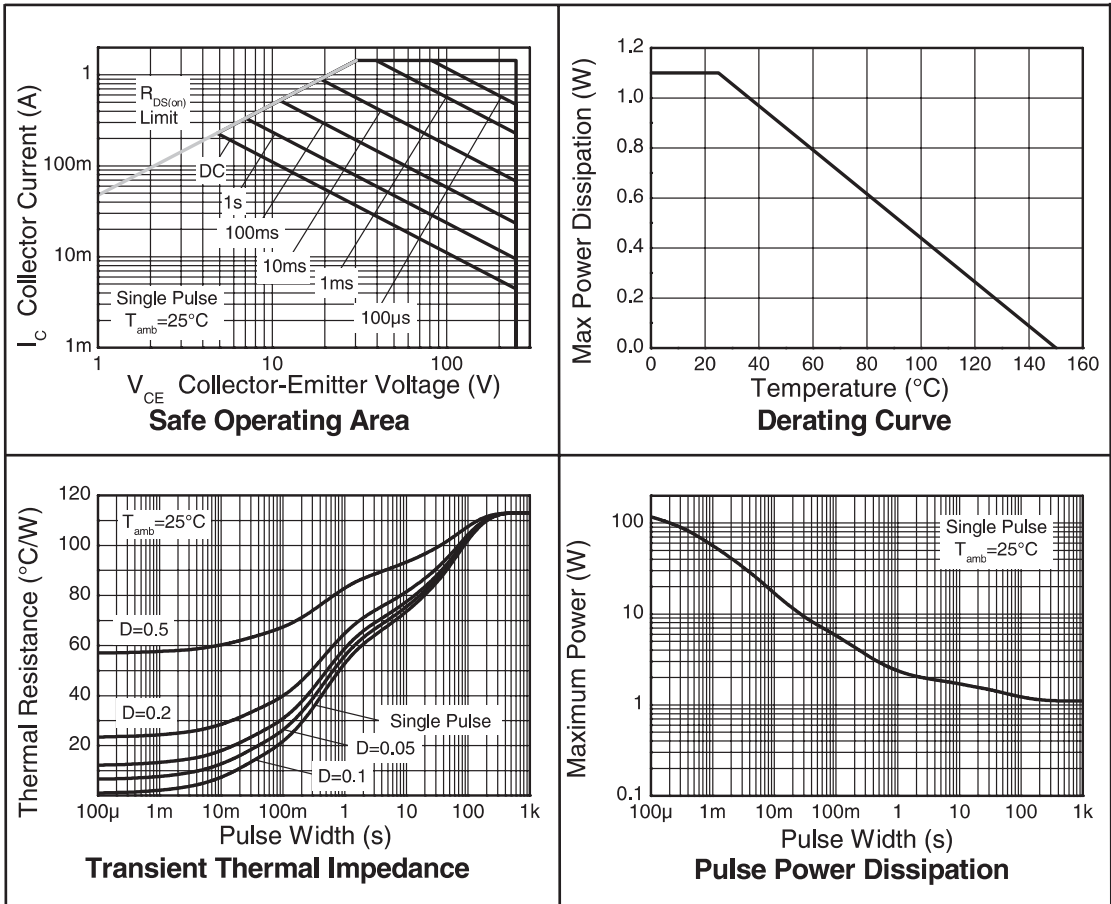
(b) For a device surface mounted on FR4 PCB measured at $t \leq 5$ secs.

(c) Repetitive rating - pulse width limited by maximum junction temperature. Refer to Transient Thermal

NB High Voltage Applications

For high voltage applications, the appropriate industry sector guidelines should be considered with regard to voltage spacing between conductors.

CHARACTERISTICS



ZVN4525E6

ELECTRICAL CHARACTERISTICS (at $T_{amb} = 25^{\circ}\text{C}$ unless otherwise stated).

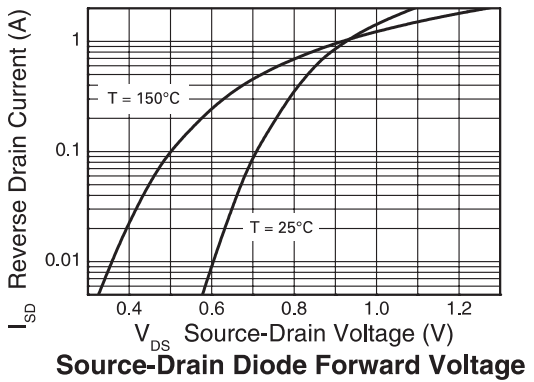
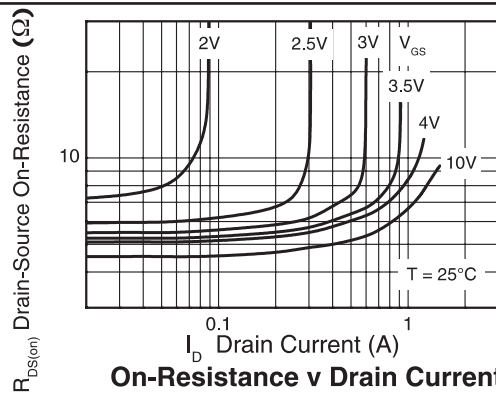
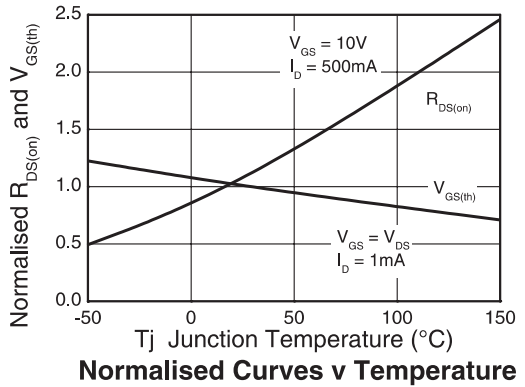
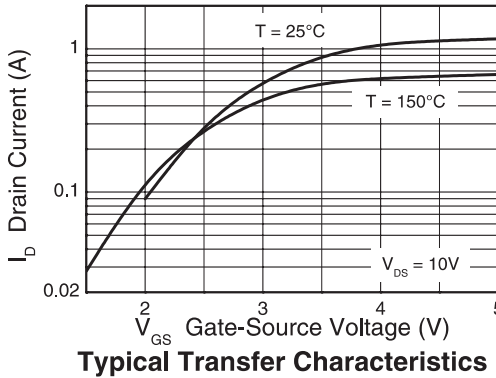
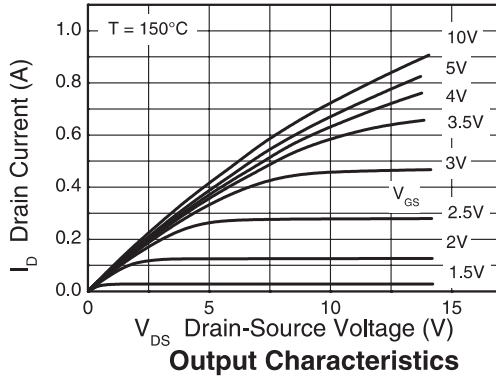
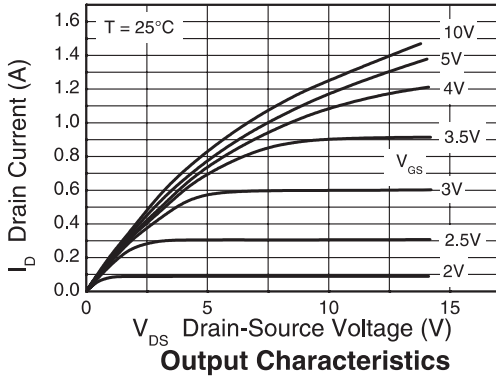
| PARAMETER | SYMBOL | MIN. | TYP. | MAX. | UNI T | CONDITIONS. |
|---|---------------|------|-------------------|-------------------|----------|--|
| STATIC | | | | | | |
| Drain-Source Breakdown Voltage | $V_{(BR)DSS}$ | 250 | 285 | | V | $I_D=1\text{mA}, V_{GS}=0\text{V}$ |
| Zero Gate Voltage Drain Current | I_{DSS} | | 35 | 500 | nA | $V_{DS}=250\text{V}, V_{GS}=0\text{V}$ |
| Gate-Body Leakage | I_{GSS} | | ± 1 | ± 100 | nA | $V_{GS}=\pm 40\text{V}, V_{DS}=0\text{V}$ |
| Gate-Source Threshold Voltage | $V_{GS(th)}$ | 0.8 | 1.4 | 1.8 | V | $I_D=1\text{mA}, V_{DS}=V_{GS}$ |
| Static Drain-Source On-State Resistance (1) | $R_{DS(on)}$ | | 5.6 5.9 6.4 | 8.5 9.0 9.5 | Ω | $V_{GS}=10\text{V}, I_D=500\text{mA}$ $V_{GS}=4.5\text{V}, I_D=360\text{mA}$ $V_{GS}=2.4\text{V}, I_D=20\text{mA}$ |
| Forward Transconductance (3) | g_{fs} | 0.3 | 0.475 | | S | $V_{DS}=10\text{V}, I_D=0.3\text{A}$ |
| DYNAMIC (3) | | | | | | |
| Input Capacitance | C_{iss} | | 72 | | pF | $V_{DS}=25\text{V}, V_{GS}=0\text{V},$ $f=1\text{MHz}$ |
| Output Capacitance | C_{oss} | | 11 | | pF | |
| Reverse Transfer Capacitance | C_{rss} | | 3.6 | | pF | |
| SWITCHING(2) (3) | | | | | | |
| Turn-On Delay Time | $t_{d(on)}$ | | 1.25 | | ns | $V_{DD}=30\text{V}, I_D=360\text{mA}$ $R_G=50\Omega, V_{GS}=10\text{V}$ (refer to test circuit) |
| Rise Time | t_r | | 1.70 | | ns | |
| Turn-Off Delay Time | $t_{d(off)}$ | | 11.40 | | ns | |
| Fall Time | t_f | | 3.5 | | ns | |
| Total Gate Charge | Q_g | | 2.6 | 3.65 | nC | $V_{DS}=25\text{V}, V_{GS}=10\text{V},$ $I_D=360\text{mA}$ (refer to test circuit) |
| Gate-Source Charge | Q_{gs} | | 0.2 | 0.28 | nC | |
| Gate Drain Charge | Q_{gd} | | 0.5 | 0.70 | nC | |
| SOURCE-DRAIN DIODE | | | | | | |
| Diode Forward Voltage (1) | V_{SD} | | | 0.97 | V | $T_j=25^{\circ}\text{C}, I_S=360\text{mA},$ $V_{GS}=0\text{V}$ |
| Reverse Recovery Time (3) | t_{rr} | | 186 | 260 | ns | $T_j=25^{\circ}\text{C}, I_F=360\text{mA},$ $di/dt= 100\text{A}/\mu\text{s}$ |
| Reverse Recovery Charge (3) | Q_{rr} | | 34 | 48 | nC | |

(1) Measured under pulsed conditions. Width=300 μs . Duty cycle $\leq 2\%$.

(2) Switching characteristics are independent of operating junction temperature.

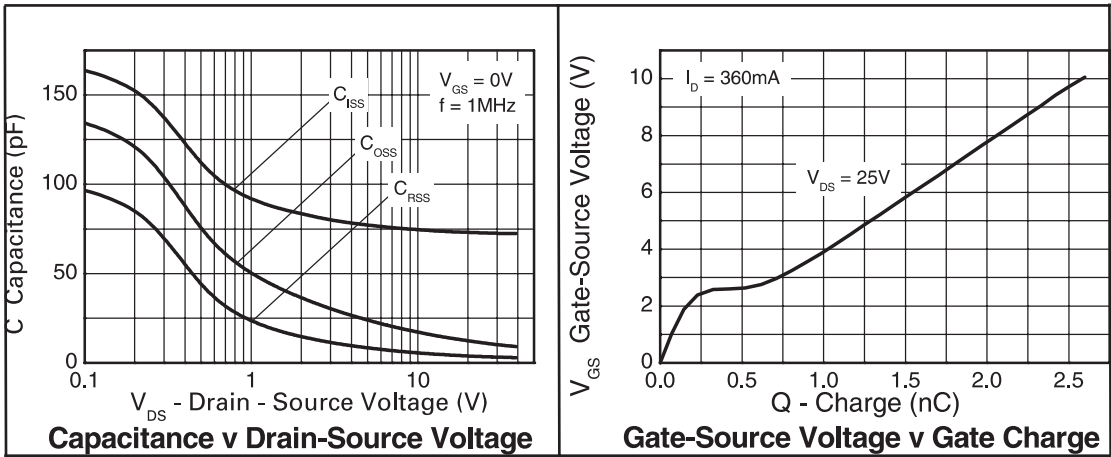
(3) For design aid only, not subject to production testing.

TYPICAL CHARACTERISTICS

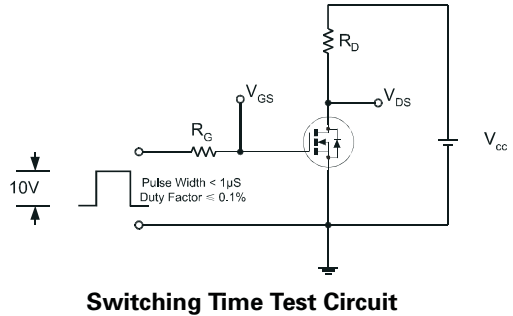
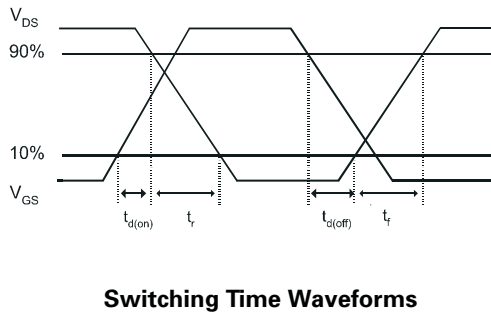
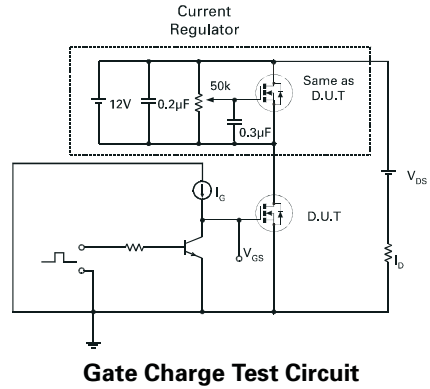
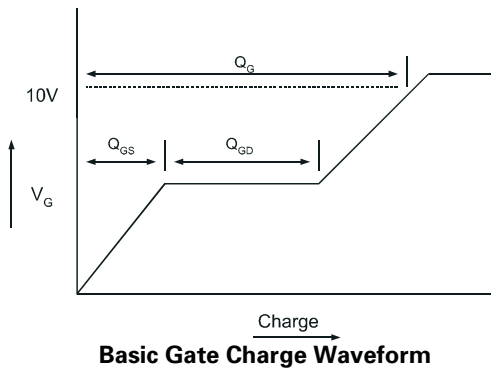


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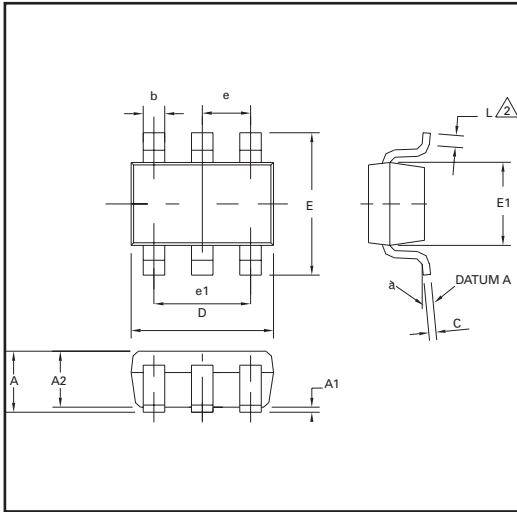


CHARACTERISTICS

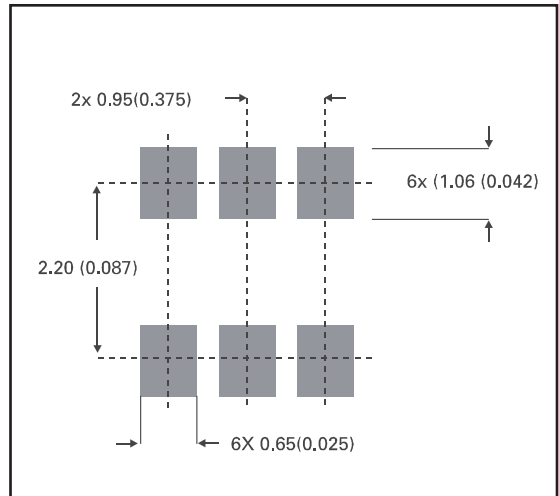


ZVN4525E6

PACKAGE DIMENSIONS



PAD LAYOUT DETAILS



| DIM | Millimetres | | Inches | |
|-----|-------------|------|-----------|-------|
| | Min | Max | Min | Max |
| A | 0.90 | 1.45 | 0.35 | 0.057 |
| A1 | 0.00 | 0.15 | 0 | 0.006 |
| A2 | 0.90 | 1.30 | 0.035 | 0.051 |
| b | 0.35 | 0.50 | 0.014 | 0.019 |
| C | 0.09 | 0.20 | 0.0035 | 0.008 |
| D | 2.80 | 3.00 | 0.110 | 0.118 |
| E | 2.60 | 3.00 | 0.102 | 0.118 |
| E1 | 1.50 | 1.75 | 0.059 | 0.069 |
| L | 0.10 | 0.60 | 0.004 | 0.002 |
| e | 0.95 REF | | 0.037 REF | |
| e1 | 1.90 REF | | 0.074 REF | |
| L | 0° | 10° | 0° | 10° |

ZETEX Zetex plc.
 Fields New Road, Chadderton, Oldham, OL9-8NP, United Kingdom.
 Telephone: (44)161 622 4422 (Sales), (44)161 622 4444 (General Enquiries)
 Fax: (44)161 622 4420

Zetex GmbH
 Streifeldstraße 19
 D-81673 München
 Germany
 Telefon: (49) 89 45 49 49 0
 Fax: (49) 89 45 49 49 49

Zetex Inc.
 47 Mall Drive, Unit 4
 Commack NY 11725
 USA
 Telephone: (631) 543-7100
 Fax: (631) 864-7630

Zetex (Asia) Ltd.
 3701-04 Metroplaza, Tower 1
 Hing Fong Road,
 Kwai Fong, Hong Kong
 Telephone: (852) 26100 611
 Fax: (852) 24250 494

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