

General Description

The WSK140N06 is the highest performance trench N-Ch MOSFET with extreme high cell density, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications.

Features

- Advanced high cell density Trench technology
- Super Low Gate Charge
- Excellent CdV/dt effect decline
- 100% EAS Guaranteed
- Green Device Available

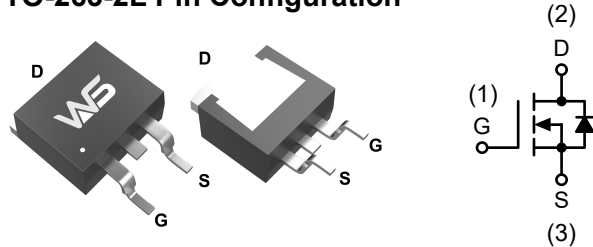
Product Summary

| BV_{DSS} | $R_{DS(on)}$ | I_D |
|------------|--------------|-------|
| 60V | 5.3mΩ | 140A |

Applications

Power Management for Inverter Systems.

TO-263-2L Pin Configuration



Absolute Maximum Ratings

| Symbol | Parameter | | Rating | Unit |
|------------------|----------------------------------|-----------------------|------------|------|
| V _{DSS} | Drain-Source Voltage | | 60 | V |
| V _{GSS} | Gate-Source Voltage | | ±20 | V |
| I _D | Continuous Drain Current | T _C =25°C | 140 | A |
| | | T _C =100°C | 70 | A |
| I _{DM} | Pulsed Drain Current * | T _C =25°C | 380 | A |
| P _D | Maximum Power Dissipation | T _C =25°C | 107 | W |
| | | T _C =100°C | 53 | W |
| I _S | Diode Continuous Forward Current | T _C =25°C | 140 | A |
| E _{AS} | Avalanche Energy, Single Pulsed | L=1mH | 500 | mJ |
| T _J | Maximum Junction Temperature | | 150 | °C |
| T _{STG} | Storage Temperature Range | | -55 to 150 | °C |

Thermal Resistance

| Symbol | Parameter | Rating | Unit |
|-----------------|--|--------|---------------|
| $R_{\theta JC}$ | Thermal Resistance-Junction to Case | 1.4 | $^{\circ}C/W$ |
| $R_{\theta JA}$ | Thermal Resistance-Junction to Ambient | 62 | |

Note :

* Repetitive rating ; pulse width limited by junction temperature

** Drain current is limited by junction temperature

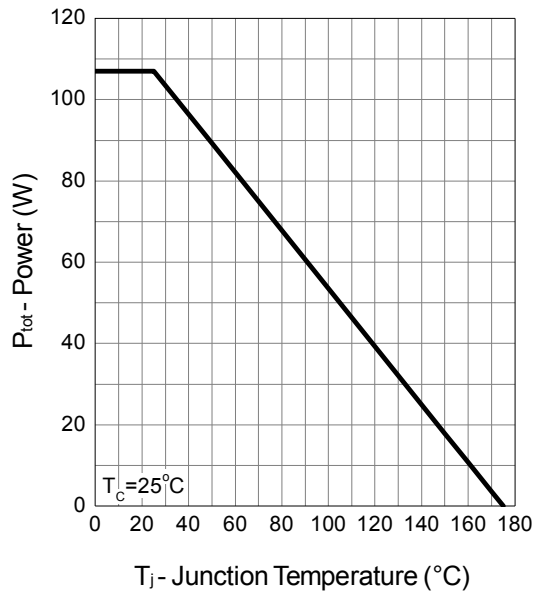
Electrical Characteristics (T= 25°C Unless Otherwise Noted)

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|-----------------------------|----------------------------------|---|------|------|------|------|
| Static Characteristics | | | | | | |
| BV _{DSS} | Drain-Source Breakdown Voltage | V _{GS} =0V, I _{DS} =250uA | 60 | - | - | V |
| I _{DSS} | Zero Gate Voltage Drain Current | V _{DS} =60V, V _{GS} =0V | - | - | 1 | uA |
| | | T _J =85°C | - | - | 10 | |
| V _{GS(th)} | Gate Threshold Voltage | V _{DS} =V _{GS} , I _{DS} =250uA | 2.0 | 3.0 | 4.0 | V |
| I _{GSS} | Gate Leakage Current | V _{GS} =±20V, V _{DS} =0V | - | - | ±100 | nA |
| R _{DS(ON)*} | Drain-Source On-state Resistance | V _{GS} =10V, I _{DS} =40A | - | 5.3 | 7.0 | mΩ |
| Diode Characteristics | | | | | | |
| V _{SD} * | Diode Forward Voltage | I _{SD} =20 A, V _{GS} =0V | - | - | 1.3 | V |
| t _{rr} | Reverse Recovery Time | I _{SD} =40A, dI _{SD} /dt=100A/us | - | 45 | - | ns |
| Q _{rr} | Reverse Recovery Charge | | - | 65 | - | nC |
| Dynamic Characteristics | | | | | | |
| R _G | Gate Resistance | V _{GS} =0V,V _{DS} =0V,F=1MHz | - | 1.1 | - | Ω |
| C _{iss} | Input Capacitance | V _{GS} =0V, V _{DS} =25V, Frequency=1.0MHz | - | 4136 | - | pF |
| C _{oss} | Output Capacitance | | - | 340 | - | |
| C _{rss} | Reverse Transfer Capacitance | | - | 260 | - | |
| t _{d(ON)} | Turn-on Delay Time | V _{DD} =30V, R _G =1.8 Ω, I _{DS} =1A, V _{GS} =10V, | - | 22 | - | ns |
| Tr | Turn-on Rise Time | | - | 24 | - | |
| t _{d(OFF)} | Turn-off Delay Time | | - | 108 | - | |
| Tf | Turn-off Fall Time | | - | 50 | - | |
| Gate Charge Characteristics | | | | | | |
| Q _g | Total Gate Charge | V _{DS} =30V, V _{GS} =10V, I _{DS} =40A | - | 90 | - | nC |
| Q _{gs} | Gate-Source Charge | | - | 15 | - | |
| Q _{gd} | Gate-Drain Charge | | - | 28 | - | |

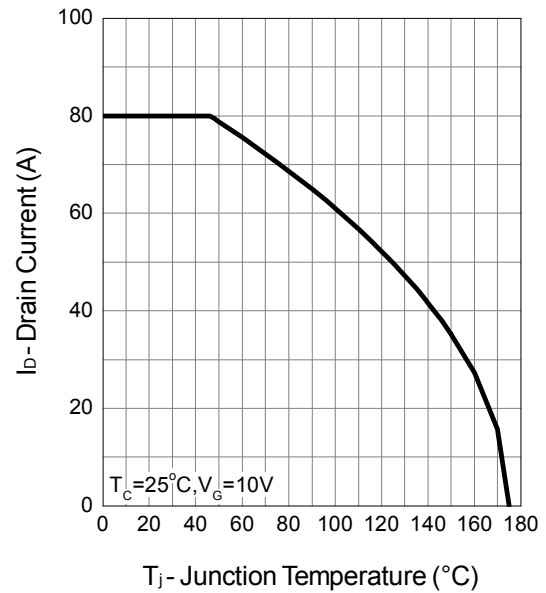
Note * : Pulse test ; pulse width ≤ 300us, duty cycle ≤ 2%.

Typical Operating Characteristics

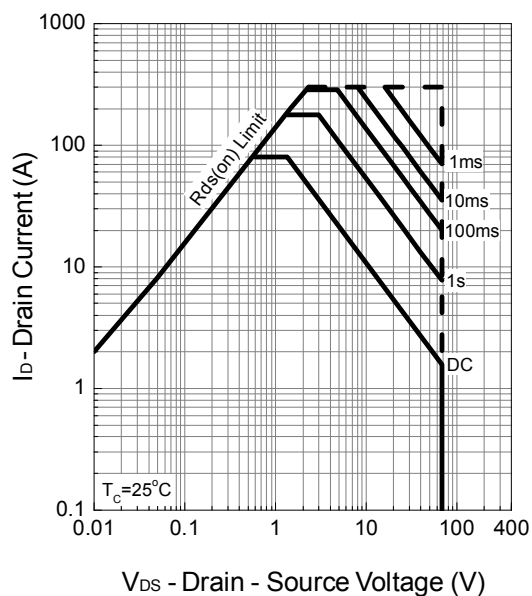
Power Dissipation



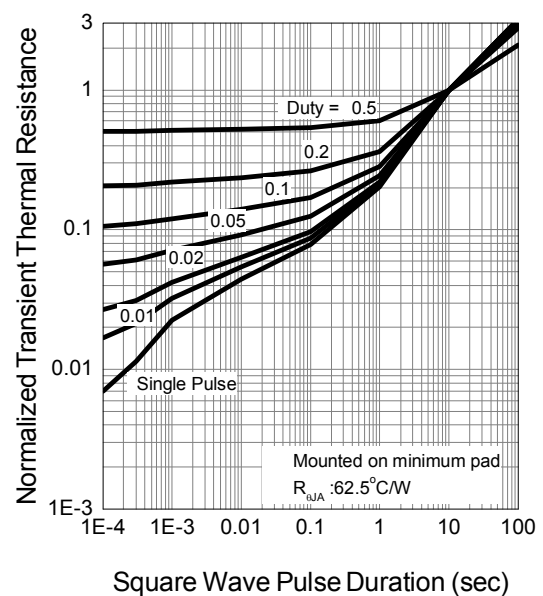
Drain Current



Safe Operation Area

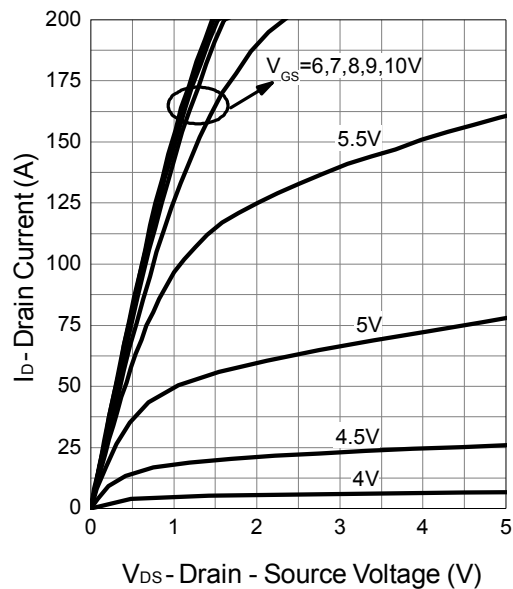


Thermal Transient Impedance

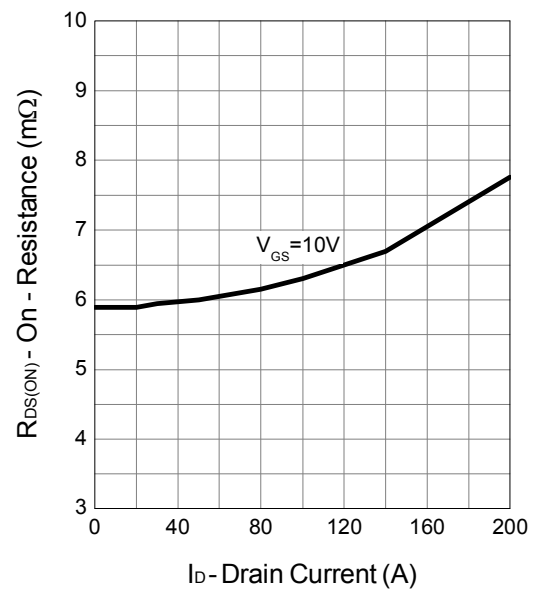


Typical Operating Characteristics (Cont.)

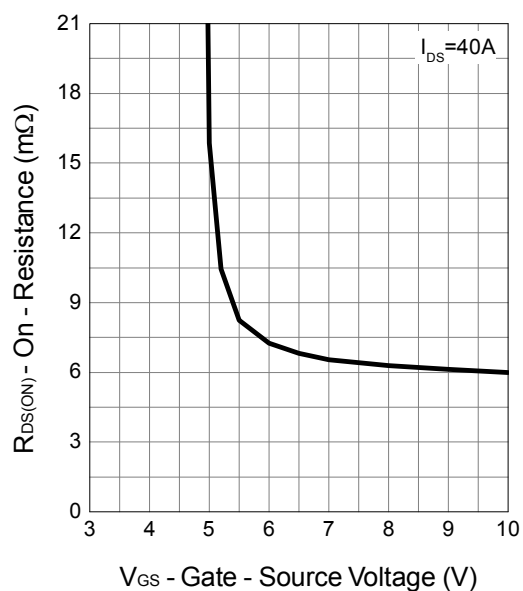
Output Characteristics



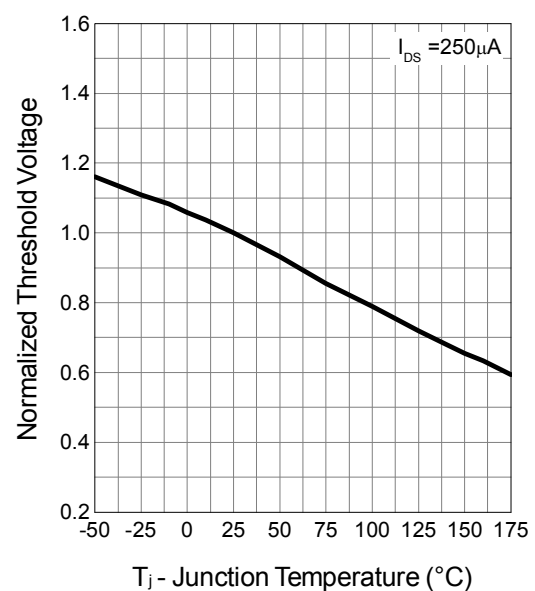
Drain-Source On Resistance



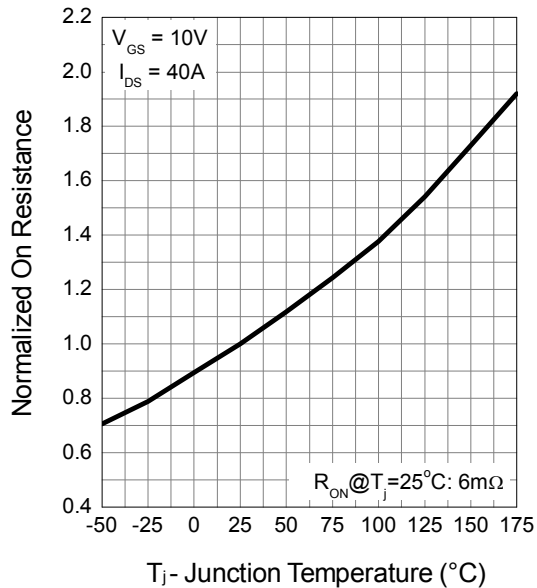
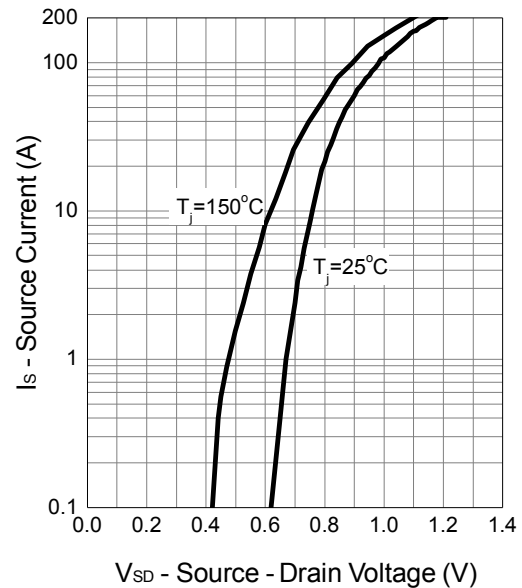
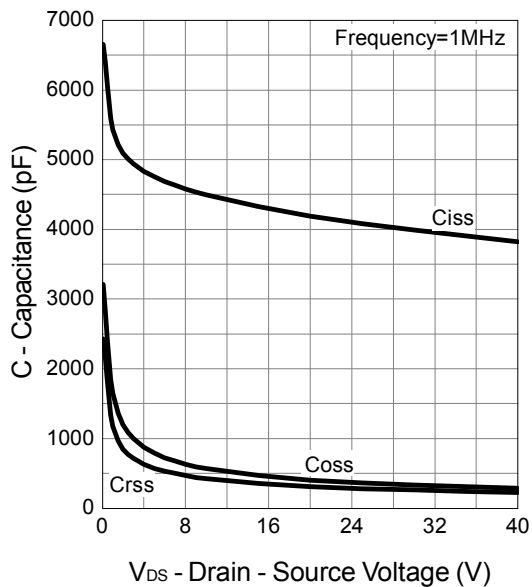
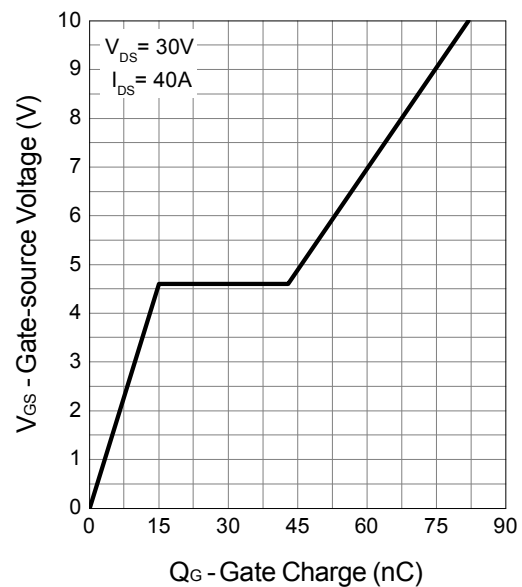
Gate-Source On Resistance



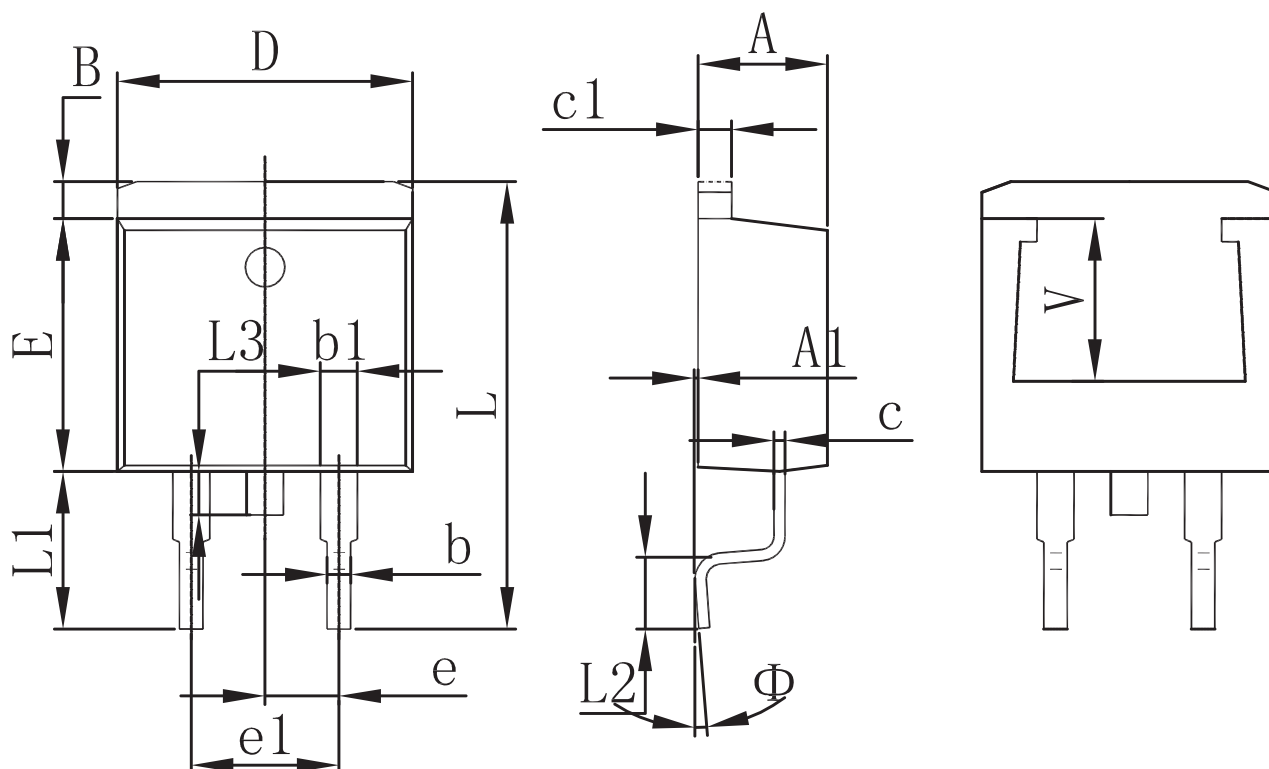
Gate Threshold Voltage



Typical Operating Characteristics (Cont.)

Drain-Source On Resistance

Source-Drain Diode Forward

Capacitance

Gate Charge


Packaging information



| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|--------|---------------------------|--------|----------------------|-------|
| | Min. | Max. | Min. | Max. |
| A | 4.470 | 4.670 | 0.176 | 0.184 |
| A1 | 0.000 | 0.150 | 0.000 | 0.006 |
| B | 1.120 | 1.420 | 0.044 | 0.056 |
| b | 0.710 | 0.910 | 0.028 | 0.036 |
| b1 | 1.170 | 1.370 | 0.046 | 0.054 |
| c | 0.310 | 0.530 | 0.012 | 0.021 |
| c1 | 1.170 | 1.370 | 0.046 | 0.054 |
| D | 10.010 | 10.310 | 0.394 | 0.406 |
| E | 8.500 | 8.900 | 0.335 | 0.350 |
| e | 2.540 TYP. | | 0.100 TYP. | |
| e1 | 4.980 | 5.180 | 0.196 | 0.204 |
| L | 14.940 | 15.500 | 0.588 | 0.610 |
| L1 | 4.950 | 5.450 | 0.195 | 0.215 |
| L2 | 2.340 | 2.740 | 0.092 | 0.108 |
| L3 | 1.300 | 1.700 | 0.051 | 0.067 |
| Φ | 0° | 8° | 0° | 8° |
| V | 5.600 REF. | | 0.220REF. | |

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