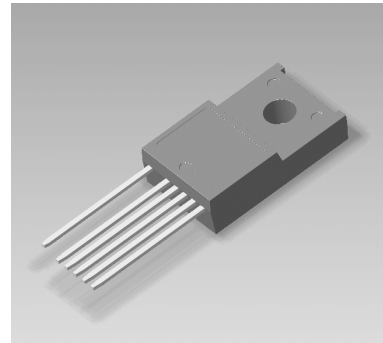


INTEGRATED SWITCHER

Features

- 6-pin SIP type full molded package, optimum IC for low-height SMPS, distance between high and low voltage pins is 1.8 mm with pin elimination.
- Oscillator is provided on the monolithic control with adopting On-Chip Trimming Technology
- Small temperature characteristics variation by adopting a comparator to compensate for temperature on the control part.
- Low start-up circuit current (100uA max)
- Avalanche energy guaranteed MOSFET with high VDSS
 - The built-in power MOSFET simplifies the surge absorption circuit since the MOSFET guarantees the avalanche energy.
 - No VDSS de-rating is required.
- Built-in constant voltage drive circuit
- Built-in step drive circuit
- Built-in low frequency PWM mode (22 kHz)
- UVLO Burst Standby
- Two operational modes by auto switching functions according to load
 - For middle~heavy load operation : QR mode
 - For light~middle load operation : 1 Bottom Skip mode
- Various kinds of protection functions
 - Pulse-by-Pulse Overcurrent Protection (OCP)
 - Overvoltage Protection with Latch mode (OVP)
 - Overload Protection with Latch mode (OLP)
 - The maximum limit of on-time

Package Outline



TO-220 Fullpack (7 Lead modified)

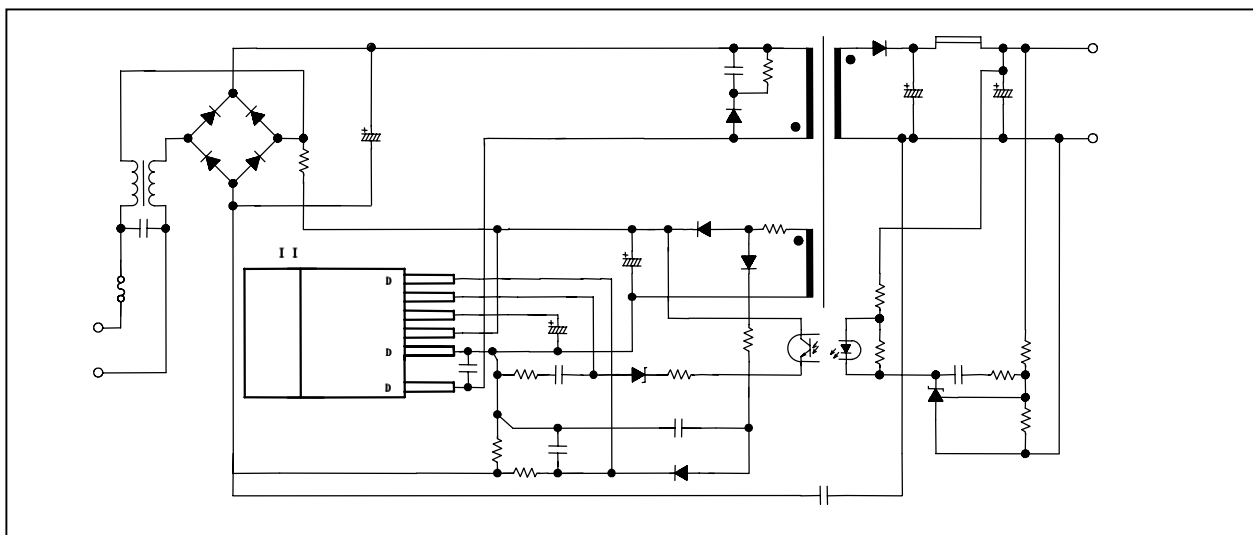
Key Specifications

| Type | MOSFET VDSS(V) | RDS(ON) MAX | AC input(V) | Pout(W) Note 1 |
|------------|----------------|-------------|-------------|----------------|
| IRIS-W6754 | 650 | | 230 15% | 160 |
| | | | 85 to 264 | 100 |

Description

IRIS-W6754 is a hybrid IC consisting of a power MOSFET and a controller IC, designed for Quasi-Resonant (including low frequency PWM) fly-back converter type SMPS (Switching Mode Power Supply) applications. This IC realizes high efficiency, low noise, downsizing and standardizing of a power supply system reducing external component count and simplifying the circuit design.

Typical Connection Diagram



Note 1:

The Pout (W) represents the thermal rating at Quasi-Resonant operation, and the peak power output is obtained by approximating 120 to 140 % of the above listed value. When the output voltage is low, and the ON-duty is narrow, the Pout (W) shall become lower than that of the above.

Absolute Maximum Ratings

Absolute maximum ratings indicate sustained limits beyond which damage to the device may occur. All voltage parameters are absolute voltages referenced to terminals stated, all currents are defined positive into any lead. The thermal resistance and power dissipation ratings are measured under board mounted and still air conditions.

| Symbol | Definition | Terminal s | Max. Ratings | Units | Note |
|--------------------|------------------------------------------|---------------|--------------|-------|------------------------------------------------|
| I _{Dpeak} | Drain Current * 1 | 1 - 3 | 15 | A | Single Pulse |
| I _{DMAX} | Maximum switching current *2 | 1 - 3 | 15 | A | Ta=-20~+125 |
| E _{AS} | Single pulse avalanche energy *3 | 1 - 3 | 292 | mJ | Single Pulse |
| | | | | | V _{DD} =99V, L=20mH |
| | | | | | I _L =5.1A |
| V _{CC} | Input voltage for control part | 4 - 3 | 35 | V | |
| V _{SSOLP} | SS/OLP pin voltage | 5 - 3 | -0.5 ~ 6.0 | V | |
| I _{FB} | FB pin inflow current | 6- 3 | 10 | mA | |
| V _{FB} | FB pin voltage | 6- 3 | -0.5 ~ 9.0 | V | within the limits of IFB |
| V _{OCPBD} | O.C.P/F.B pin voltage | 7- 3 | -1.5 ~ 5.0 | V | |
| P _{D1} | Power dissipation of MOSFET *4 | 1 - 3 | 28.0 | W | With infinite heatsink |
| | | | 1.1 | | Without heatsink |
| P _{D2} | Power dissipation for control part (MIC) | 4 - 3 | 0.8 | W | Specified by V _{cc} x I _{cc} |
| T _F | Internal frame temperature in operation | - | -20 ~ +115 | | Refer to recommended operating temperature |
| T _{op} | Operating ambient temperature | - | -20 ~ +115 | | |
| T _{stg} | Storage temperature | - | -40 ~ +125 | | |
| T _{ch} | Channel temperature | - | 150 | | |

*1 Refer to MOS FET A.S.O. curve

*2 Maximum switching current

The maximum switching current is the Drain current determined by the drive voltage of the IC and threshold voltage (V_{th}) of the MOS FET.

*3 Refer to MOS FET T_{ch}-EAS curve

*4 Refer to MOS FET Ta-PD1 curve

Electrical Characteristics (for Control IC)

Electrical characteristics for control part (Ta=25 , Vin=20V,unless otherwise specified)

| Symbol | Definition | Terminals | Ratings | | | Units | Note |
|----------------------------------------|---------------------------------------|-----------|---------|------|------|-------|--------------------------------|
| | | | MIN | TYP | MAX | | |
| Power Supply Start-up Operation | | | | | | | |
| V _{CC(ON)} | Operation Start Voltage | 4 - 3 | 16.3 | 18.2 | 19.9 | V | V _{cc} =0 19.9V |
| V _{CC(OFF)} | Operation Stop Voltage | 4 - 3 | 8.8 | 9.7 | 10.6 | V | V _{cc} =19.9 8.8 V |
| I _{CC(ON)} | Circuit Current in Operation | 4 - 3 | - | - | 6 | mA | - |
| I _{CC(OFF)} | Circuit Current in Non-Operation | 4 - 3 | - | - | 100 | μA | V _{cc} =15V |
| f _{osc} | Oscillation Frequency | 1 - 3 | 19 | 22 | 25 | kHz | - |
| V _{SSOLP(SS)} | Soft Start Operation Stop Voltage | 5 - 3 | 1.1 | 1.2 | 1.4 | V | - |
| I _{SSOLP(SS)} | Soft Start Operation Charging Current | 5 - 3 | -710 | -550 | -390 | μA | - |

| Normal Operation | | | | | | | |
|-------------------------|----------------------------------------------|-------|--------|--------|--------|----|---|
| V _{OCBPD(BS1)} | Bottom-Skip Operation Threshold Voltage1 | 7 - 3 | -0.72 | -0.665 | -0.605 | V | - |
| V _{OCBPD(BS2)} | Bottom-Skip Operation Threshold Voltage2 | 7 - 3 | -0.485 | -0.435 | -0.385 | V | - |
| V _{OCBPD(LIM)} | Overcurrent Detection Threshold Voltage | 7 - 3 | -0.995 | -0.94 | -0.895 | V | - |
| I _{OCBPD} | OCP/BD Pin Outflow Current | 7 - 3 | -250 | -100 | -40 | μA | - |
| V _{OCBPD(TH1)} | Quasi-Resonant Operation Threshold Voltage 1 | 7 - 3 | 0.28 | 0.4 | 0.52 | V | - |
| V _{OCBPD(TH2)} | Quasi-Resonant Operation Threshold Voltage 2 | 7 - 3 | 0.67 | 0.8 | 0.93 | V | - |
| V _{FB(OFF)} | FB Pin Threshold Voltage | 6 - 3 | 1.32 | 1.45 | 1.58 | V | - |
| I _{FB(ON)} | FB Pin Inflow Current (Normal Operation) | 6 - 3 | 600 | 1000 | 1400 | μA | - |

IRIS-W6754

Electrical Characteristics (for Control IC), Contd.

| Stand-by Operation | | | | | | | |
|----------------------|---------------------------------------------|-------|------|------|------|-----------|--------------------------------------------|
| $V_{CC(S)}$ | Stand-by Operation Start Voltage | 4 - 3 | 10.3 | 11.1 | 12.1 | V | $V_{CC}=0 \rightarrow 12.2V$ |
| $V_{CC(SK)}$ | Stand-by Operation Start Voltage Interval | 4 - 3 | 1.1 | 1.35 | 1.65 | V | - |
| $I_{CC(S)}$ | Stand-by Non-Operation Circuit Current | 4 - 3 | - | 20 | 56 | μA | $V_{CC}=10.2V$ |
| $I_{FB(S)}$ | FB Pin Inflow Current (Stand-by) | 6 - 3 | - | 4 | 14 | μA | $V_{CC}=10.2V$ |
| $V_{FB(S)}$ | Stand-by Operation FB Pin Threshold Voltage | 6 - 3 | 0.55 | 1.1 | 1.5 | V | $V_{CC}=12.2V$ |
| $T_{ON(MIN)}$ | Minimum ON Time | 1 - 3 | 0.5 | 0.8 | 1.1 | μSec | - |
| Protection Operation | | | | | | | |
| $T_{ON(MAX)}$ | Maximum ON Time | 1 - 3 | 27.5 | 32.5 | 39 | μSec | - |
| $V_{SSOLP(OLP)}$ | OLP Operation Threshold Voltage | 5 - 3 | 4 | 4.9 | 5.8 | V | - |
| $I_{SSOLP(OLP)}$ | OLP Operation Charging Current | 5 - 3 | -16 | -11 | -6 | μA | - |
| $V_{CC(OVP)}$ | OVP Operation Voltage | 4 - 3 | 25.5 | 27.7 | 29.9 | V | $V_{CC}=0 \rightarrow 29.9V$ |
| $I_{CC(H)}$ | Latch Circuit Holding Current *5 | 4 - 3 | -- | 45 | 140 | μA | $V_{CC}=29.9 \rightarrow V_{CC(OFF)}-0.3V$ |
| VCC(La.OFF) | Latch Circuit Release Voltage *5 | 4 - 3 | 6 | 7.2 | 8.5 | V | $V_{CC}=29.9 \rightarrow 6V$ |

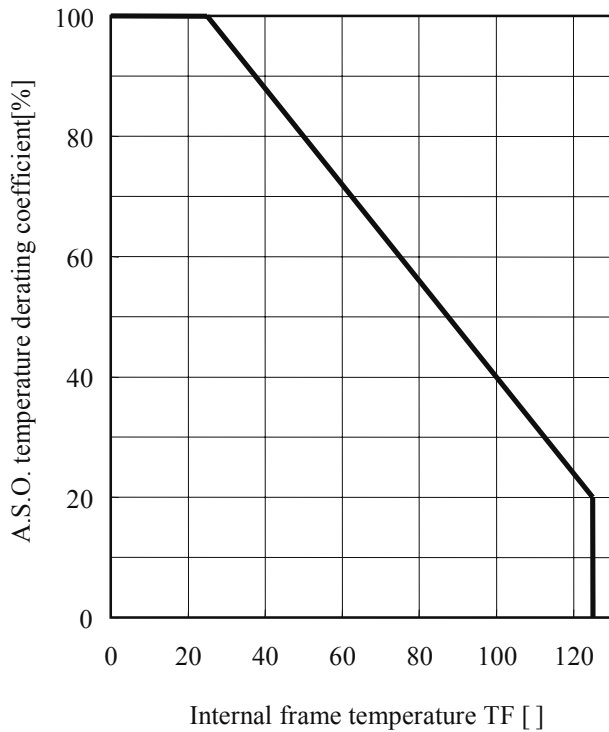
*5 The latch circuit means a circuit operated O.V.P and O.L.P.

*6 The current ratings are based on those of the IC , and plus(+) represents sink and minus(-) represents source.

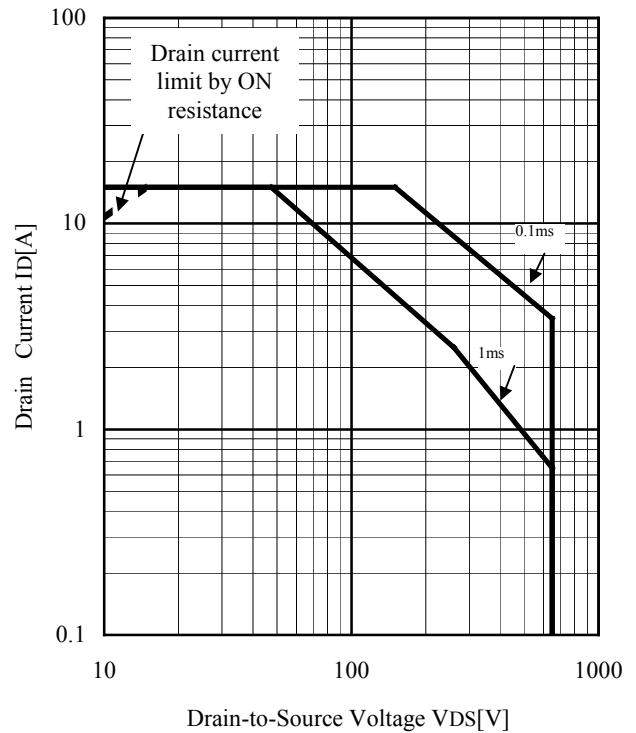
Electrical characteristics for MOSFET (Ta=25 deg C)

| Symbol | Definition | Terminals | Ratings | | | Units | Note |
|---------------------|-----------------------------------|-----------|---------|-----|------|-------|------------------------------------|
| | | | MIN | TYP | MAX | | |
| V _{DSS} | Drain-to-Source breakdown voltage | 1 - 3 | 650 | - | - | V | I _D =300μA |
| I _{DSS} | Drain leakage current | 1 - 3 | - | - | 300 | μA | V _{DS} =650V |
| R _{DS(ON)} | On-resistance | 1 - 3 | - | - | 0.96 | | I _D =1.9A |
| t _f | Switching time | 1 - 3 | - | - | 400 | nSec | - |
| ch-F | Thermal resistance | - | - | - | 1.6 | /W | Between channel and internal frame |

IRIS-W6754
 A.S.O. temperature derating coefficient curve

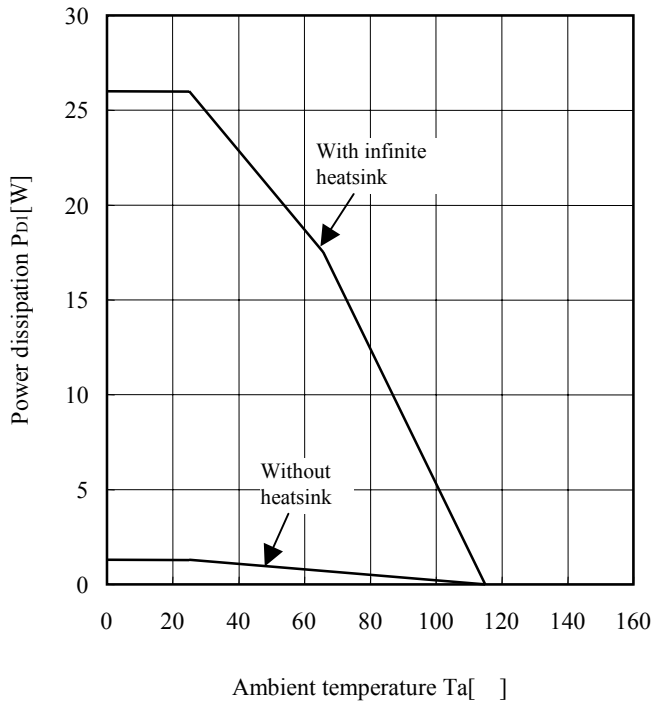


IRIS-W6754
 MOS FET A.S.O. curve

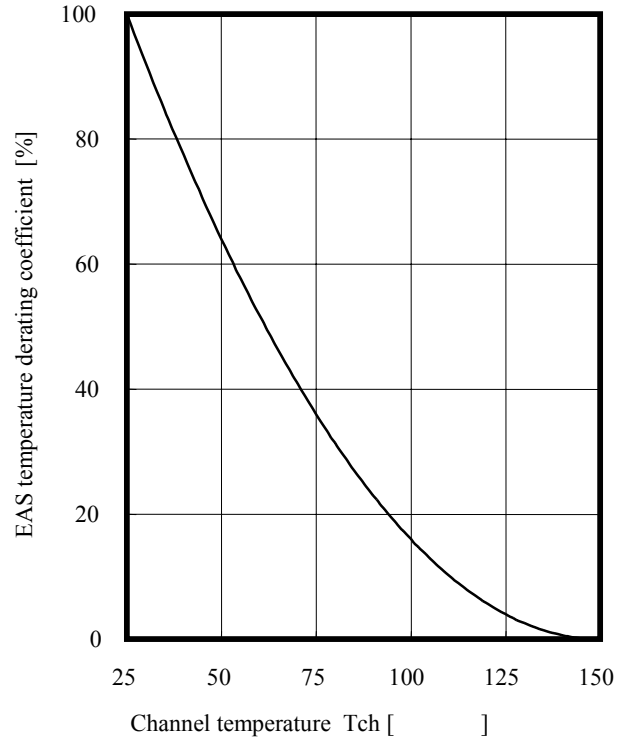


IRIS-W6754

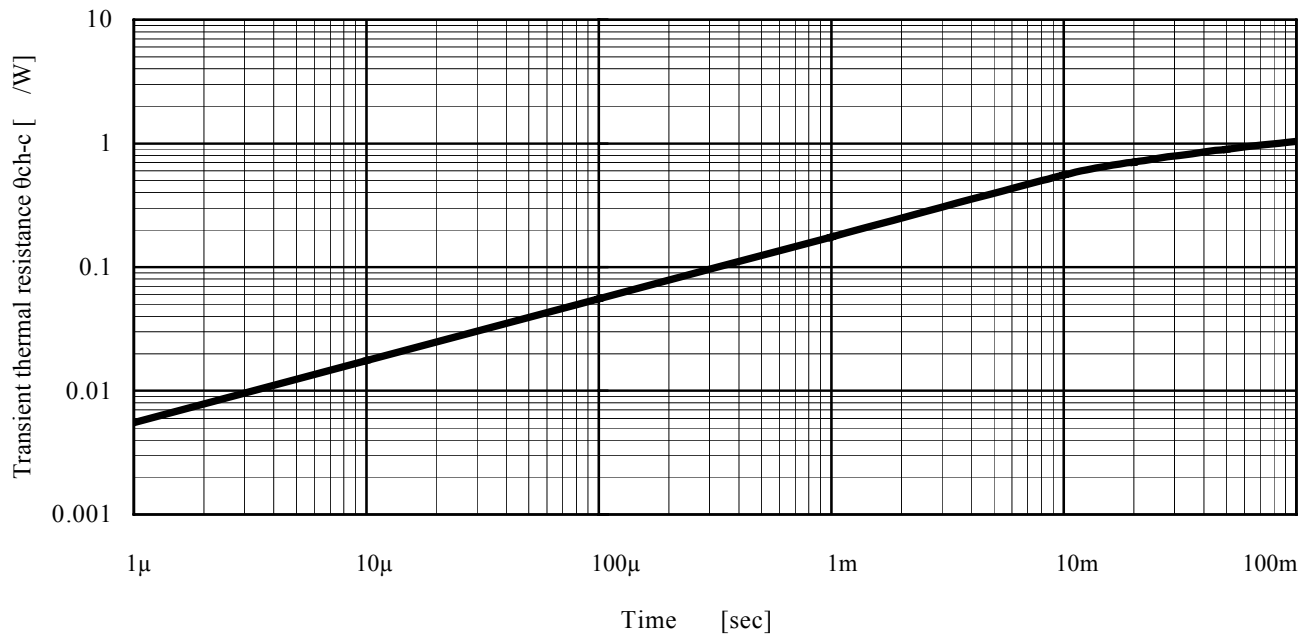
IRIS-W6754
MOSFET Ta-PD1 Curve



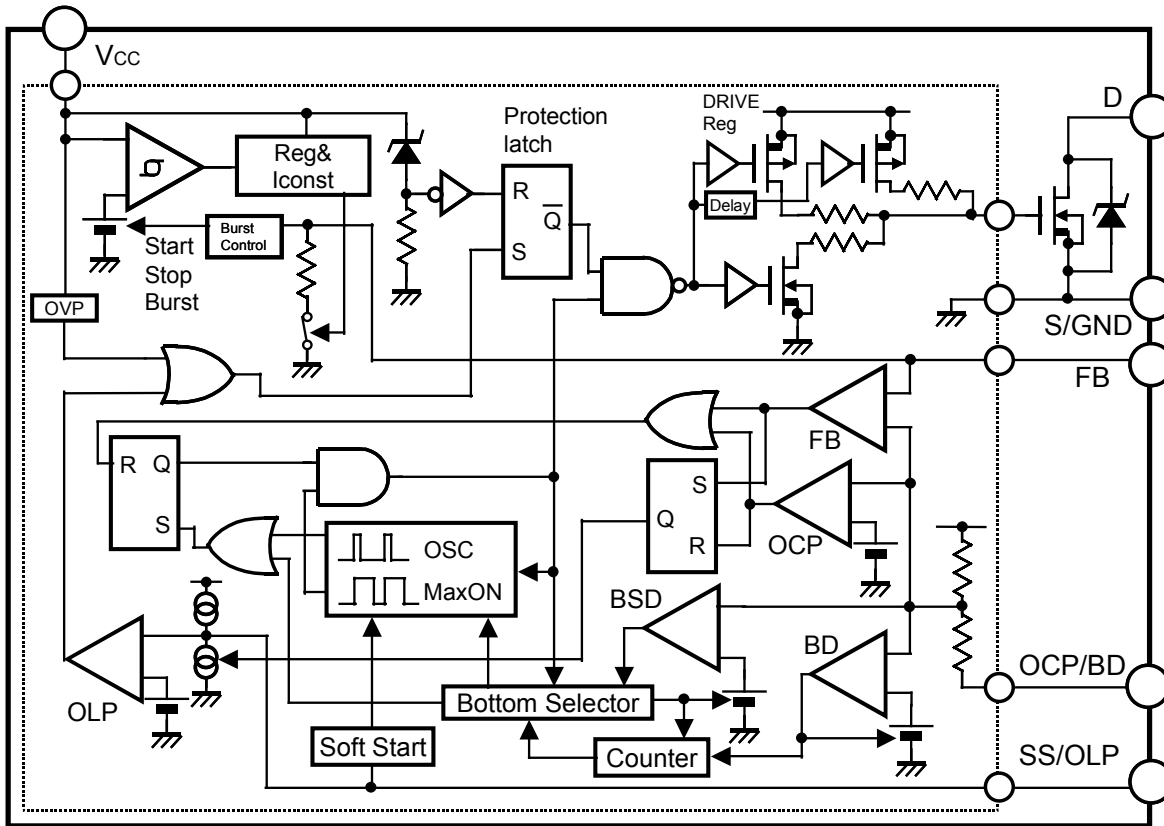
IRIS-W6754
Avalanche energy derating curve



IRIS-W6754
Transient thermal resistance curve



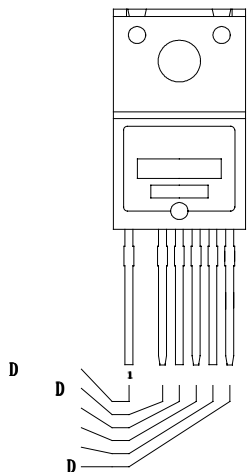
Block Diagram



Pin Designation

| Pin No. | Symbols | Descriptions | Functions |
|---------|---------|-----------------------------------------------------|-------------------------------------------------------------------------------------|
| 1 | D | Drain pin | MOSFET drain |
| 3 | S/GND | Source /Ground pin | MOSFET Source / Ground |
| 4 | VCC | Power supply pin | Input of power supply for control circuit |
| 5 | SS/OLP | Delay at Overload /Soft Start set up Pin | Overload Protection and Soft Start Operation Time set up |
| 6 | FB | Feedback pin | Constant Voltage Control Signal Input, Burst(intermittent) mode Oscillation Control |
| 7 | OCP/BD | Overcurrent Protection Input / Bottom Detection Pin | Overcurrent Detection Signal Input /Bottom Detection Signal Input |

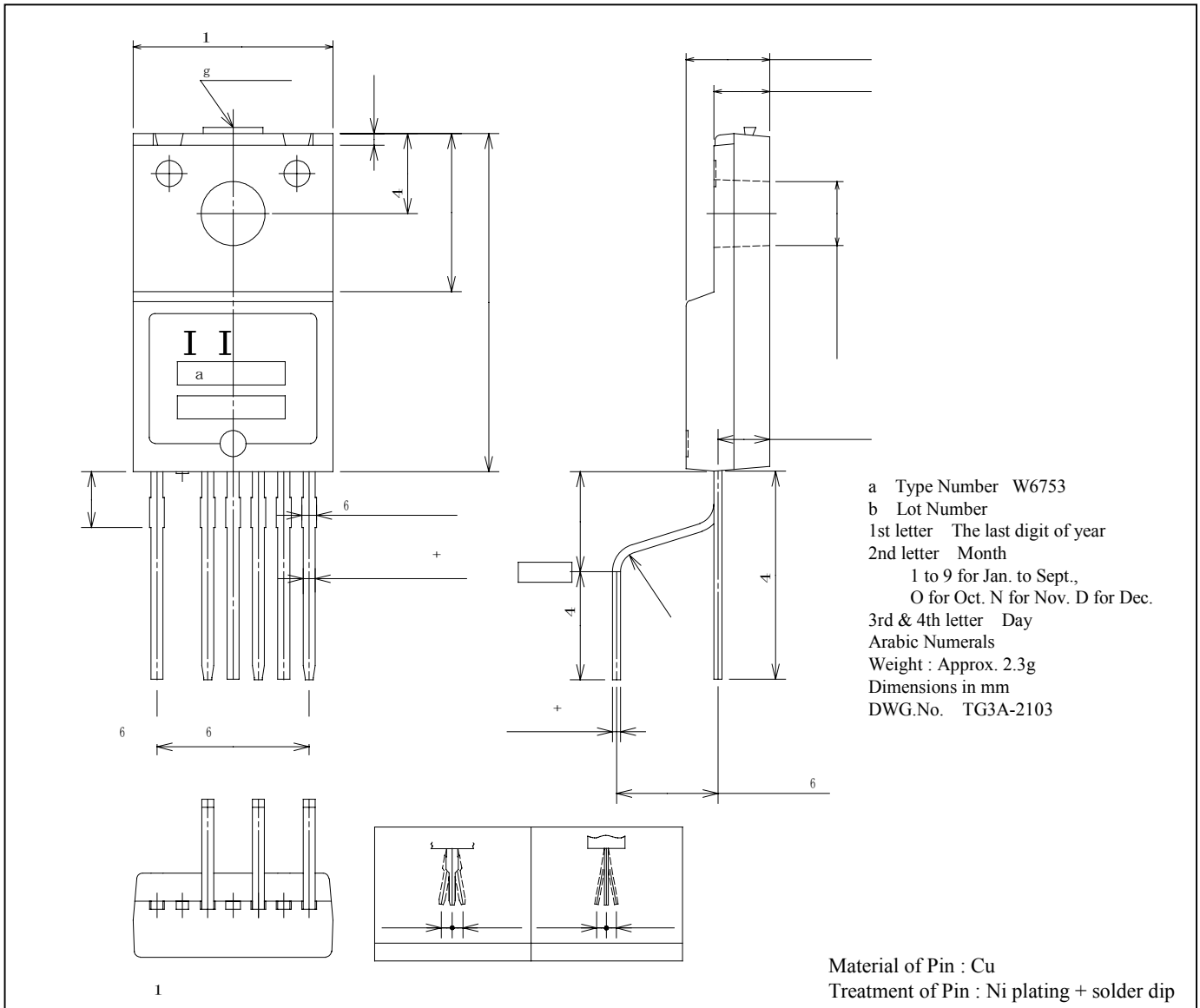
Pin Assignments



IRIS-W6754

Case Outline

International
IOR Rectifier



Data and specifications subject to change without notice.

International
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