## Description

The MT4953 provide the designer with the best combination of fast switching, ruggedized device design, low on-resistance and cost-effectiveness.

The SOP-8 package is universally preferred for all commercial-industrial surface mount applications and suited for low voltage applications such as DC/DC converters.

## Features

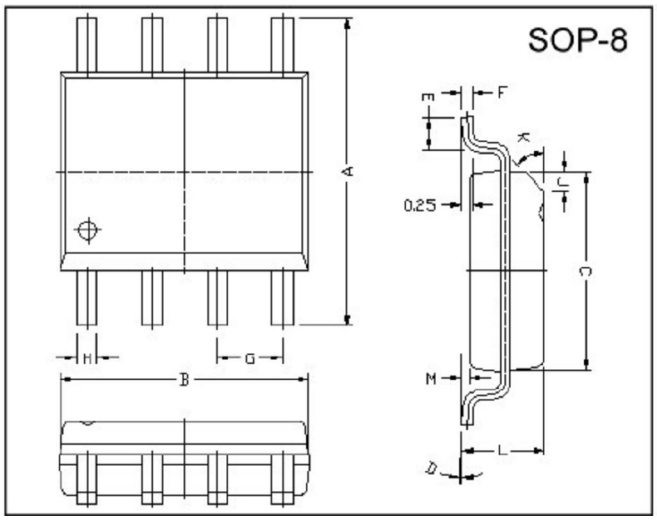
***** Simple Drive Requirement

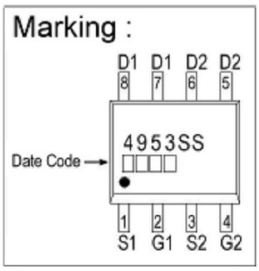
***** Lower on-resistance

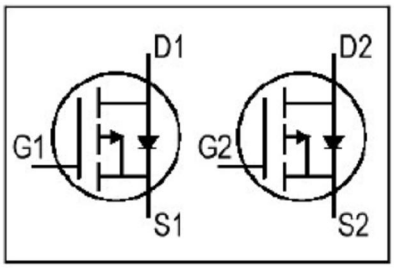
***** Fast Switching

| | |
|---|---|
| **$BV_{DSS}$** | **- 30 V** |
| **$R_{DS(ON)}$** | **53 mΩ** |
| **$I_D$** | **- 5 A** |

## Package Dimensions




| REF. | Millimeter | | REF. | Millimeter | |
|---|---|---|---|---|---|
| | Min. | Max. | | Min. | Max. |
| A | 5.80 | 6.20 | M | 0.10 | 0.25 |
| B | 4.80 | 5.00 | H | 0.35 | 0.49 |
| C | 3.80 | 4.00 | L | 1.35 | 1.75 |
| D | 0° | 8° | J | 0.375 REF. | |
| E | 0.40 | 0.90 | K | 45° | |
| F | 0.19 | 0.25 | G | 1.27 TYP. | |

## Absolute Maximum Ratings

| Parameter | Symbol | Ratings | Unit |
|---|---|---|---|
| Drain-Source Voltage | $V_{DS}$ | -30 | V |
| Gate-Source Voltage | $V_{GS}$ | +/- 16 | V |
| Continuous Drain Current[1] | $I_D$ @$T_A$=25℃ | -5 | A |
| Continuous Drain Current[1] | $I_D$ @$T_A$=70℃ | -4 | A |
| Pulsed Drain Current[2] | $I_{DM}$ | -20 | A |
| Total Power Dissipation[1] | $P_D$ @$T_A$=25℃ | 2 | W |
| Linear Derating Factor | | 0.02 | W/℃ |
| o perating Junction and Storage Temperature Range | Tj, Tstg | -55~+150 | ℃ |

## Thermal Data

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Thermal Resistance Junction-ambient[1] Max. | Rthj-amb | 62.5 | ℃/W |

## Electrical Characteristics (Tj = 25℃ unless otherwise specified)

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Test Conditions |
|---|---|---|---|---|---|---|
| Drain-Source Breakdown Voltage | $BV_{DSS}$ | -30 | - | - | V | $V_{GS}$=0, $I_D$=-250uA |
| Gate Threshold Voltage | $V_{GS(th)}$ | -1.0 | - | -2.5 | V | $V_{DS}$=$V_{GS}$, $I_D$=-250uA |
| Forward Transconductance[2] | $g_{fs}$ | - | 5 | - | S | $V_{DS}$=-5V, $I_D$=-5A |
| Gate-Source Leakage Current | $I_{GSS}$ | - | - | ±100 | nA | $V_{GS}$= ±16V |
| Drain-Source Leakage Current | $I_{DSS}$ | - | - | -1 | uA | $V_{DS}$=-24V, $V_{GS}$=0 |
| Static Drain-Source On-Resistance[2] | $R_{DS(ON)}$ | - | - | 53 | mΩ | $V_{GS}$=-10V, $I_D$=-5A |
| | | - | - | 90 | | $V_{GS}$=-4.5V, $I_D$=-4A |
| Total Gate Charge[2] | $Q_g$ | - | 11.7 | - | nC | $I_D$=-5A<br>$V_{DS}$=-15V<br>$V_{GS}$=-10V |
| Gate-Source Charge | $Q_{gs}$ | - | 2.1 | - | | |
| Gate-Drain ("Miller") Change | $Q_{gd}$ | - | 2.9 | - | | |
| Turn-on Delay Time[2] | $T_{d(on)}$ | - | 9 | - | ns | $V_{DS}$=-15V<br>$I_D$=-1A<br>$V_{GS}$=-10V<br>$R_G$=6Ω<br>$R_D$=15Ω |
| Rise Time | $T_r$ | - | 10 | - | | |
| Turn-off Delay Time | $T_{d(off)}$ | - | 37 | - | | |
| Fall Time | $T_f$ | - | 23 | - | | |
| Input Capacitance | $C_{iss}$ | - | 582 | - | pF | $V_{GS}$=0V<br>$V_{DS}$=-15V<br>f=1.0MHz |
| Output Capacitance | $C_{oss}$ | - | 125 | - | | |
| Reverse Transfer Capacitance | $C_{rss}$ | - | 86 | - | | |

## Source-Drain Diode

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Test Conditions |
|---|---|---|---|---|---|---|
| Forward On Voltage[2] | $V_{SD}$ | - | -0.84 | -1.2 | V | $I_S$=-1.7A, $V_{GS}$=0V |

Notes: 1. Surface Mounted on FR4 Board, t≦10sec.

2. Pulse width≦300us, duty cycle≦2%.

## Characteristics Curve

**Fig 1. Typical Output Characteristics**

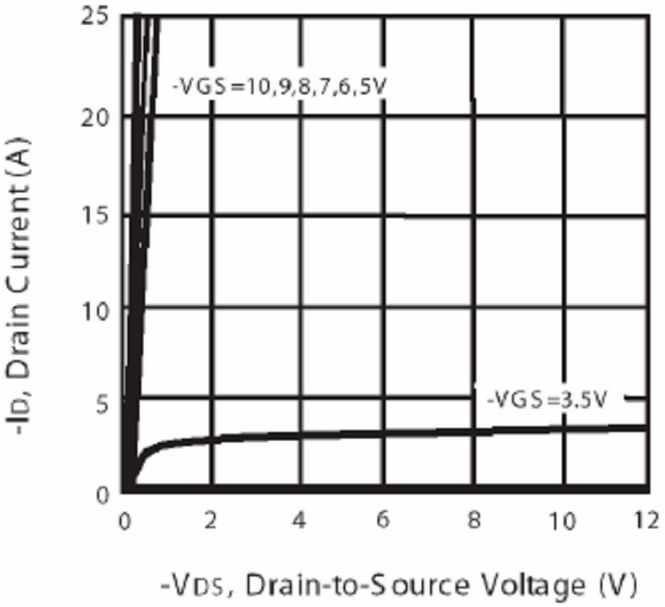



**Fig 2. Transfer Characteristics**

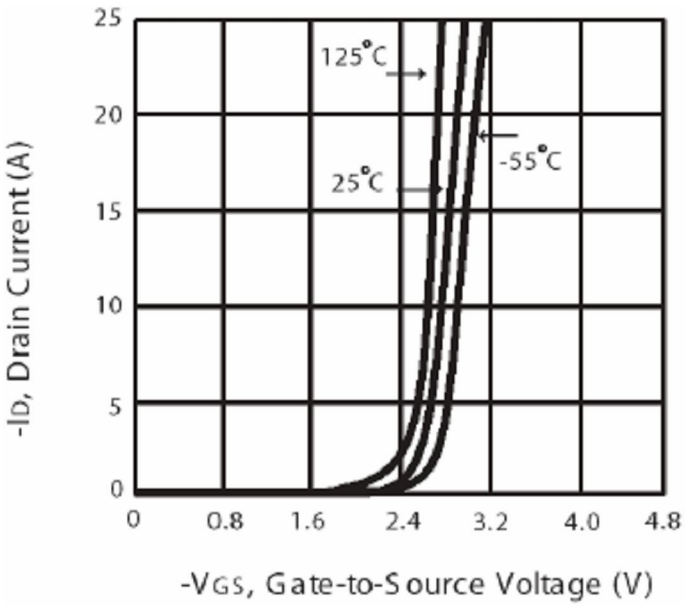



**Fig 3. Transconductance v.s. Drain Current**

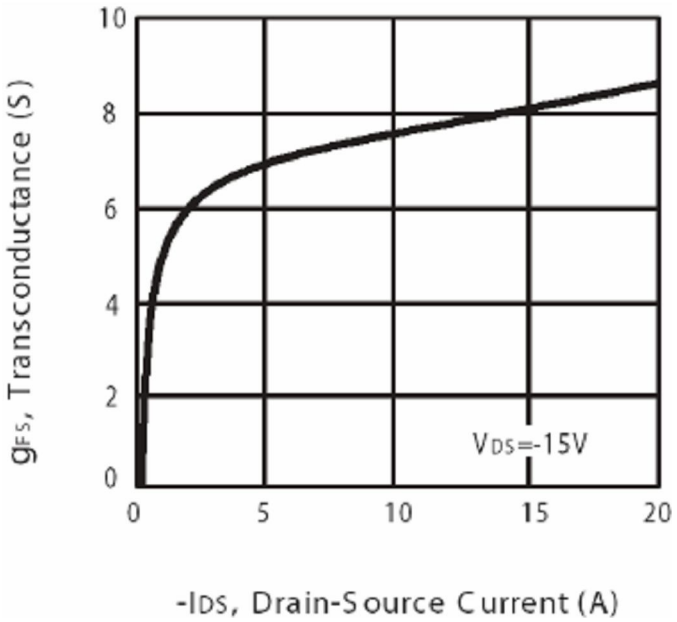



**Fig 4. On-Resistance v.s. Junction Temperature**

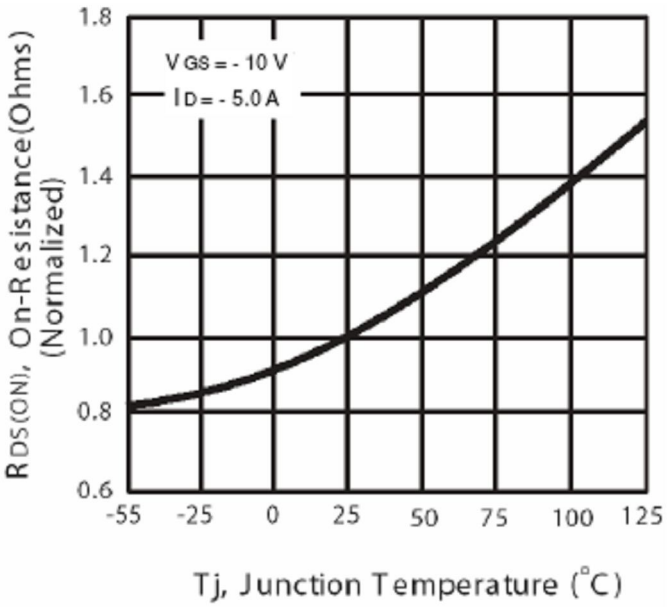


**Fig 5. Breakdown Voltage v.s. Junction Temperature**

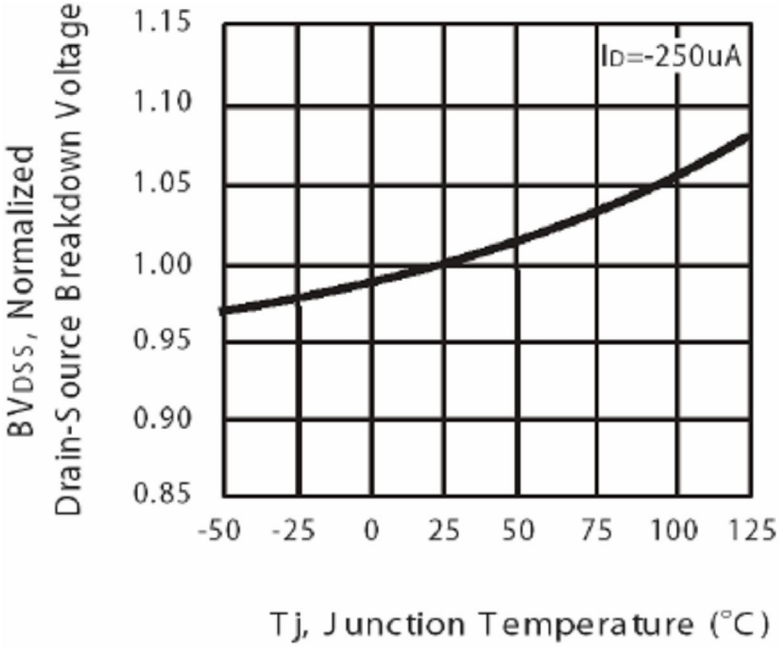



**Fig 6. Body Diode Forward Voltage v.s. Source Current**

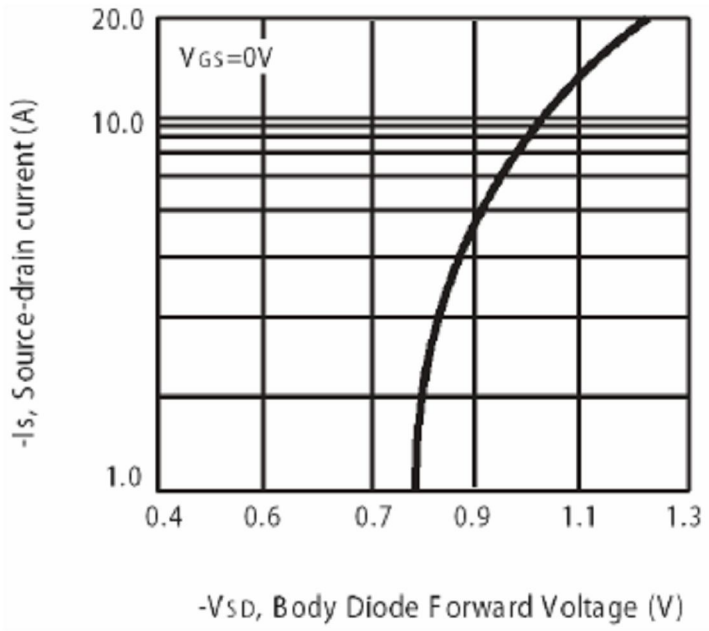


**Fig 7. Maximum Safe Operating Area**

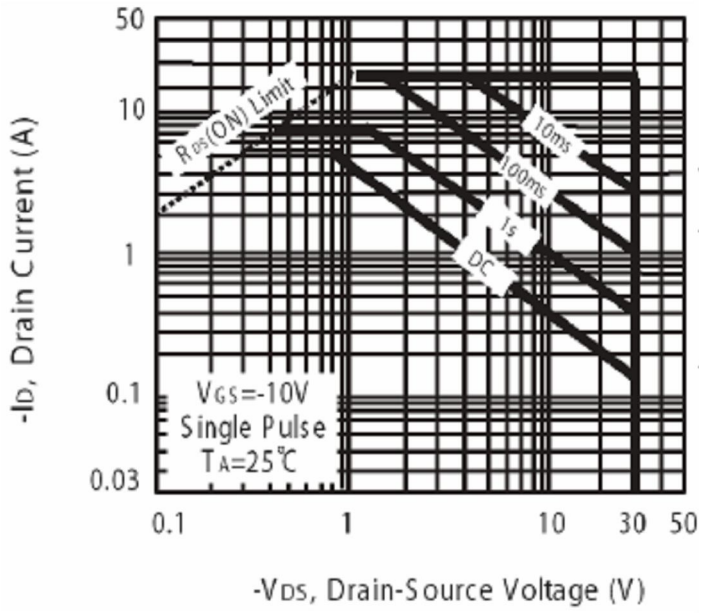



**Fig 8. Gate Threshold Voltage v.s. Junction Temperature**

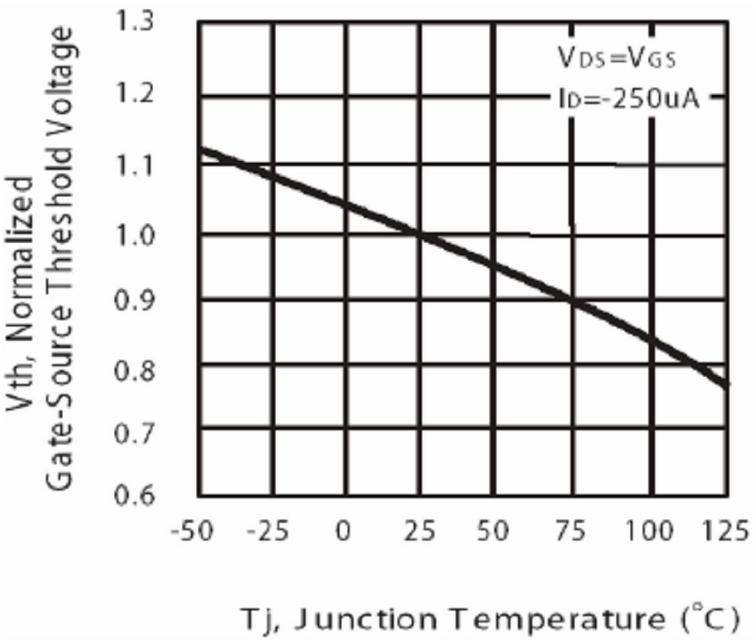


**Fig 9. Gate Charge Characteristics**

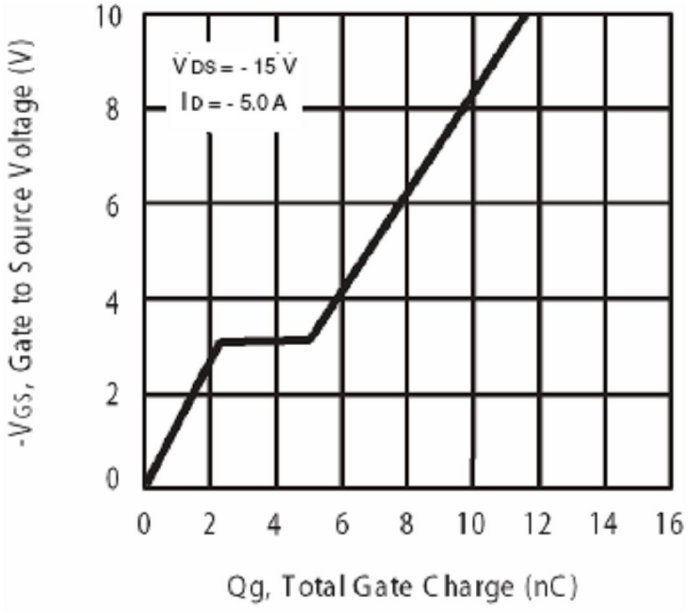



**Fig 10. Typical Capacitance Characteristics**

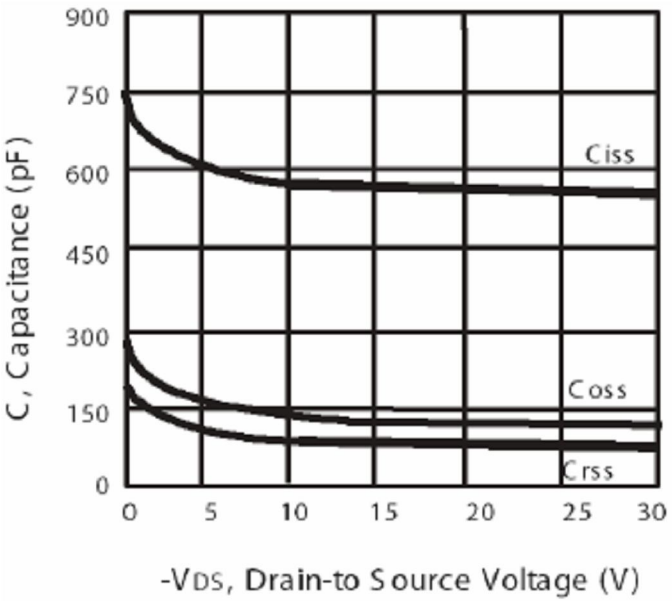



**Fig 11. Switching Time Circuit**

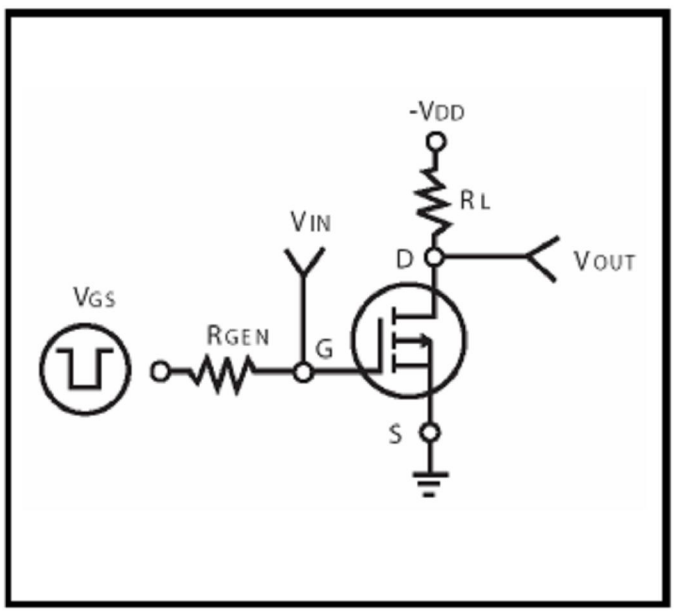



**Fig 12. Switching Time Waveform**

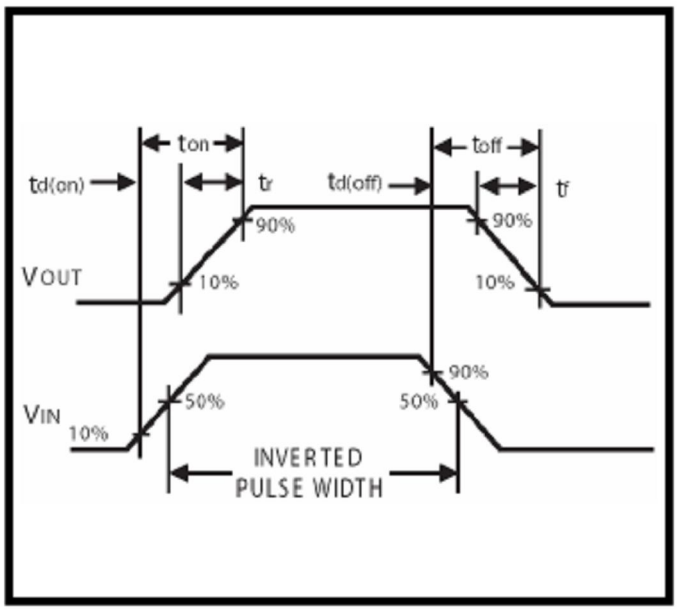
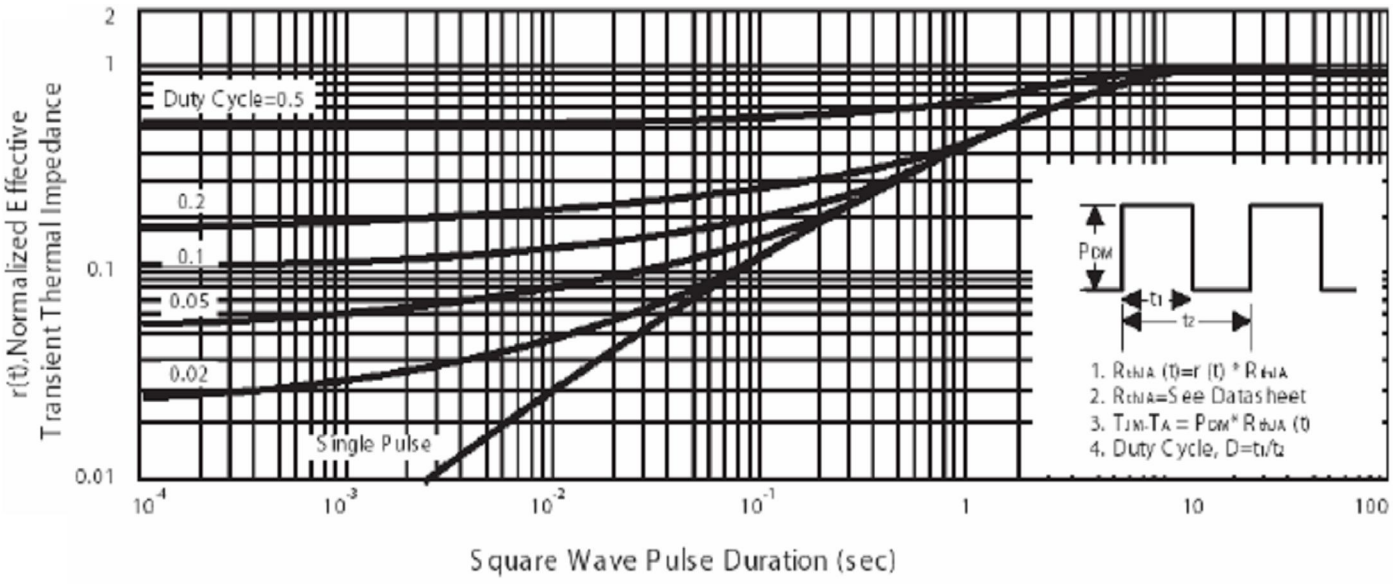


**Fig 13. Normalized Thermal Transient Impedance Curve**




1. $R_{thJA}$ (t) = r (t) * $R_{thJA}$
2. $R_{thJA}$ = See Datasheet
3. $T_{JM}$-$T_A$=$P_{DM}$ * $R_{thJA}$ (t)
4. Duty Cycle,D = $t_1/t_2$