Leadpower Semiconductor

# Power MOSFETS

## DATASHEET

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## LM80034NHK8A

N-Channel

Enhancement Mode MOSFET

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CERTIFIED ISO 9001 CERTIFIED

RoHS compliant

REACH

AEC Qualified

Quality Management Systems

ISO 9001:2015 Certificate

# LM80034NHK8A

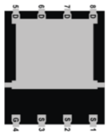
## N-Channel Enhancement Mode MOSFET

### ▪ Pin Description

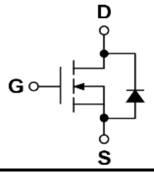
**PDFN5X6**

Top view

Bottom view



**Symbol**



### ▪ Product Summary

| Symbol | N-CH | Unit |
|---|---|---|
| $V_{DSS}$ | 80 | V |
| $R_{DSON\ (MAX)}$ | 3.7 | mΩ |
| $I_D$ | 141.6 | A |

### ▪ Feature

- Fast switching speed
- Reliable and Rugged
- ROHS Compliant & Halogen-Free
- 100% UIS and Rg Tested
- ESD Level>2kV

### ▪ Applications

- DC-to-DC converters

### ▪ Ordering Information

| Orderable Part Number | Package Type | Form | Shipping | Marking |
|---|---|---|---|---|
| LM80034NHK8A | PDFN5X6 | Tape & Reel | 5000 / Tape & Reel | 80034<br>□□□□□□ |

Note：□□□□□□ = Lot Code

### ▪ Absolute Maximum Ratings ($T_J$=25°C Unless Otherwise Noted)

| SYMBOL | PARAMETERS | Test Condition | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|
| $V_{DSS}$ | Drain-Source Voltage | | 80 | - | - | V |
| $V_{GSS}$ | Gate-Source Voltage | | -20 | - | 20 | |
| $T_j$ | Maximum Junction Temperature | | -55 | - | 175 | °C |
| $T_{stg}$ | Storage Temperature Range | | -55 | - | 175 | °C |
| $I_{SP}$ | Diode Pulse Current[1] | $T_C$ = 25 °C | - | - | 95 | A |
| $I_S$ | Diode Continuous Forward Current | $T_C$ = 25 °C | - | - | 38 | A |
| $I_{DM}$ | Pulsed Drain Current[1] | $T_C$ = 25 °C | - | - | 566 | A |
| $I_D$ | Continuous Drain Current | $T_C$ = 25 °C | - | - | 141.6 | A |
| | | $T_C$ = 100 °C | - | - | 102 | |
| $P_D$ | Maximum Power Dissipation | $T_C$ = 25 °C | - | - | 150 | W |
| | | $T_C$ = 100 °C | - | - | 75 | |
| $I_D$ | Continuous Drain Current | $T_A$ = 25 °C | - | - | 21 | A |
| | | $T_A$ = 70 °C | - | - | 17 | |
| $P_D$ | Maximum Power Dissipation | $T_A$ = 25 °C | - | - | 3.1 | W |
| | | $T_A$ = 70 °C | - | - | 2.2 | |
| $I_{AS}$ | Avalanche Current,Single pulse[2] | L = 0.1mH | - | - | 55 | A |
| $E_{AS}$ | Avalanche Energy ,Single pulse[2] | L = 0.1mH | - | - | 140 | mJ |
| $E_{AR}$ | Avalanche energy, repetitive[2] | L = 0.1mH | - | - | 0.7 | mJ |
| dv/dt | MOSFET dv/dt ruggedness | $V_{DS}$=0...40V | - | - | 10 | V/ns |
| dv/dt | Reverse diode dv/dt | IF=10A, VR=64V | - | - | 10 | V/ns |
| diF/dt | Maximum diode commutation speed | IF=10A, VR=64V | - | - | 100 | A/us |

Note ①：Max. current is limited by junction temperature

Note ②：UIS tested and pulse width are limited by maximum junction temperature 175°C

## ▪ Thermal Characteristics

| SYMBOL | PARAMETERS | | Rating | UNIT |
|---|---|---|---|---|
| $R_{\theta JC}$ | Thermal Resistance-Junction to Case | Steady State | 1 | °C / W |
| $R_{\theta JA}$ | Thermal Resistance-Junction to Ambient[3] | Steady State | 48 | °C / W |

## ▪ N-Channel Electrical Characteristics ($T_J$=25°C Unless Otherwise Noted)

| SYMBOL | PARAMETER | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|
| **Static Electrical Characteristics** | | | | | | |
| $BV_{DSS}$ | Drain-Source Breakdown Voltage | $V_{GS}$ = 0V, $I_D$ = 250µA | 80 | - | - | V |
| $I_{DSS}$ | Zero Gate Voltage Drain Current | $V_{DS}$ = 80V, $V_{GS}$ = 0V | - | - | 1 | µA |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS}$ = $V_{GS}$, $I_D$ = 250µA | 2.0 | 3.0 | 4.0 | V |
| $I_{GSS}$ | Gate-Body Leakage | $V_{DS}$ = 0V, $V_{GS}$ = ±20V | - | - | ±100 | nA |
| $R_{DS(ON)}$ | Drain-Source On-State Resistance[4] | $V_{GS}$ = 10V, $I_D$ = 20A | 1.5 | 3.1 | 3.7 | mΩ |
| $g_{fs}$ | Forward Transconductance | $V_{DS}$ = 5V, $I_D$ = 10A | - | 32 | - | S |
| **Dynamic Characteristics ⑤** | | | | | | |
| $R_g$ | Gate Resistance | $V_{GS}$=0V, $V_{DS}$=0V, f = 1MHz | 0.1 | 0.8 | 1.6 | Ω |
| $C_{iss}$ | Input Capacitance | $V_{GS}$ = 0V, $V_{DS}$ = 40V, f = 1MHz | 1968 | 3935 | 5903 | pF |
| $C_{oss}$ | Output Capacitance | | 580 | 1160 | 2320 | |
| $C_{rss}$ | Reverse Transfer Capacitance | | 51 | 101 | 202 | |
| $t_{d(on)}$ | Turn-On Delay Time | $V_{DS}$ = 40V, $V_{GS}$ = 10V, $I_D$ = 1A , $R_{GEN}$ = 1Ω | - | 19.3 | - | nS |
| $t_r$ | Turn-On Rise Time | | - | 12.3 | - | |
| $t_{d(off)}$ | Turn-Off Delay Time | | - | 47.5 | - | |
| $t_f$ | Turn-Off Fall Time | | - | 92.8 | - | |
| $Q_g(V_{GS}$=6V) | Total Gate Charge | $V_{DS}$ = 40V, $V_{GS}$ = 10V, $I_D$ = 20A | 27 | 53.5 | 80 | nC |
| $Q_g(V_{GS}$=10V) | Total Gate Charge | | 42 | 84.2 | 126 | |
| $Q_{gs}$ | Gate-Source Charge | | 13 | 26.5 | 40 | |
| $Q_{gd}$ | Gate-Drain Charge | | 8.0 | 16 | 24 | |
| **Source-Drain Characteristics** | | | | | | |
| $V_{SD}$ | Diode Forward Voltage[4] | $I_{SD}$ = 10A, $V_{GS}$ = 0V | - | 0.75 | 1.1 | V |
| $t_{rr}$ | Reverse Recovery Time | $I_F$=10A, $V_R$=64V<br>$dI_F/dt$=100A/µs | - | 60.5 | 121 | nS |
| $Q_{rr}$ | Reverse Recovery Charge | | - | 86 | 172 | nC |
| Irm | Peak reverse recovery current | | - | 2.3 | 3.4 | A |

Note ③：Surface Mounted on $1in^2$ FR-4 board with 1oz

Note ④：Pulse test (pulse width ≤ 300us, duty cycle ≤ 2%).

Note ⑤：Guaranteed by design, not subject to production testing.

## ▪ N-Channel Typical Characteristics

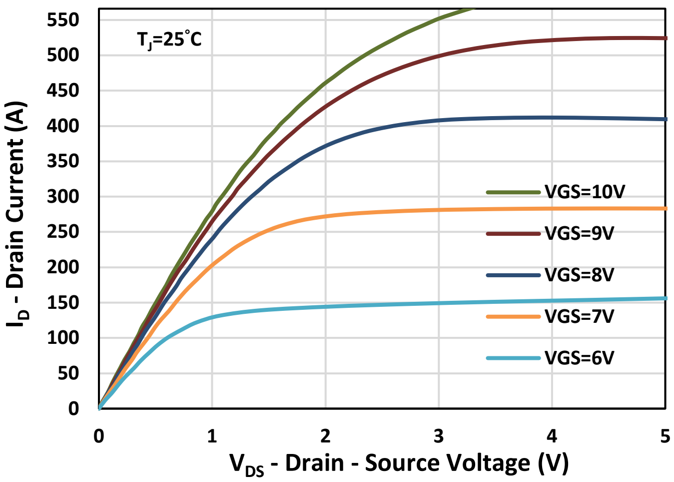


Fig.1 Output Characteristics

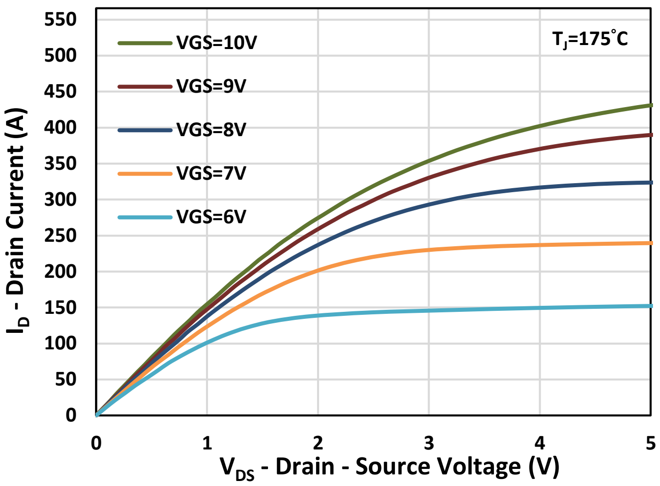


Fig.2 Output Characteristics

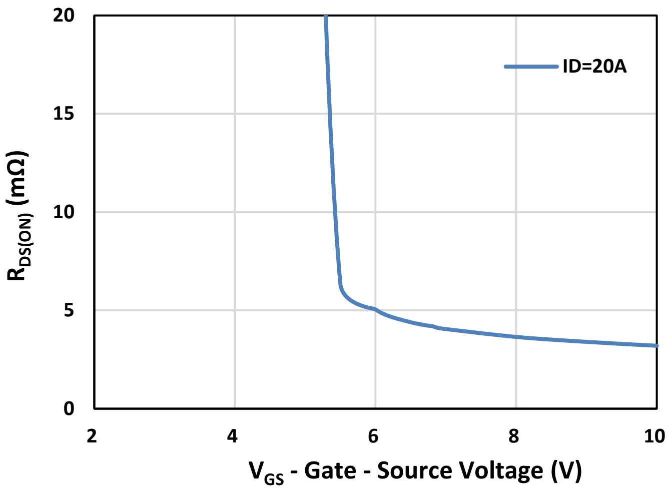


Fig.3 On—Resistance vs. VGS

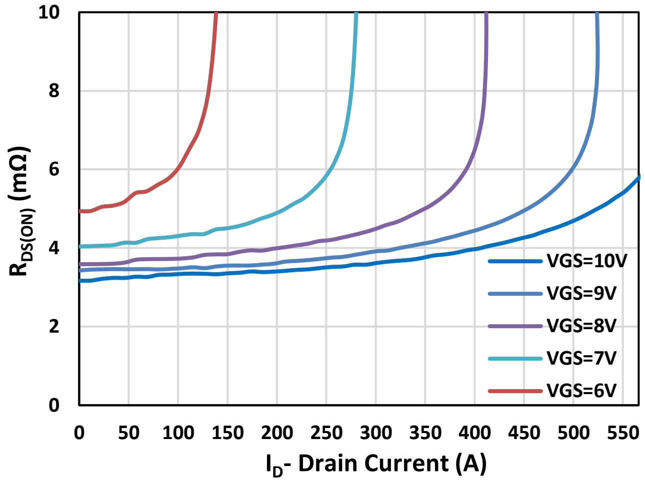


Fig.4 On—Resistance vs. ID

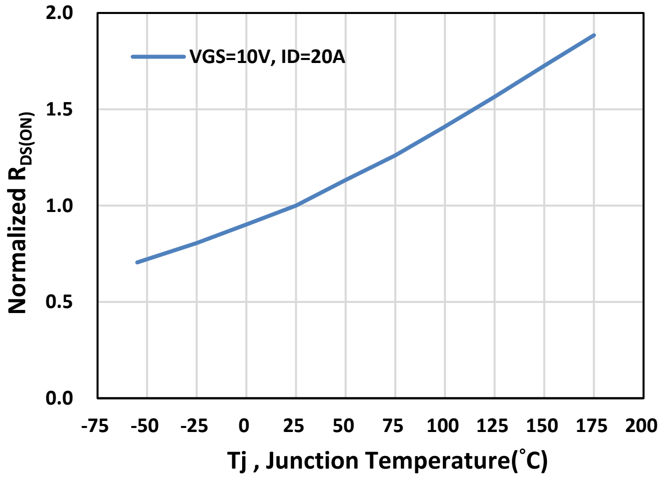


Fig.5 Drain-Source On Resistance

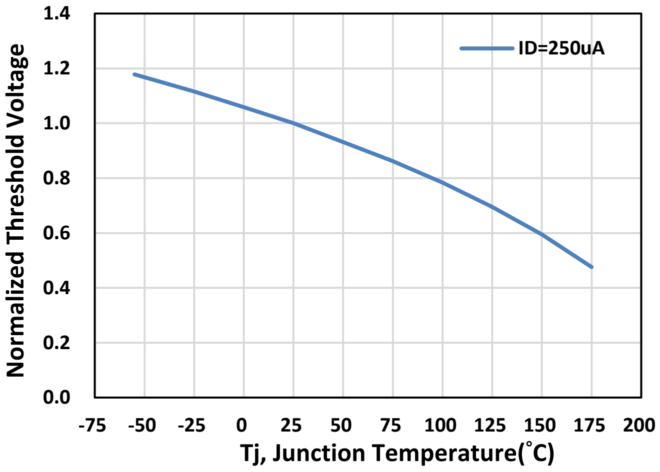


Fig.6 Gate Threshold Voltage

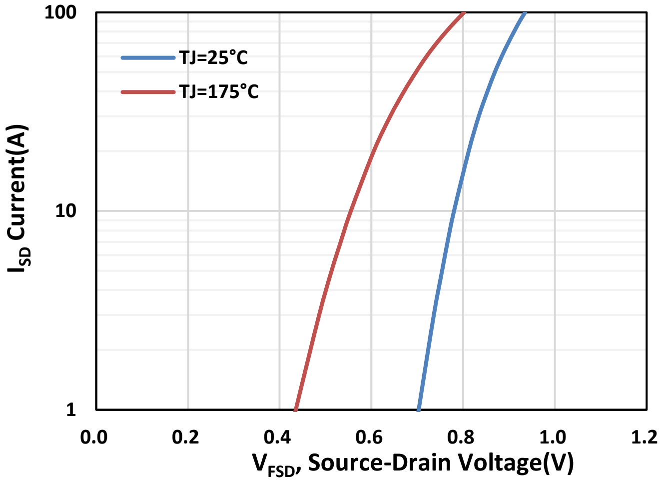


Fig.7 Source-Drain Diode Forward

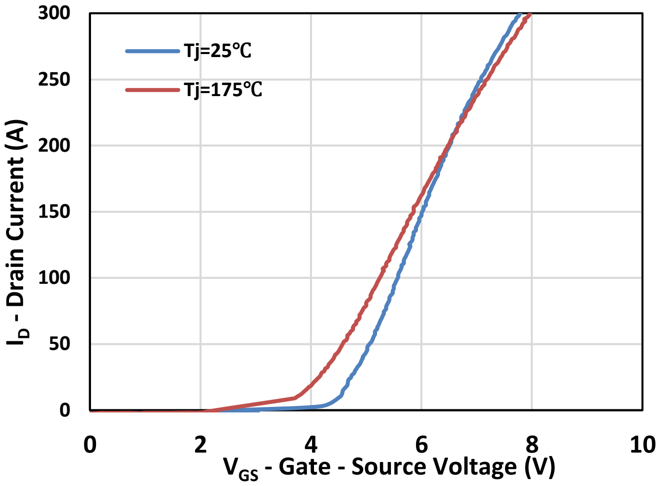


Fig.8 Transfer Characteristics

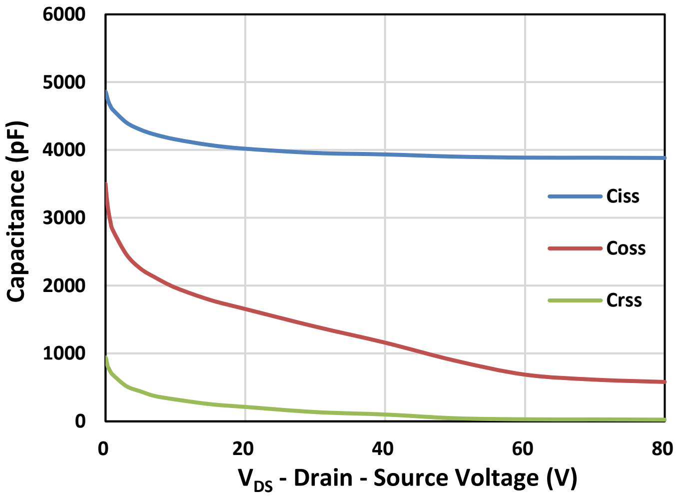


Fig.9 Capacitance

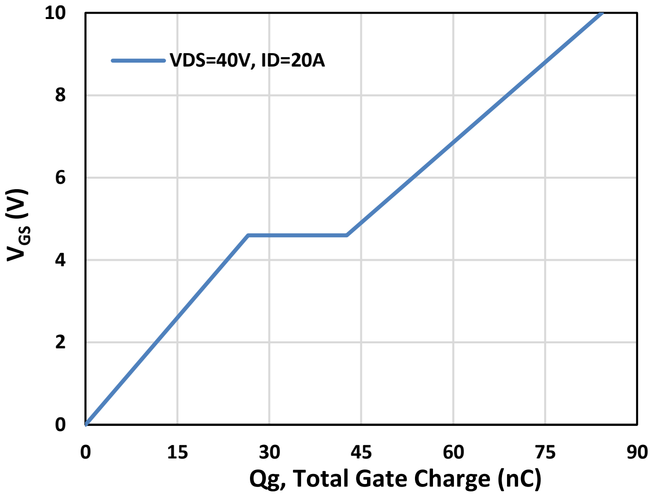


Fig.10 Gate Charge Characteristics

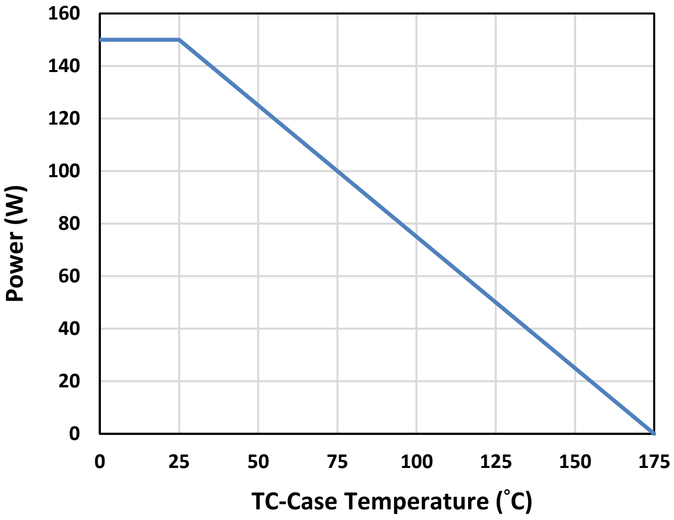


Fig 11. Power dissipation

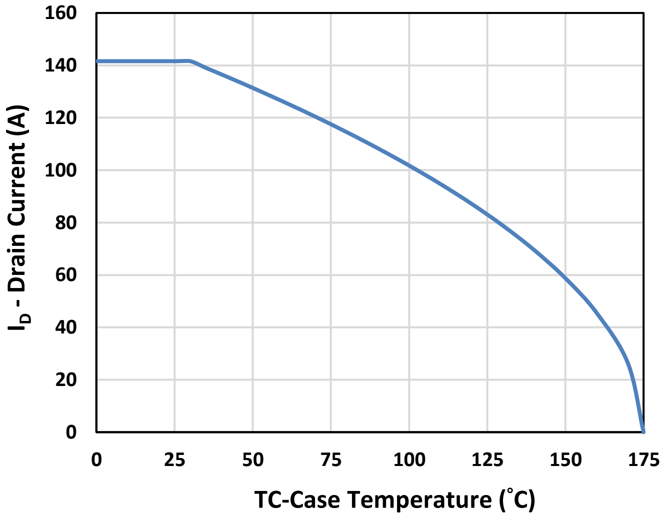


Fig 12. Drain current

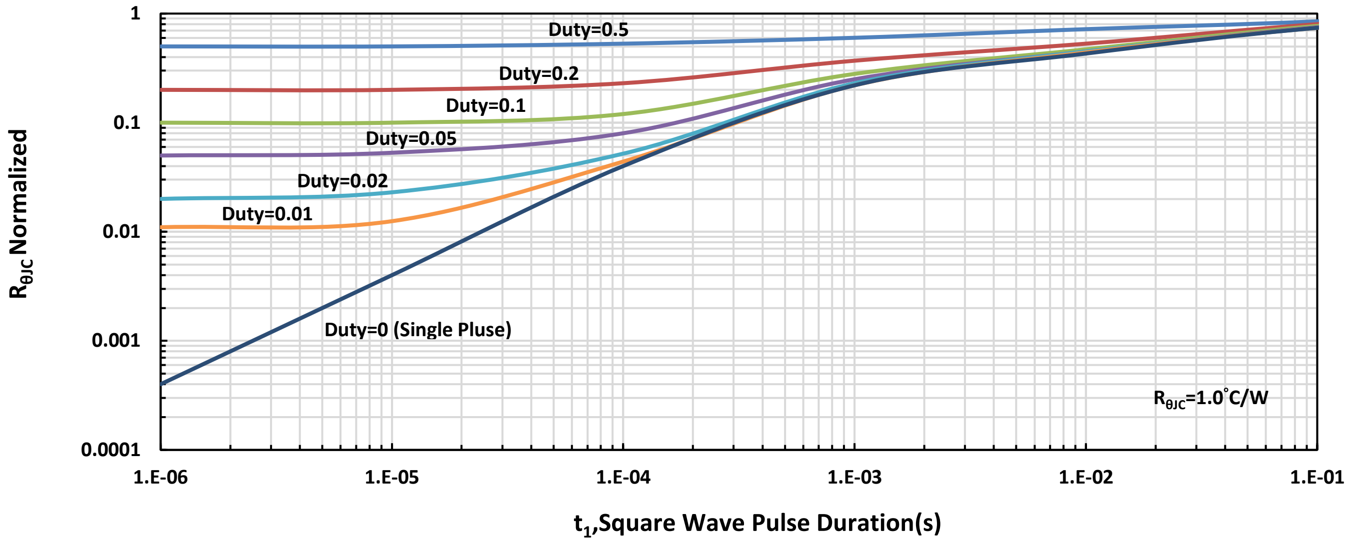


Fig 13. $R_{\theta JC}$ transient thermal impedance

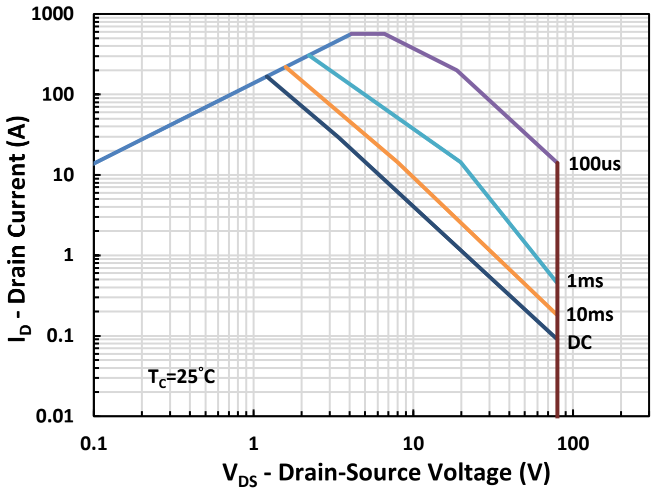


Fig 14. Safe operating area

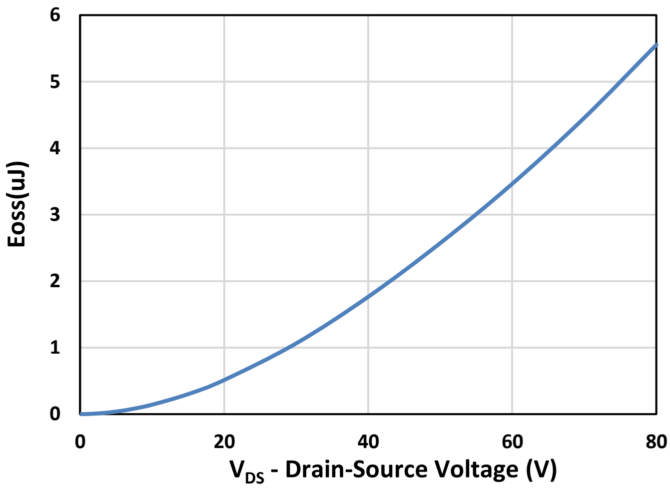


Fig.15 Typ. Coss stored energy

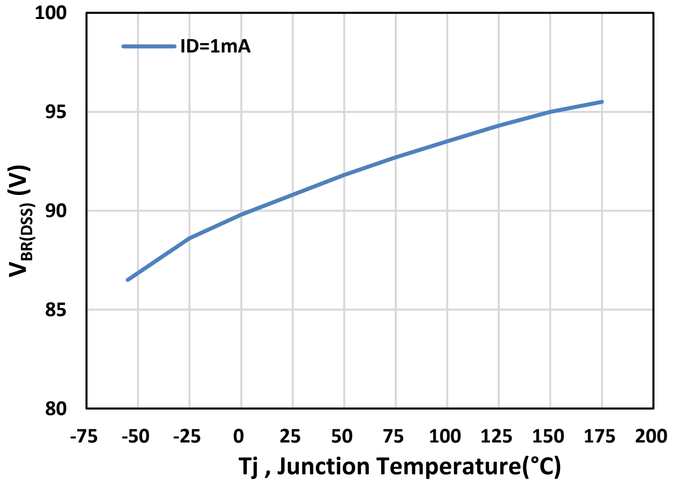


Fig.16 Drain-source breakdown voltage

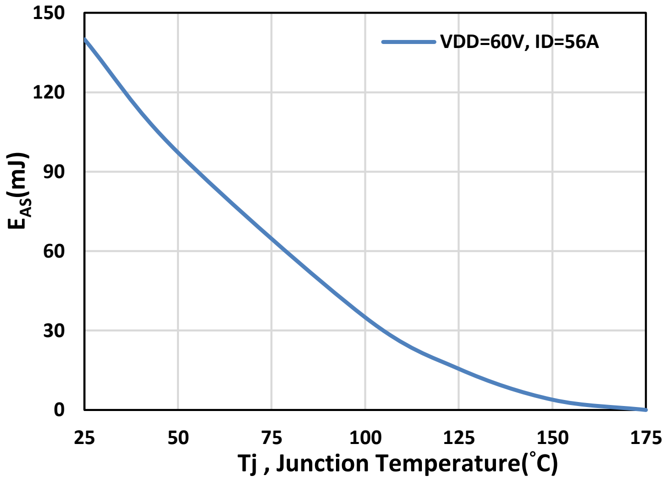
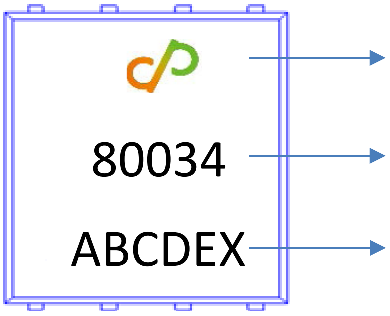


Fig.17: Avalanche energy

## Marking Information:



LeadPower LOGO

Part number : 80034

ABCDEX = Lot Code
A: Year(1:2021 2:2022 3:2023 4:2024 5:2025….)
BC: Week
DE: Work order serial number
X = Packaging Site Code