

General Description

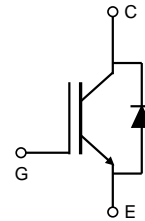
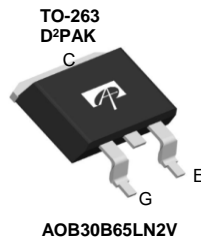
- AEC-Q101 qualified
- 650V breakdown voltage
- Low Vce(sat) and fast turn-on speed
- Very low Vf and Qrr
- Low turn-off switching loss and softness
- Very good EMI behavior
- High ruggedness and temperature stable behavior

Applications

- Discharge switch
- Relay replacement
- PTC heater

Product Summary

| | |
|---|-------|
| V _{CE} | 650V |
| I _C (T _C =100°C) | 30A |
| V _{CE(sat)} (T _J =25°C) | 1.86V |



| Orderable Part Number | Package Type | Form | Minimum Order Quantity |
|--|-----------------------------------|-----------------------|------------------------|
| AOB30B65LN2V | TO263 | Tape & Reel | 800 |
| Absolute Maximum Ratings T_A=25°C unless otherwise noted | | | |
| Parameter | Symbol | AOB30B65LN2V | Units |
| Collector-Emitter Voltage | V _{CE} | 650 | V |
| Gate-Emitter Voltage | V _{GE} | ±30 | V |
| Continuous Collector Current | I _C | T _C =25°C | 60 |
| | | T _C =100°C | 30 |
| Pulsed Collector Current, Limited by T _{Jmax} | I _{CM} | 90 | A |
| Turn-Off SOA, V _{CE} ≤ 650V, Limited by T _{Jmax} | I _{LM} | 90 | A |
| Continuous Diode Forward Current | I _F | T _C =25°C | 20 |
| | | T _C =100°C | 10 |
| Diode Pulsed Current, Limited by T _{Jmax} | I _{FM} | 20 | A |
| Short Circuit Withstanding Time ⁽¹⁾ V _{GE} =15V, V _{CC} ≤ 400V, T _J ≤ 175°C | t _{SC} | 5 | µs |
| Power Dissipation | P _D | T _C =25°C | 227 |
| | | T _C =100°C | 114 |
| Junction and Storage Temperature Range | T _J , T _{STG} | -55 to 175 | °C |
| Maximum Lead Temperature for Soldering Purpose, 1/8" from case for 5 seconds | T _L | 300 | °C |
| Thermal Characteristics | | | |
| Parameter | Symbol | AOB30B65LN2V | Units |
| Maximum Junction-to-Ambient | R _{θJA} | 65 | °C/W |
| Maximum IGBT Junction-to-Case | R _{θJC} | 0.66 | °C/W |
| Maximum Diode Junction-to-Case | R _{θJC} | 3.5 | °C/W |

(1) Allowed number of short circuits: <1000; time between short circuits: >1s.

Electrical Characteristics (T_J=25°C unless otherwise noted)

| Symbol | Parameter | Conditions | Min | Typ | Max | Units | |
|--|--------------------------------------|---|---|------|------|-------|----|
| STATIC PARAMETERS | | | | | | | |
| BV _{CES} | Collector-Emitter Breakdown Voltage | I _C =1mA, V _{GE} =0V, T _J =25°C | 650 | - | - | V | |
| V _{CE(sat)} | Collector-Emitter Saturation Voltage | V _{GE} =15V, I _C =30A | T _J =25°C | - | 1.86 | 2.35 | V |
| | | | T _J =125°C | - | 2.32 | - | |
| | | | T _J =175°C | - | 2.58 | - | |
| V _F | Diode Forward Voltage | V _{GE} =0V, I _F =20A | T _J =25°C | - | 1.3 | 1.65 | V |
| | | | T _J =125°C | - | 1.28 | - | |
| | | | T _J =175°C | - | 1.27 | - | |
| V _{GE(th)} | Gate-Emitter Threshold Voltage | V _{CE} =5V, I _C =1mA | 4 | 4.7 | 5.4 | V | |
| I _{CES} | Zero Gate Voltage Collector Current | V _{CE} =650V, V _{GE} =0V | T _J =25°C | - | - | 10 | μA |
| | | | T _J =125°C | - | - | 500 | |
| | | | T _J =175°C | - | - | 10000 | |
| I _{GES} | Gate-Emitter Leakage Current | V _{CE} =0V, V _{GE} =±30V | - | - | ±100 | nA | |
| g _{FS} | Forward Transconductance | V _{CE} =20V, I _C =30A | - | 20 | - | S | |
| DYNAMIC PARAMETERS | | | | | | | |
| C _{ies} | Input Capacitance | V _{GE} =0V, V _{CC} =25V, f=1MHz | - | 1246 | - | pF | |
| C _{oes} | Output Capacitance | | - | 92 | - | pF | |
| C _{res} | Reverse Transfer Capacitance | | - | 38 | - | pF | |
| Q _g | Total Gate Charge | V _{GE} =15V, V _{CC} =520V, I _C =30A | - | 52 | - | nC | |
| Q _{ge} | Gate to Emitter Charge | | - | 14 | - | nC | |
| Q _{gc} | Gate to Collector Charge | | - | 22 | - | nC | |
| I _{C(SC)} | Short Circuit Collector Current | V _{GE} =15V, V _{CC} =400V, t _{sc} ≤5μs, T _J ≤175°C | - | 150 | - | A | |
| R _g | Gate Resistance | V _{GE} =0V, V _{CC} =0V, f=1MHz | - | 11 | - | Ω | |
| SWITCHING PARAMETERS, (Load Inductive, T_J=25°C) | | | | | | | |
| t _{D(on)} | Turn-On Delay Time | T _J =25°C V _{GE} =15V, V _{CC} =400V, I _C =30A, R _G =10Ω | - | 23 | - | ns | |
| t _r | Turn-On Rise Time | | - | 27 | - | ns | |
| t _{D(off)} | Turn-Off Delay Time | | - | 109 | - | ns | |
| t _f | Turn-Off Fall Time | | - | 14 | - | ns | |
| E _{on} | Turn-On Energy | | - | 0.88 | - | mJ | |
| E _{off} | Turn-Off Energy | | - | 0.35 | - | mJ | |
| E _{total} | Total Switching Energy | | - | 1.24 | - | mJ | |
| t _{rr} | Diode Reverse Recovery Time | | T _J =25°C | - | 312 | - | ns |
| Q _{rr} | Diode Reverse Recovery Charge | | I _F =20A, di/dt=200A/μs, V _{CC} =400V | - | 2.28 | - | μC |
| I _{rm} | Diode Peak Reverse Recovery Current | | - | - | 11.4 | - | A |
| SWITCHING PARAMETERS, (Load Inductive, T_J=175°C) | | | | | | | |
| t _{D(on)} | Turn-On Delay Time | T _J =175°C V _{GE} =15V, V _{CC} =400V, I _C =30A, R _G =10Ω | - | 22 | - | ns | |
| t _r | Turn-On Rise Time | | - | 31 | - | ns | |
| t _{D(off)} | Turn-Off Delay Time | | - | 133 | - | ns | |
| t _f | Turn-Off Fall Time | | - | 24 | - | ns | |
| E _{on} | Turn-On Energy | | - | 0.85 | - | mJ | |
| E _{off} | Turn-Off Energy | | - | 0.70 | - | mJ | |
| E _{total} | Total Switching Energy | | - | 1.55 | - | mJ | |
| t _{rr} | Diode Reverse Recovery Time | | T _J =175°C | - | 390 | - | ns |
| Q _{rr} | Diode Reverse Recovery Charge | | I _F =20A, di/dt=200A/μs, V _{CC} =400V | - | 2.63 | - | μC |
| I _{rm} | Diode Peak Reverse Recovery Current | | - | - | 10.5 | - | A |

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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

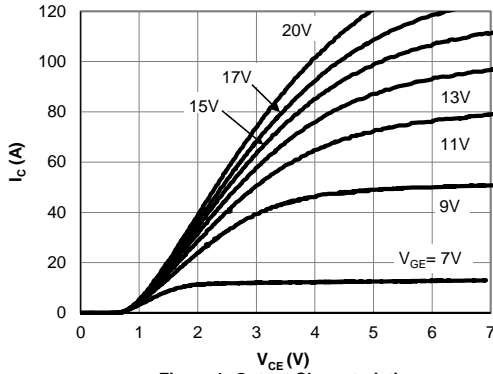


Figure 1: Output Characteristic
($T_j=25^\circ\text{C}$)

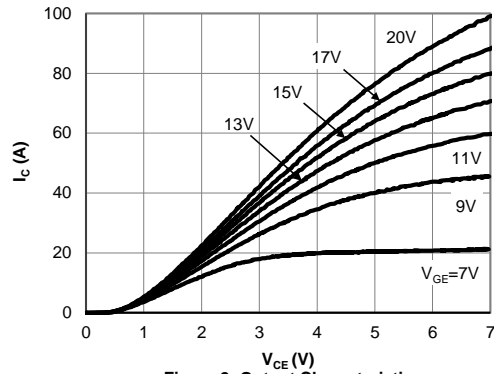


Figure 2: Output Characteristic
($T_j=175^\circ\text{C}$)

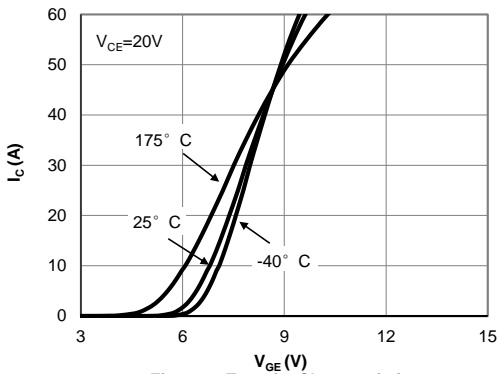


Figure 3: Transfer Characteristic

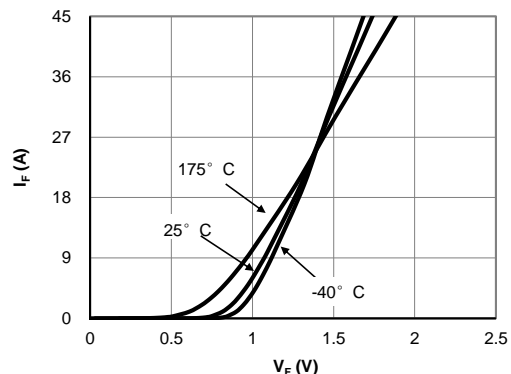


Figure 4: Diode Characteristic

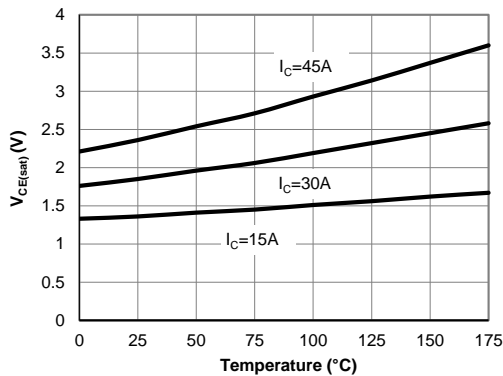


Figure 5: Collector-Emitter Saturation Voltage vs. Junction Temperature

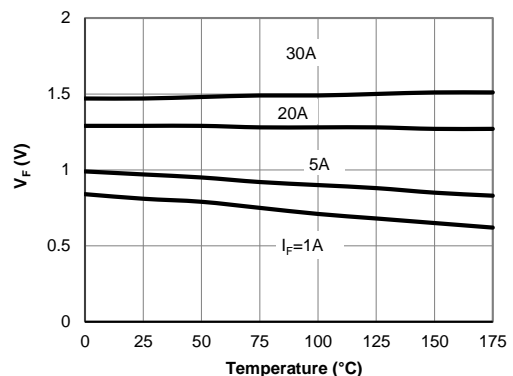


Figure 6: Diode Forward voltage vs. Junction Temperature

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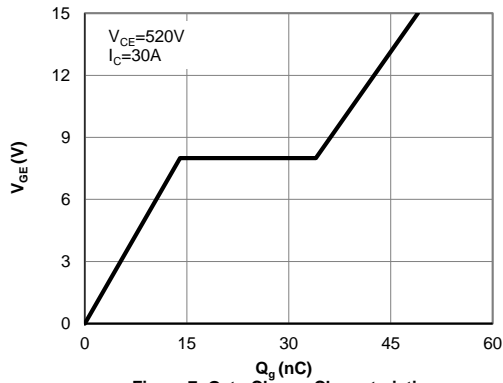


Figure 7: Gate-Charge Characteristics

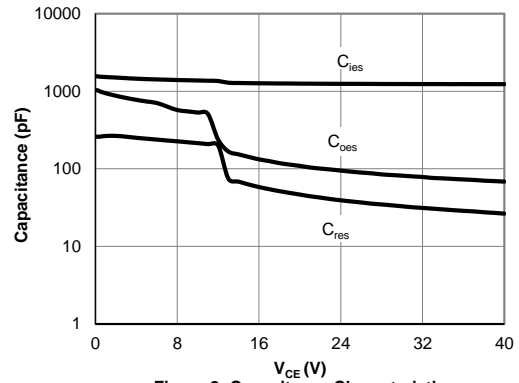


Figure 8: Capacitance Characteristic

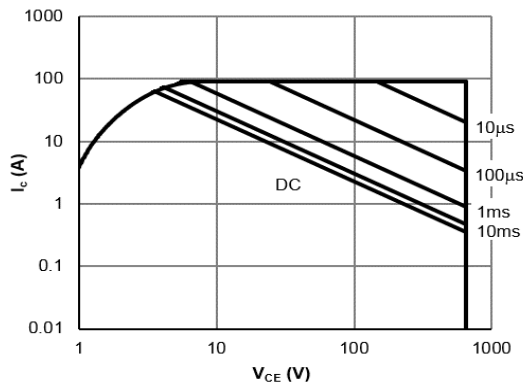


Figure 9: Forward Bias Safe Operating Area
($T_C=25^{\circ}\text{C}$, $V_{GE}=15\text{V}$)

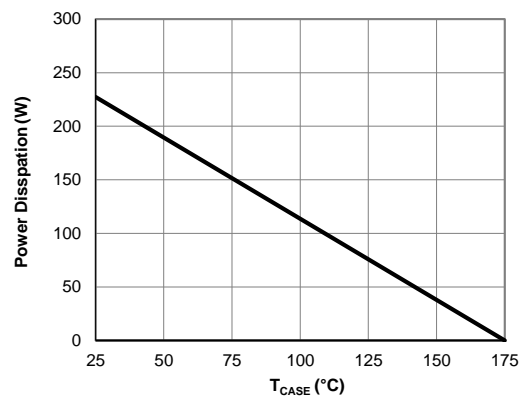


Figure 10: Power Dissipation as a Function of Case

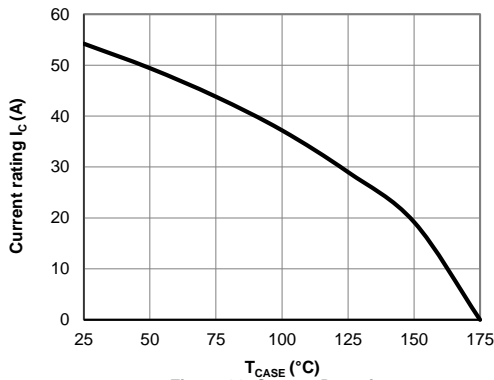


Figure 11: Current De-rating

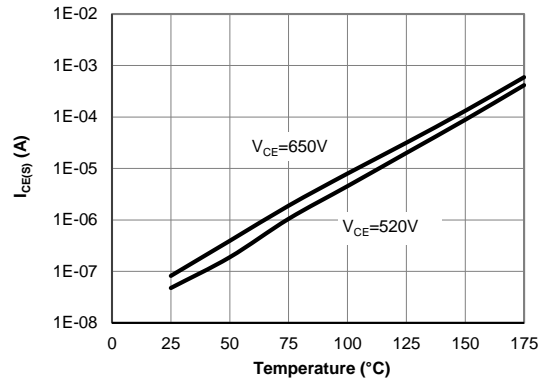


Figure 12: Diode Reverse Leakage Current vs. Junction Temperature

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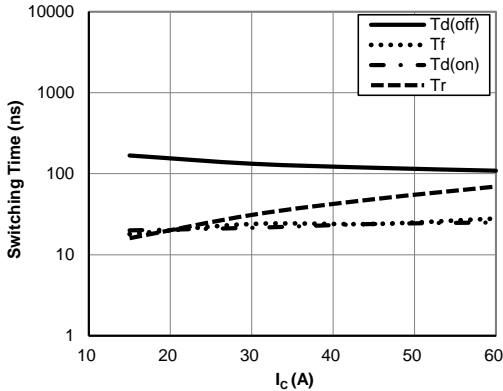


Figure 13: Switching Time vs. I_C
($T_J=175^\circ\text{C}$, $V_{GE}=15\text{V}$, $V_{CE}=400\text{V}$, $R_g=10\Omega$)

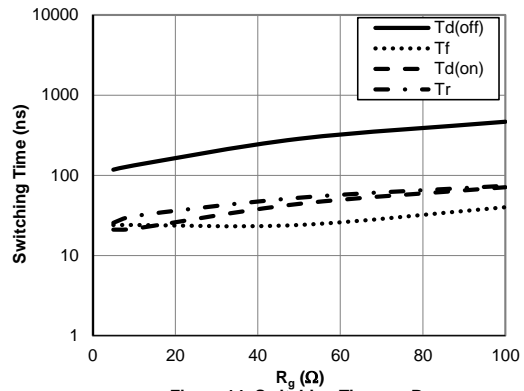


Figure 14: Switching Time vs. R_g
($T_J=175^\circ\text{C}$, $V_{GE}=15\text{V}$, $V_{CE}=400\text{V}$, $I_C=30\text{A}$)

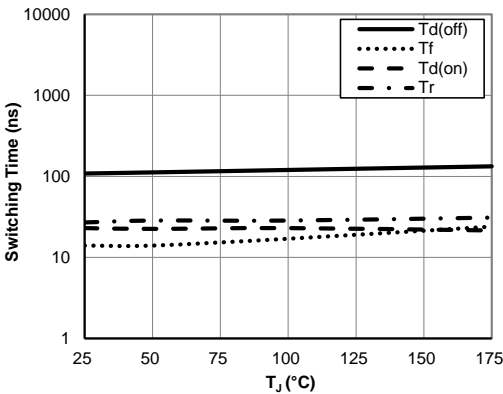


Figure 15: Switching Time vs. T_J
($V_{GE}=15\text{V}$, $V_{CE}=400\text{V}$, $I_C=30\text{A}$, $R_g=10\Omega$)

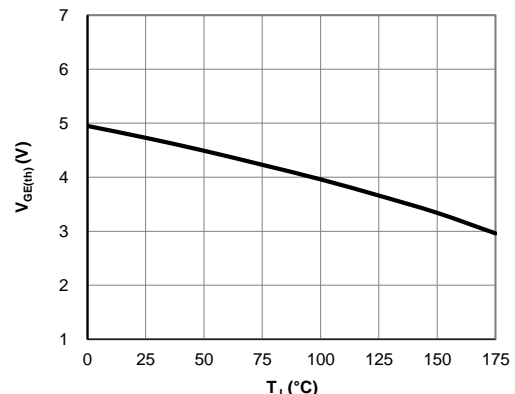


Figure 16: $V_{GE(th)}$ vs. T_J

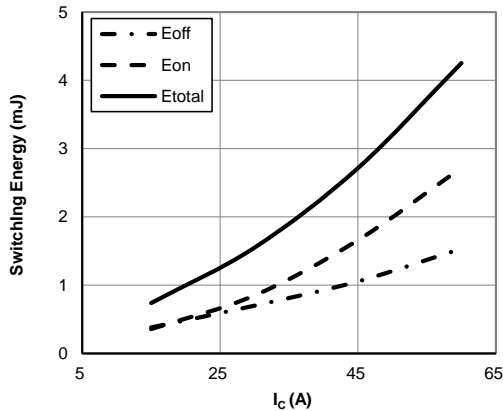


Figure 17: Switching Loss vs. I_C
($T_J=175^\circ\text{C}$, $V_{GE}=15\text{V}$, $V_{CE}=400\text{V}$, $R_g=10\Omega$)

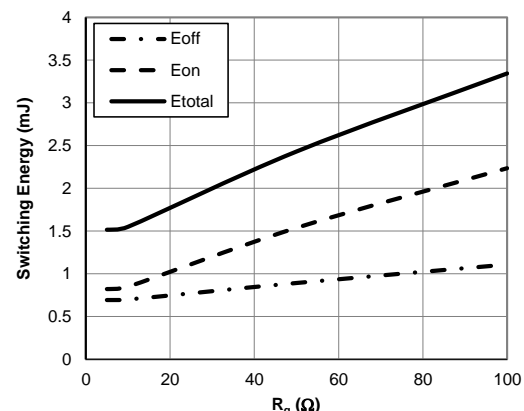


Figure 18: Switching Loss vs. R_g
($T_J=175^\circ\text{C}$, $V_{GE}=15\text{V}$, $V_{CE}=400\text{V}$, $I_C=30\text{A}$)

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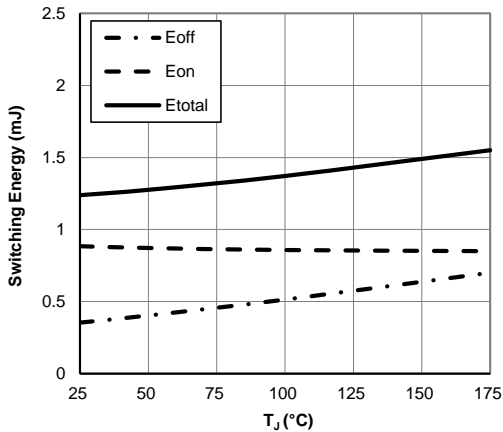


Figure 19: Switching Loss vs. T_j
($V_{GE}=15V$, $V_{CE}=400V$, $I_C=30A$, $R_g=10\Omega$)

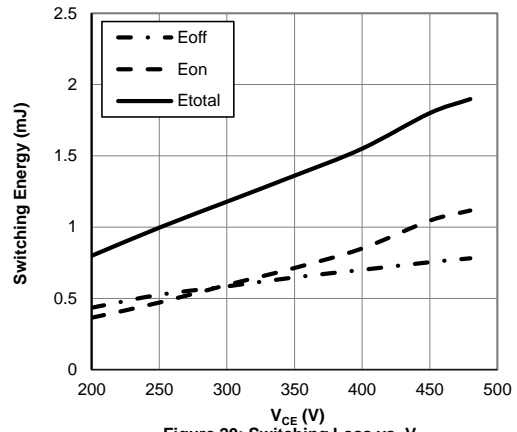


Figure 20: Switching Loss vs. V_{CE}
($T_j=175^\circ C$, $V_{GE}=15V$, $I_C=30A$, $R_g=10\Omega$)

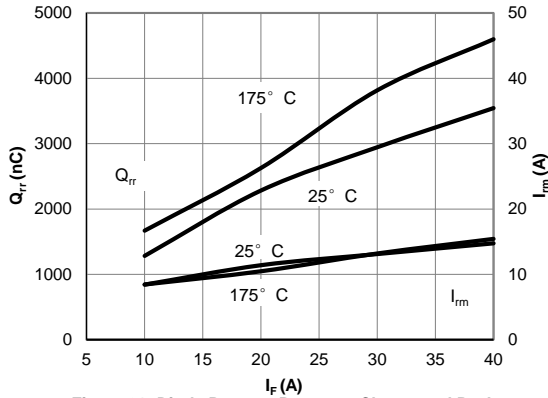


Figure 21: Diode Reverse Recovery Charge and Peak Current vs. Conduction Current
($V_{GE}=15V$, $V_{CE}=400V$, $di/dt=200A/\mu s$)

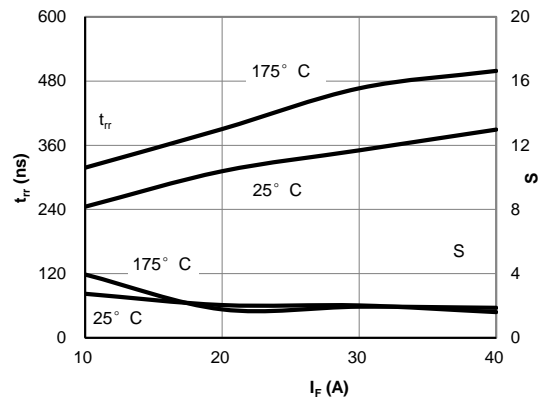


Figure 22: Diode Reverse Recovery Time and Softness Factor vs. Conduction Current
($V_{GE}=15V$, $V_{CE}=400V$, $di/dt=200A/\mu s$)

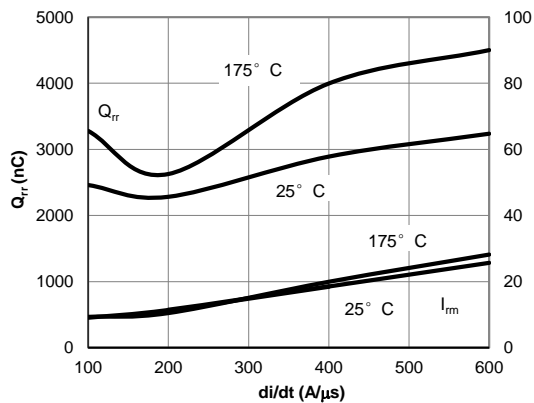


Figure 23: Diode Reverse Recovery Charge and Peak Current vs. di/dt
($V_{GE}=15V$, $V_{CE}=400V$, $I_F=20A$)

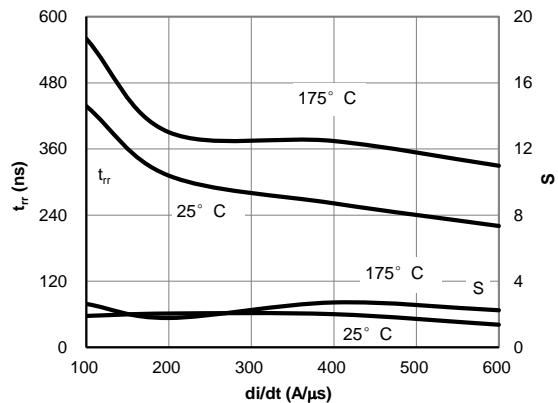


Figure 24: Diode Reverse Recovery Time and Softness Factor vs. di/dt
($V_{GE}=15V$, $V_{CE}=400V$, $I_F=20A$)

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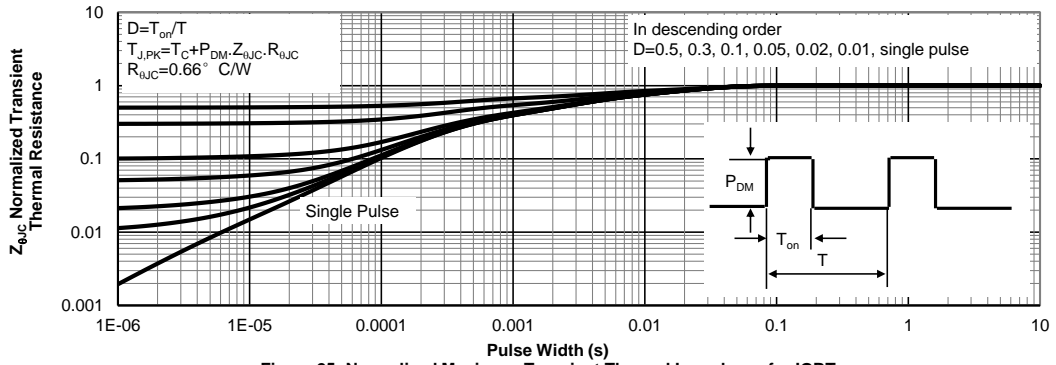


Figure 25: Normalized Maximum Transient Thermal Impedance for IGBT

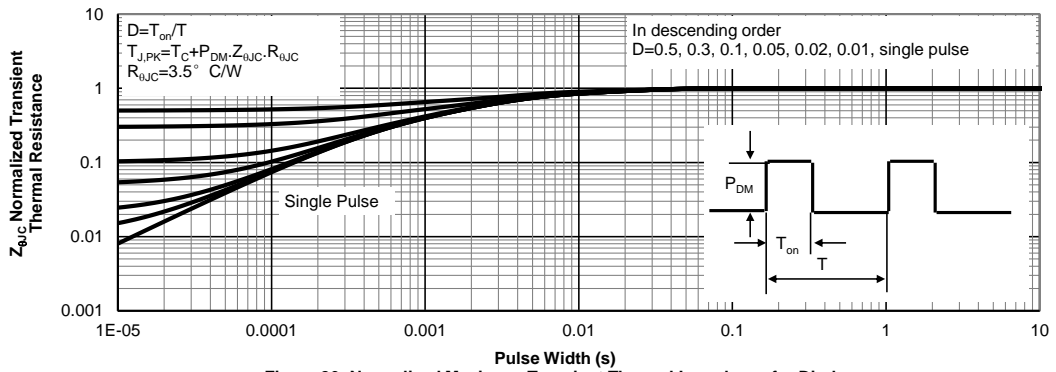


Figure 26: Normalized Maximum Transient Thermal Impedance for Diode