



ALPHA & OMEGA
SEMICONDUCTOR

AOT266L/AOB266L/AOTF266L 60V N-Channel MOSFET

General Description

The AOT266L & AOB266L & AOTF266L uses Trench MOSFET technology that is uniquely optimized to provide the most efficient high frequency switching performance. Both conduction and switching power losses are minimized due to an extremely low combination of $R_{DS(ON)}$, Ciss and Coss. This device is ideal for boost converters and synchronous rectifiers for consumer, telecom, industrial power supplies and LED backlighting.

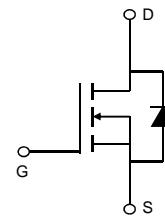
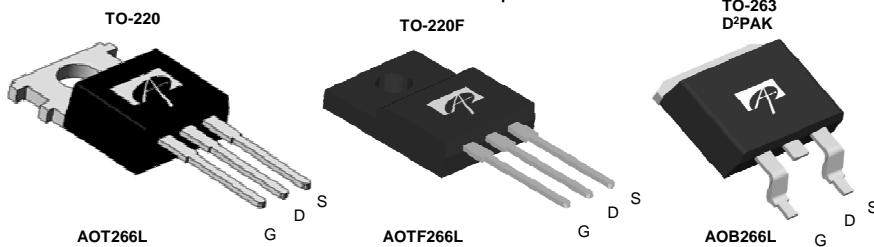
Product Summary

V_{DS}	60V
I_D (at $V_{GS}=10V$)	140A/78A
$R_{DS(ON)}$ (at $V_{GS}=10V$)	< 3.5mΩ (< 3.2mΩ*)
$R_{DS(ON)}$ (at $V_{GS}=6V$)	< 4.0mΩ (< 3.8mΩ*)

100% UIS Tested
100% R_g Tested



Top View



Orderable Part Number	Package Type	Form	Minimum Order Quantity
AOT266L	TO220 Green	Tube	1000
AOTF266L	TO220F Green	Tube	1000
AOB266L	TO263 Green	Tape & Reel	800

Absolute Maximum Ratings $T_A=25^\circ\text{C}$ unless otherwise noted

Parameter	Symbol	AOT266L/AOB266L	AOTF266L	Units
Drain-Source Voltage	V_{DS}	60		V
Gate-Source Voltage	V_{GS}	± 20		V
Continuous Drain Current ^G	I_D	140	78	A
$T_C=100^\circ\text{C}$		110	55	
Pulsed Drain Current ^C	I_{DM}	450		
Continuous Drain Current ^G	I_{DSM}	18		A
$T_A=70^\circ\text{C}$		14		
Avalanche Current ^C	I_{AS}	90		A
Avalanche energy L=0.1mH ^C	E_{AS}	405		mJ
Power Dissipation ^B	P_D	268	45.5	W
$T_C=100^\circ\text{C}$		134	22.5	
Power Dissipation ^A	P_{DSM}	2.1		W
$T_A=70^\circ\text{C}$		1.3		
Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 175		°C

Thermal Characteristics

Parameter	Symbol	AOT266L/AOB266L	AOTF266L	Units
Maximum Junction-to-Ambient ^A	$t \leq 10\text{s}$	15	15	°C/W
Maximum Junction-to-Ambient ^{AD}	Steady-State	60	60	°C/W
Maximum Junction-to-Case	Steady-State	0.56	3.3	°C/W

* Surface mount package TO263

Electrical Characteristics ($T_J=25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
STATIC PARAMETERS						
BV_{DSS}	Drain-Source Breakdown Voltage	$I_D=250\mu\text{A}, V_{GS}=0\text{V}$	60			V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=60\text{V}, V_{GS}=0\text{V}$ $T_J=55^\circ\text{C}$			1 5	μA
I_{GSS}	Gate-Body leakage current	$V_{DS}=0\text{V}, V_{GS}=\pm20\text{V}$			±100	nA
$V_{GS(\text{th})}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$	2.2	2.7	3.2	V
$R_{DS(\text{ON})}$	Static Drain-Source On-Resistance	$V_{GS}=10\text{V}, I_D=20\text{A}$ TO220/TO220F $T_J=125^\circ\text{C}$		2.9	3.5	$\text{m}\Omega$
		$V_{GS}=6\text{V}, I_D=20\text{A}$ TO220/TO220F		3.2	4	$\text{m}\Omega$
		$V_{GS}=10\text{V}, I_D=20\text{A}$ TO263		2.6	3.2	$\text{m}\Omega$
		$V_{GS}=6\text{V}, I_D=20\text{A}$ TO263		3	3.8	$\text{m}\Omega$
g_{FS}	Forward Transconductance	$V_{DS}=5\text{V}, I_D=20\text{A}$	80			S
V_{SD}	Diode Forward Voltage	$I_S=1\text{A}, V_{GS}=0\text{V}$		0.65	1	V
I_S	Maximum Body-Diode Continuous Current ^G				140	A
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	$V_{GS}=0\text{V}, V_{DS}=30\text{V}, f=1\text{MHz}$		5650		pF
C_{oss}	Output Capacitance			720		pF
C_{rss}	Reverse Transfer Capacitance			20		pF
R_g	Gate resistance	$V_{GS}=0\text{V}, V_{DS}=0\text{V}, f=1\text{MHz}$	0.4	0.9	1.4	Ω
SWITCHING PARAMETERS						
$Q_g(10\text{V})$	Total Gate Charge	$V_{GS}=10\text{V}, V_{DS}=30\text{V}, I_D=20\text{A}$		65	90	nC
Q_{gs}	Gate Source Charge			20		nC
Q_{gd}	Gate Drain Charge			7		nC
$t_{D(\text{on})}$	Turn-On DelayTime	$V_{GS}=10\text{V}, V_{DS}=30\text{V}, R_L=1.5\Omega,$ $R_{\text{GEN}}=3\Omega$		21		ns
t_r	Turn-On Rise Time			20		ns
$t_{D(\text{off})}$	Turn-Off DelayTime			36		ns
t_f	Turn-Off Fall Time			6		ns
t_{rr}	Body Diode Reverse Recovery Time	$I_F=20\text{A}, dI/dt=500\text{A}/\mu\text{s}$		27		ns
Q_{rr}	Body Diode Reverse Recovery Charge	$I_F=20\text{A}, dI/dt=500\text{A}/\mu\text{s}$		145		nC

A. The value of R_{BJA} is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, in a still air environment with $T_A=25^\circ\text{ C}$. The Power dissipation P_{DSM} is based on R_{BJA} and the maximum allowed junction temperature of 150° C. The value in any given application depends on the user's specific board design, and the maximum temperature of 175° C may be used if the PCB allows it.

B. The power dissipation P_D is based on $T_{J(\text{MAX})}=175^\circ\text{ C}$, using junction-to-case thermal resistance, and is more useful in setting the upper dissipation limit for cases where additional heatsinking is used.

C. Repetitive rating, pulse width limited by junction temperature $T_{J(\text{MAX})}=175^\circ\text{ C}$. Ratings are based on low frequency and duty cycles to keep initial $T_J=25^\circ\text{ C}$.

D. The R_{BJA} is the sum of the thermal impedance from junction to case R_{JJC} and case to ambient.

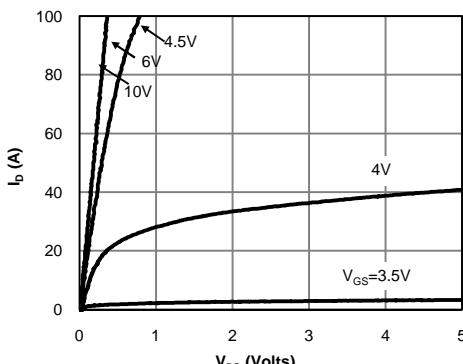
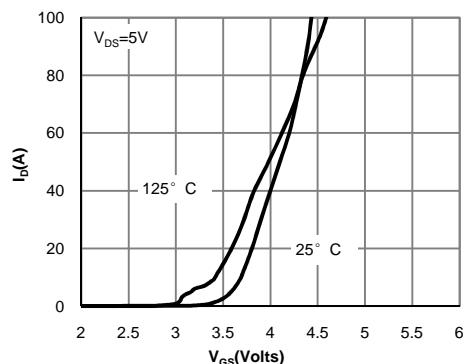
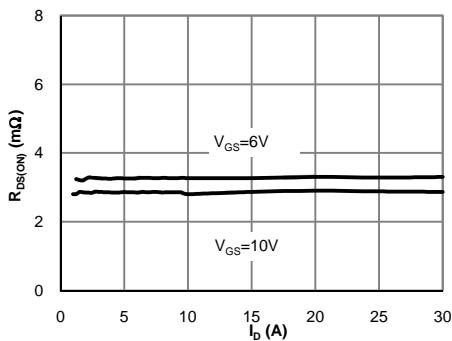
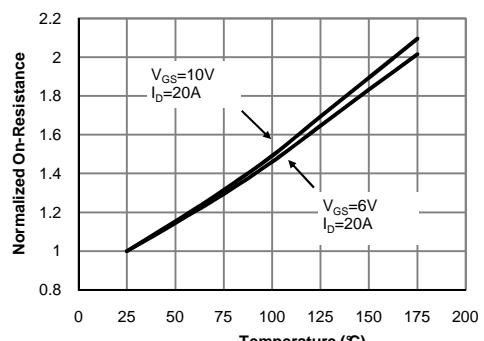
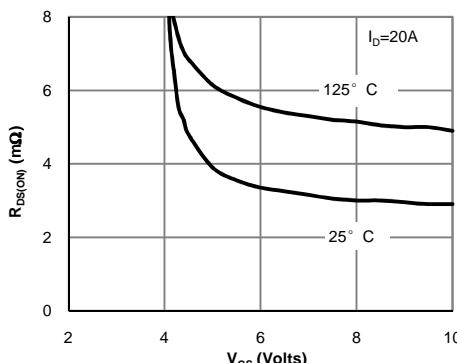
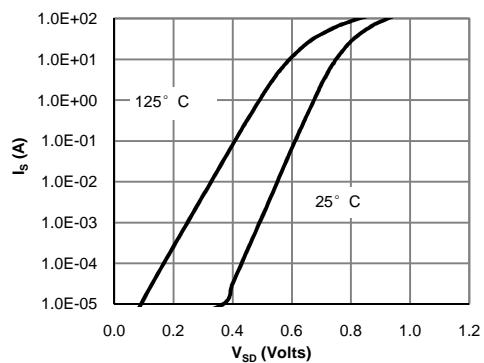
E. The static characteristics in Figures 1 to 6 are obtained using <300μs pulses, duty cycle 0.5% max.

F. These curves are based on the junction-to-case thermal impedance which is measured with the device mounted to a large heatsink, assuming a maximum junction temperature of $T_{J(\text{MAX})}=175^\circ\text{ C}$. The SOA curve provides a single pulse rating.

G. The maximum current limited by package.

H. These tests are performed with the device mounted on 1 in² FR-4 board with 2oz. Copper, in a still air environment with $T_A=25^\circ\text{ C}$.

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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

Fig 1: On-Region Characteristics (Note E)

Figure 2: Transfer Characteristics (Note E)

Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

Figure 4: On-Resistance vs. Junction Temperature (Note E)

Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

Figure 6: Body-Diode Characteristics (Note E)

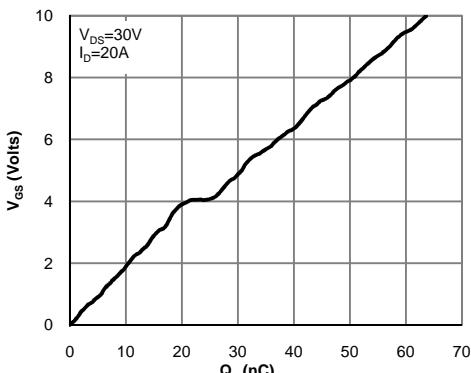
TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS


Figure 7: Gate-Charge Characteristics

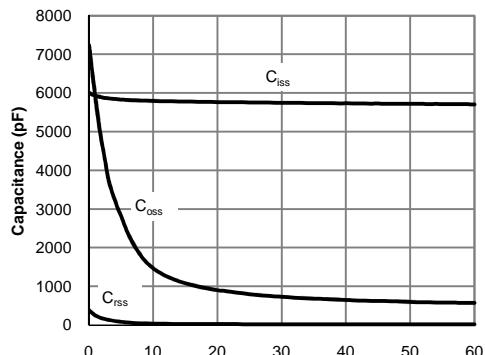


Figure 8: Capacitance Characteristics

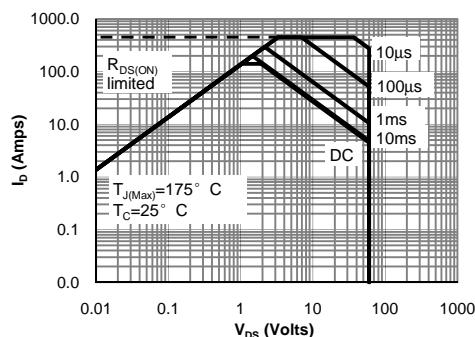


Figure 9: Maximum Forward Biased Safe Operating Area for AOT266L and AOB266L (Note F)

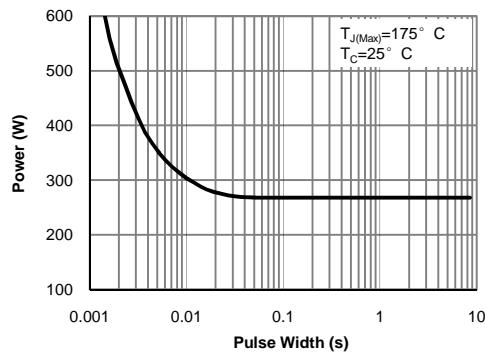


Figure 10: Single Pulse Power Rating Junction-to-Case for AOT266L and AOB266L (Note F)

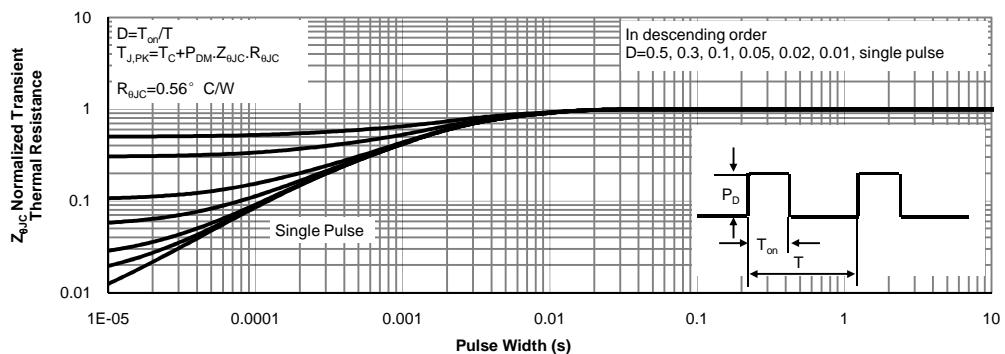
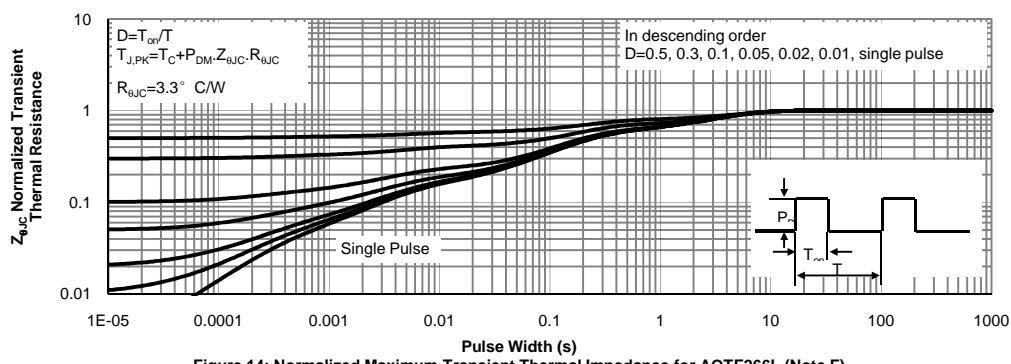
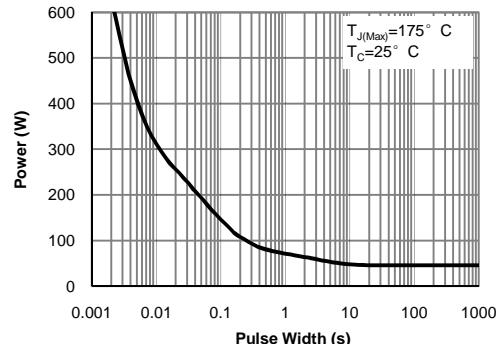
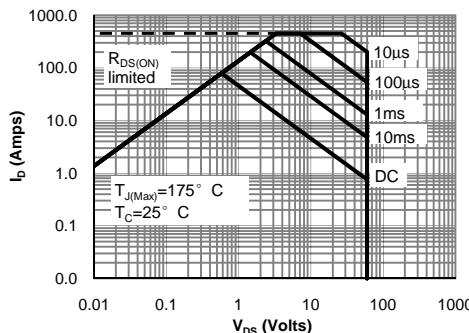
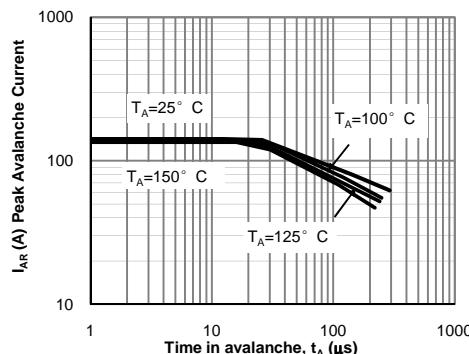
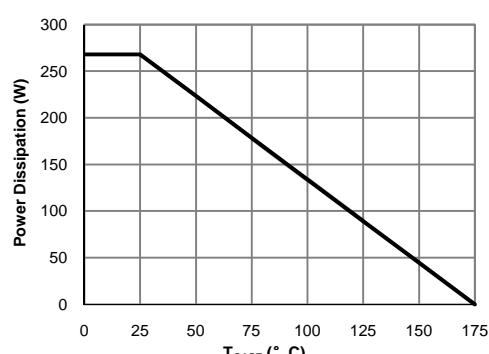
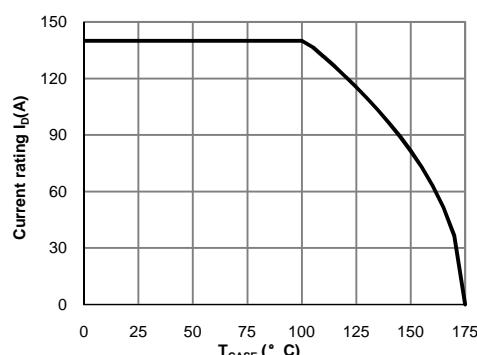
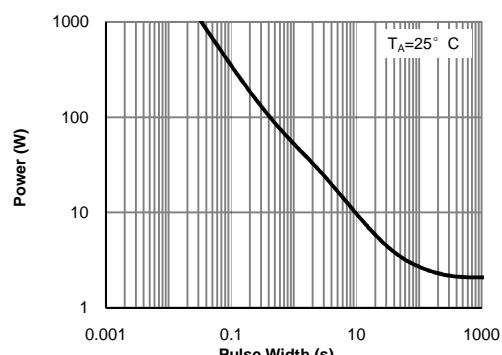
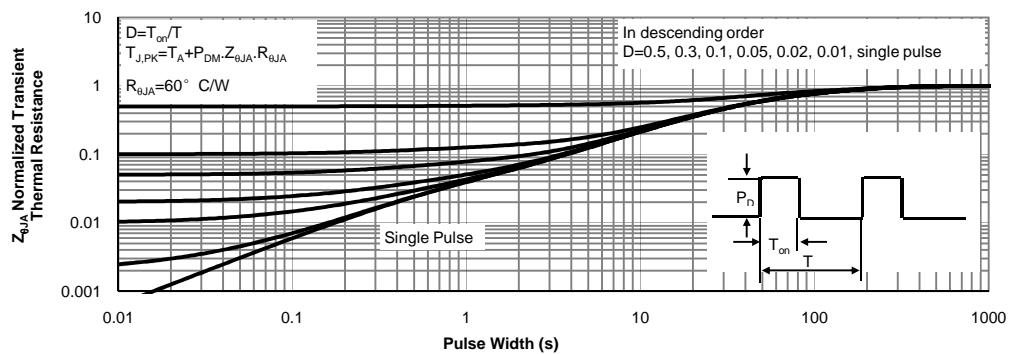
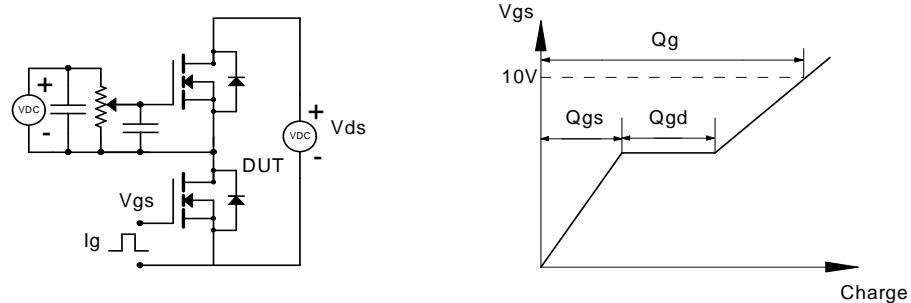
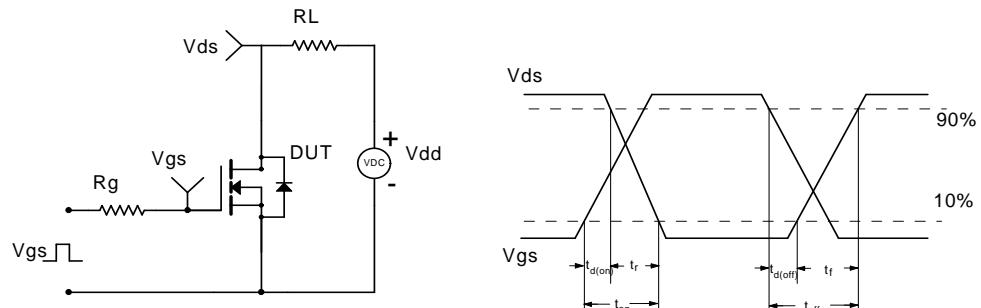
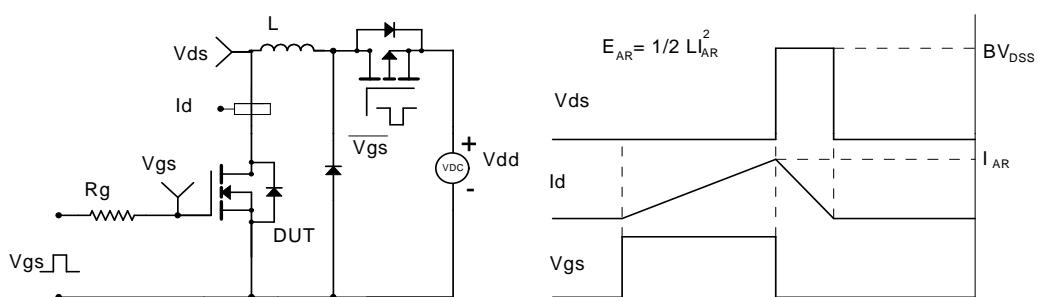


Figure 11: Normalized Maximum Transient Thermal Impedance for AOT266L and AOB266L (Note F)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS


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Figure 15: Single Pulse Avalanche capability (Note C)

Figure 16: Power De-rating (Note F)

Figure 17: Current De-rating (Note F)

Figure 18: Single Pulse Power Rating Junction-to-Ambient (Note H)

Figure 19: Normalized Maximum Transient Thermal Impedance (Note H)

Gate Charge Test Circuit & Waveform

Resistive Switching Test Circuit & Waveforms

Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

Diode Recovery Test Circuit & Waveforms
