100V N-Channel Power MOSFET

DESCRIPTION

The MDT15N10 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge. It can be used in a wide variety of applications.

Application

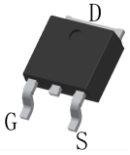
- Power switching application
- Hard switched and High frequency circuits
- Uninterruptible power supply

KEY CHARACTERISTICS

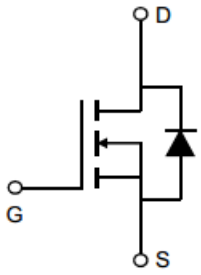
- V_{DS} = 100V,I_D = 15A
  $R_{DS(ON)}$ < 90mΩ @ V_{GS}=10V
  $R_{DS(ON)}$ < 115mΩ @ V_{GS}=4.5V
- High density cell design for lower Rdson
- Fully characterized avalanche voltage and current
- Good stability and uniformity with high EAS
- Excellent package for good heat dissipation

100% UIS TESTED!

100% DVDS TESTED!



TO-252-2L Top View



Schematic diagram

Package Marking And Ordering Information

Device Marking	Ordering Codes	Package	Product Code	Packing
MDT15N10	MDT15N10	TO-252	MDT15N10	Reel

Absolute Maximum Ratings (T_A=25℃ unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	100	V
Gate-Source Voltage	V_{GS}	±20	V
Drain Current-Continuous	I_D	15	A
Drain Current-Pulsed (Note 1)	I_{DM}	40	A
Maximum Power Dissipation(Tc=25℃)	P_D	31	W
Single pulse avalanche energy(Note 2)	E_{AS}	21	mJ
Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55 To 175	℃

Thermal Characteristic

Thermal Resistance,Junction-to-Case	$R_{\theta JC}$	4.8	℃/W

Electrical Characteristics (TA=25℃ unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V I_D=250μA	100	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=100V,V_{GS}=0V	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±20V,V_{DS}=0V	-	-	±100	nA
On Characteristics						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=250μA	1	1.8	2.4	V
Drain-Source On-State Resistance(Note 3)	$R_{DS(ON)}$	V_{GS}=10V, I_D=5A	-	80	90	mΩ
		V_{GS}=4.5V, I_D=5A		90	115	
Forward Transconductance	g_{FS}	V_{DS}=25V,I_D=3.6A	-	5	-	S
Dynamic Characteristics						
Input Capacitance	C_{lss}	V_{DS}=25V,V_{GS}=0V, f=1.0MHz	-	680	-	pF
Output Capacitance	C_{oss}		-	110	-	pF
Reverse Transfer Capacitance	C_{rss}		-	85	-	pF
Switching Characteristics (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=50V, ID=5A, V_{GS}=10V,R_{GEN}=2.5Ω	-	10	-	nS
Turn-on Rise Time	t_r		-	7	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	34	-	nS
Turn-Off Fall Time	t_f			9	-	nS
Total Gate Charge	Q_g	V_{DS}=80V,I_D=3A V_{GS}=10V	-	16	-	nC
Gate-Source Charge	Q_{gs}		-	4	-	nC
Gate-Drain Charge	Q_{gd}		-	5	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage	V_{SD}	V_{GS}=0V,I_S=15A	-	-	1.2	V

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. E_{AS} condition :T_j=25℃,V_{DD}=50V,V_{GS}=10V,L=0.5mH,Rg=25Ω
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production.

Characteristics Curves

Figure 1 Output Characteristics

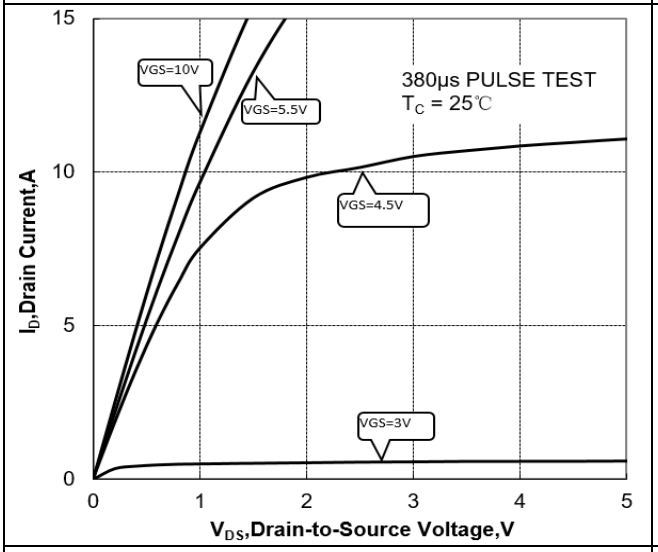


Figure 2 Transfer Characteristics

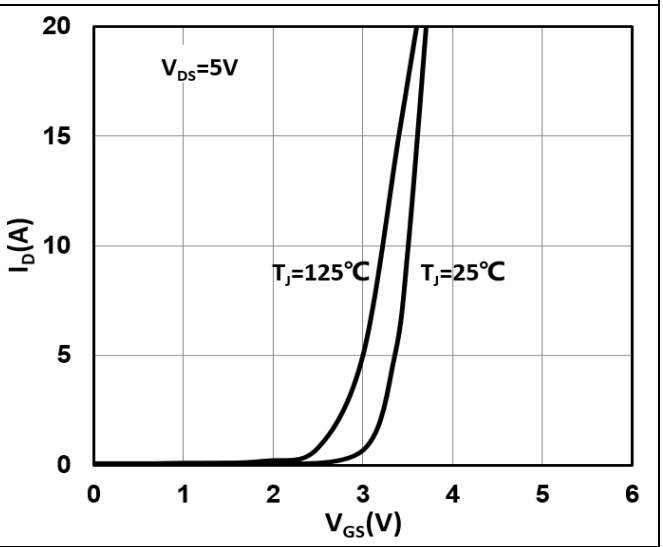


Figure 3 On-Resistance vs. I_D and V_{GS}

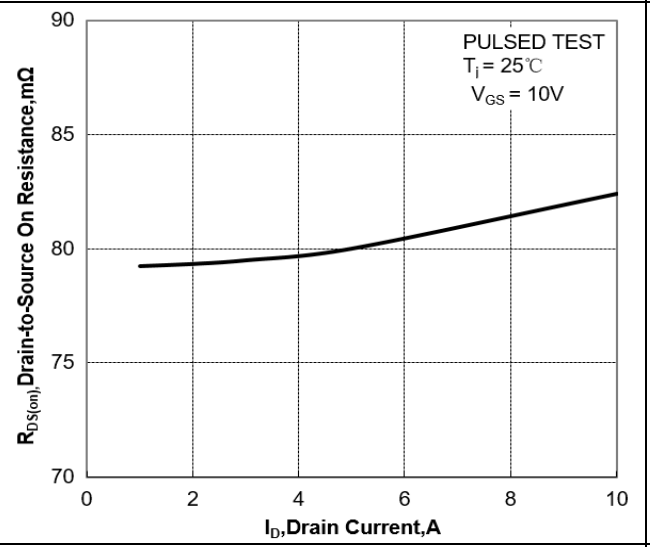


Figure 4 On-Resistance vs. Junction Temperature

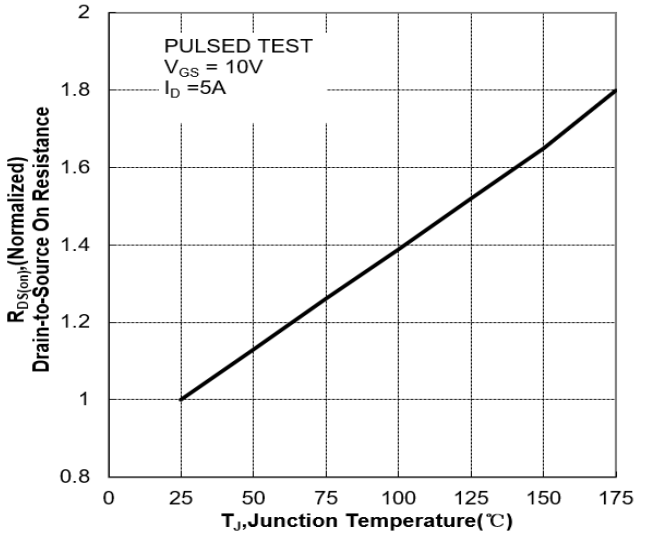


Figure 5 On-Resistance vs. V_{GS}

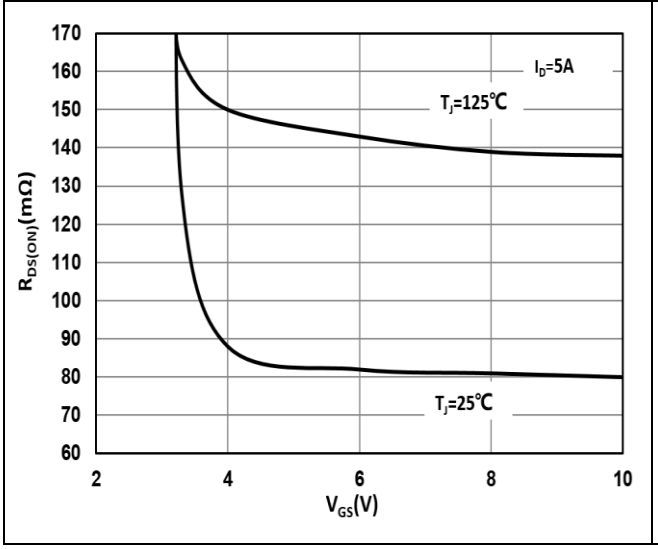


Figure 6 Body Diode Forward Voltage

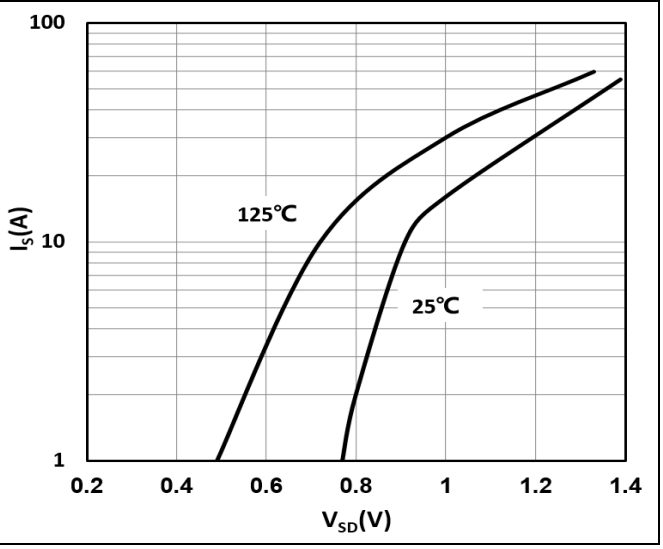


Figure 7 Gate-Charge Characteristics

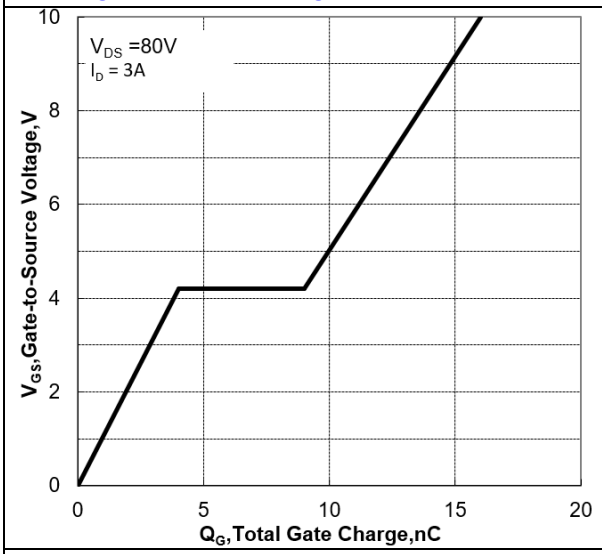


Figure 8 Capacitance Characteristics

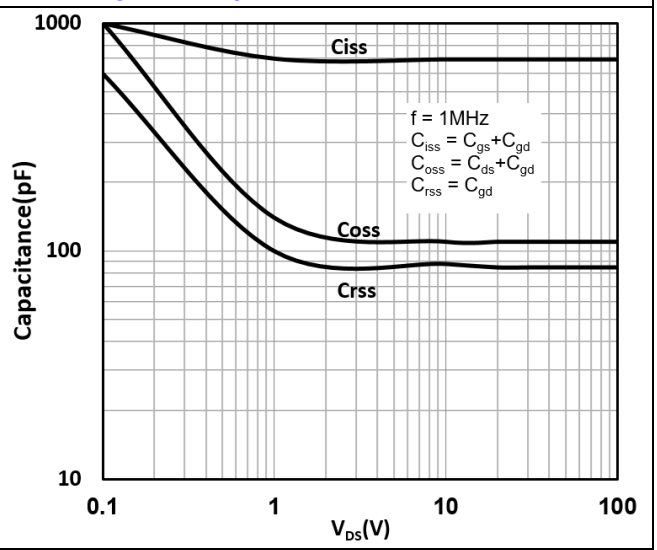


Figure 9 Maximum Forward Biased Safe Operation Area

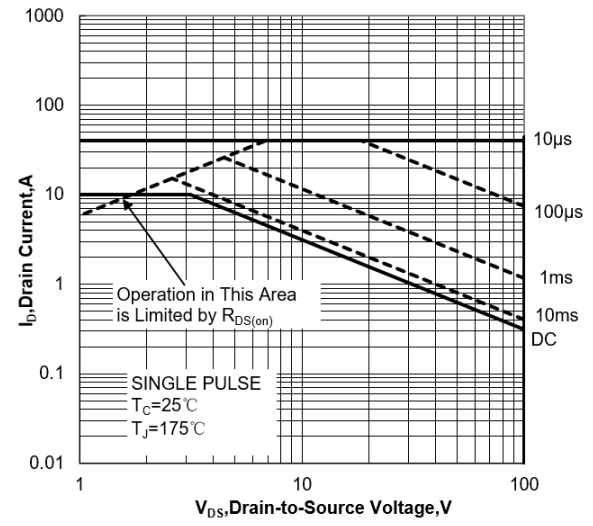


Figure 10 Single Pulse Power Rating Junction-to-Ambient

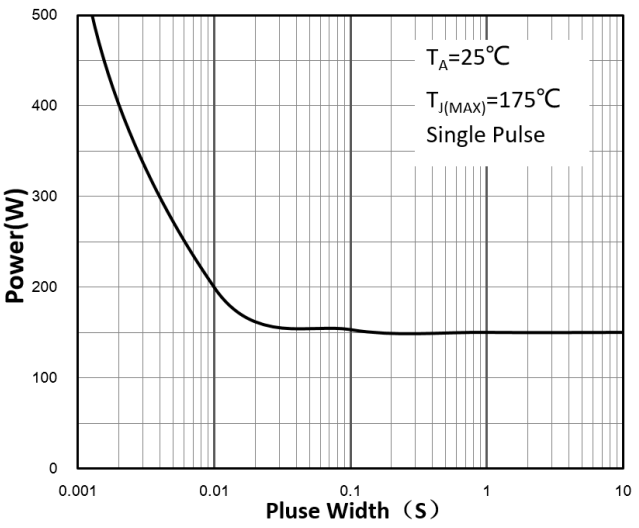
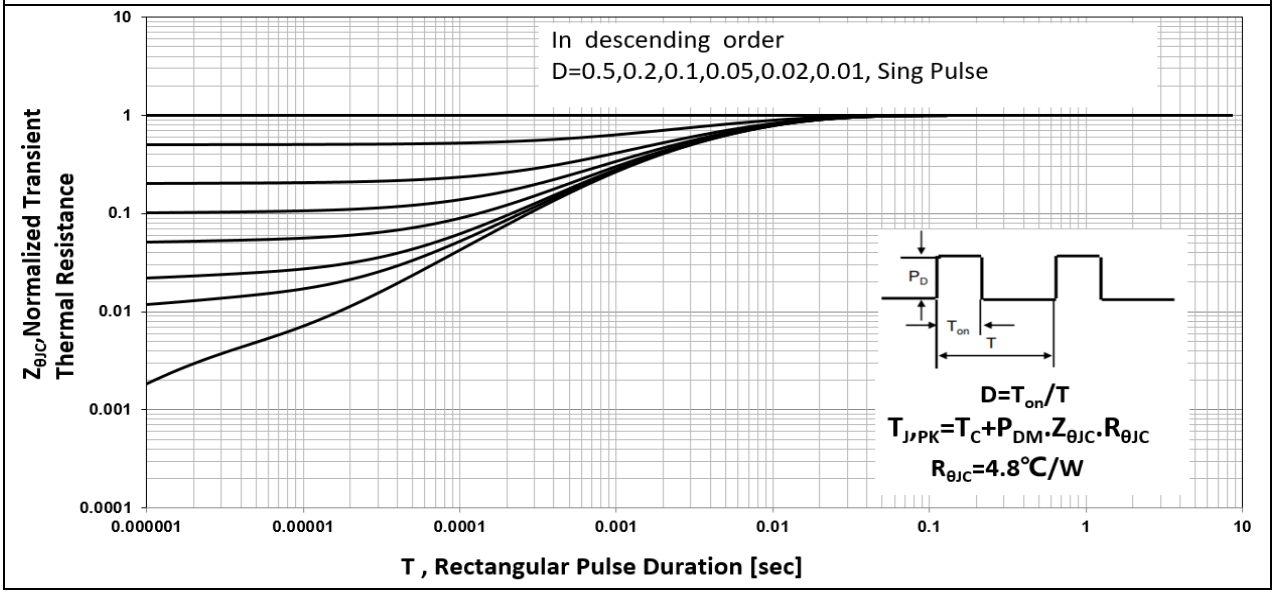
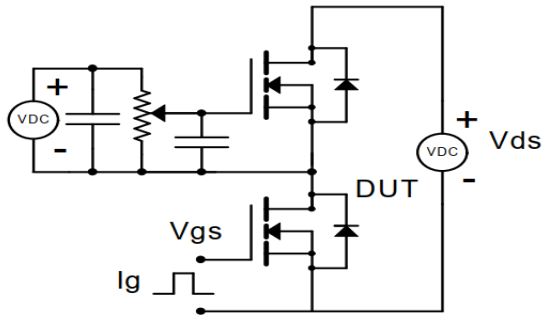
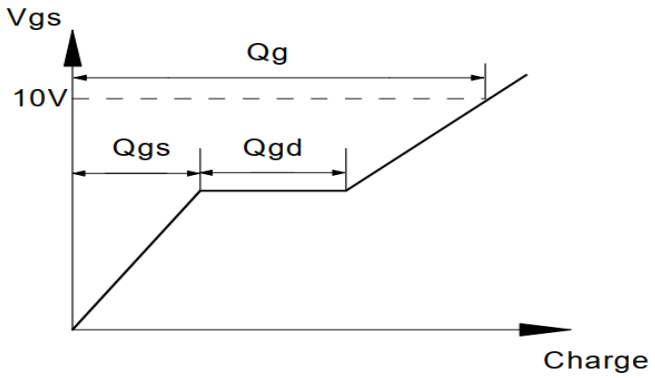
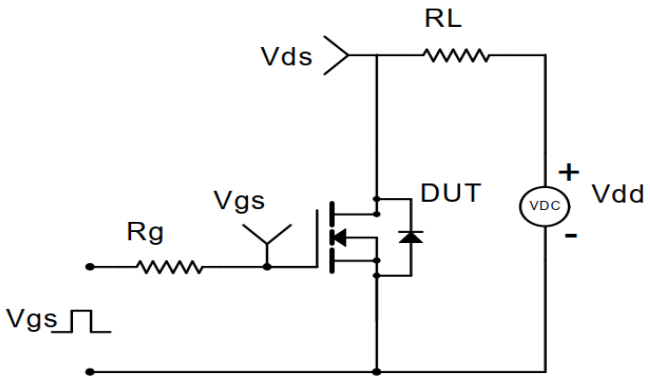
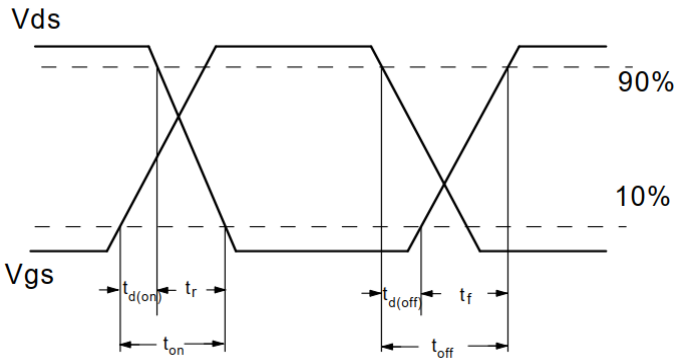
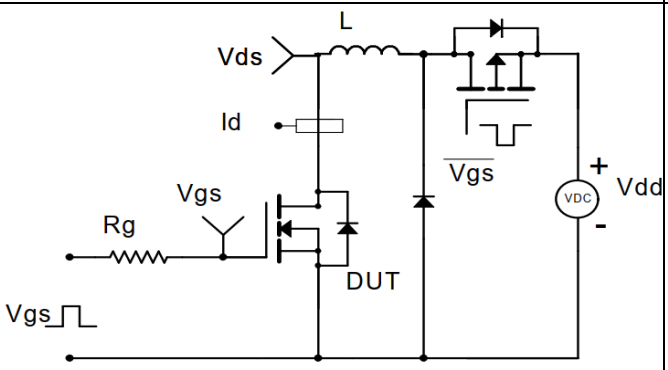
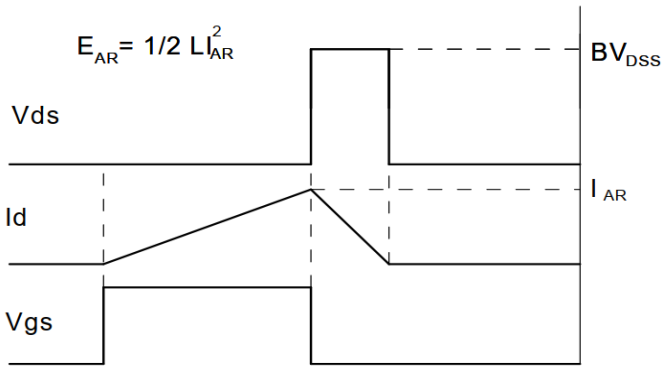
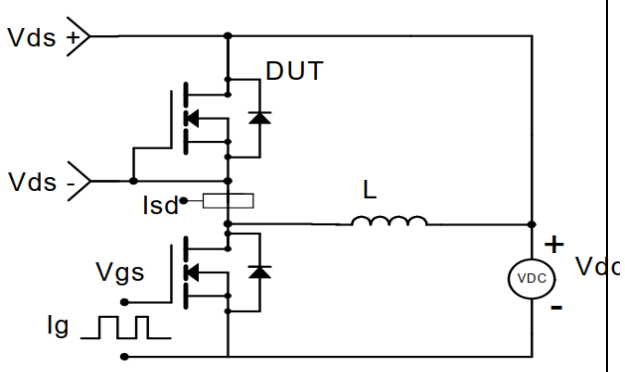
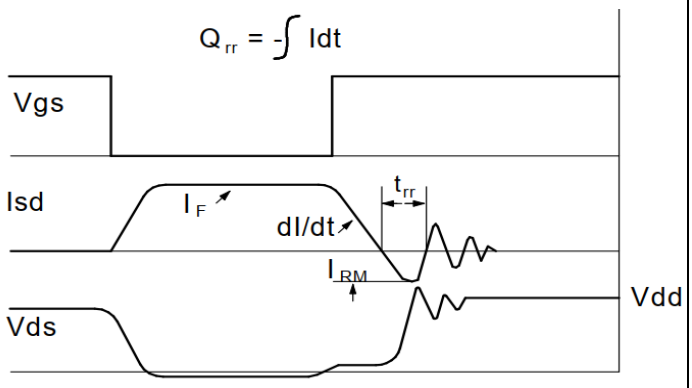


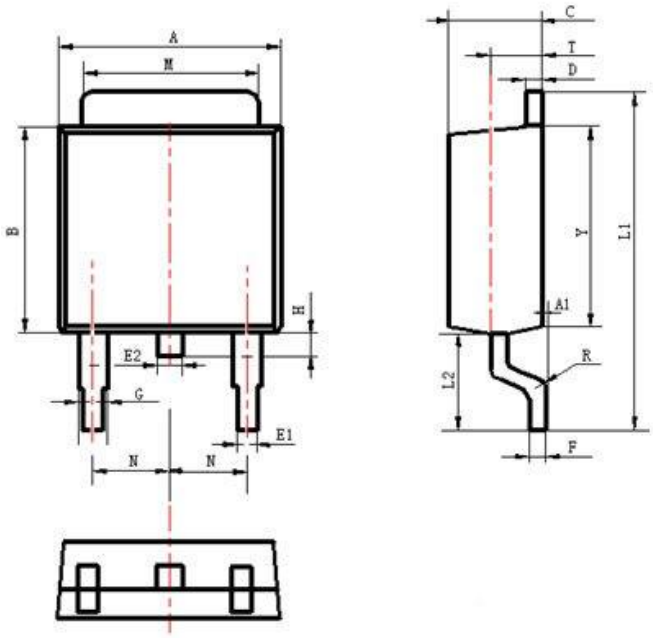
Figure 11 Normalized Maximum Transient Thermal Impedance



Test Circuit and Waveform

Gate Charge Test Circuit	Gate Charge Test Waveform
	
Resistive Switching Test Circuit	**Resistive Switching Test Waveforms**
	
Unclamped Inductive Switching (UIS) Test Circuit	**Unclamped Inductive Switching (UIS) Test Waveforms**
	
Diode Recovery Test Circuit	**Diode Recovery Test Waveforms**
	

Package Description



Items	Values(mm)	
	MIN	MAX
A	6.30	6.90
A1	0	0.13
B	5.70	6.30
C	2.10	2.50
D	0.30	0.60
E1	0.60	0.90
E2	0.70	1.00
F	0.30	0.60
G	0.70	1.20
L1	9.60	10.50
L2	2.70	3.10
H	0.60	1.00
M	5.10	5.50
N	2.09	2.49
R	0 .3	
T	1.40	1.60
Y	5.10	6.30

TO-252 Package