

200V N-Channel MOSFET

Product Summary

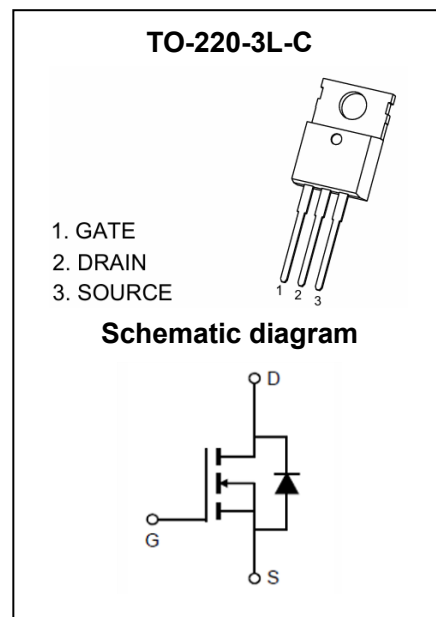
$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
200V	8.6mΩ@10V	115A

Feature

- Split Gate Trench Technology
- Low $R_{DS(ON)}$
- Low Gate Charge
- Low Gate Resistance
- 100% UIS Tested

Application

- Load Switching
- Motor Driving
- Power Management
- Current Switching



Package Marking and Ordering Information

Part Number	Package	Marking	Packing	Reel Size	Tape Width	Qty
T086N20NTB	TO-220-3L-C	T086N20N	Tube	NA	NA	50pcs

ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Value	Unit	
Drain-Source Voltage	V_{DS}	200	V	
Gate-Source Voltage	V_{GS}	±20	V	
Continuous Drain Current ¹	$T_C = 25^\circ\text{C}$	I_D	115	A
	$T_C = 100^\circ\text{C}$	I_D	81	A
Pulsed Drain Current ²	I_{DM}	460	A	
Single Pulsed Avalanche Current ³	I_{AS}	70	A	
Single Pulsed Avalanche Energy ³	E_{AS}	1225	mJ	
Power Dissipation ⁵	$T_C = 25^\circ\text{C}$	P_D	300	W
Thermal Resistance from Junction to Ambient ⁶	$R_{\theta JA}$	30	$^\circ\text{C/W}$	
Thermal Resistance from Junction to Case	$R_{\theta JC}$	0.50	$^\circ\text{C/W}$	
Junction Temperature	T_J	175	$^\circ\text{C}$	
Storage Temperature	T_{STG}	-55~ +175	$^\circ\text{C}$	

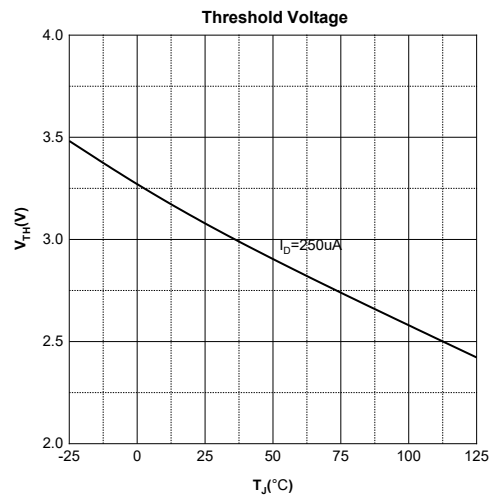
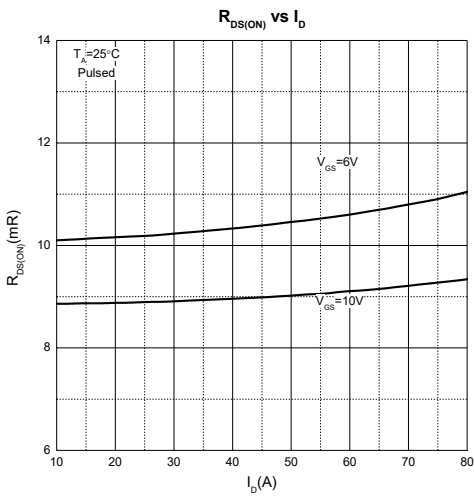
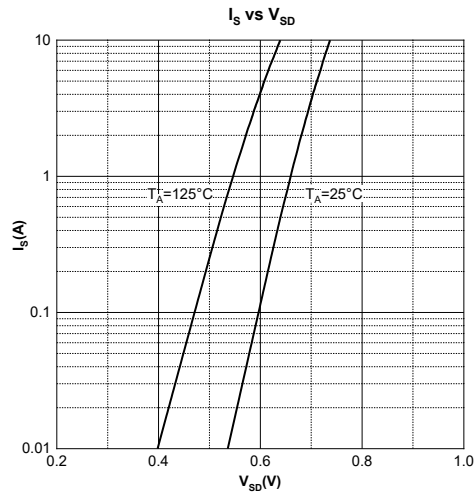
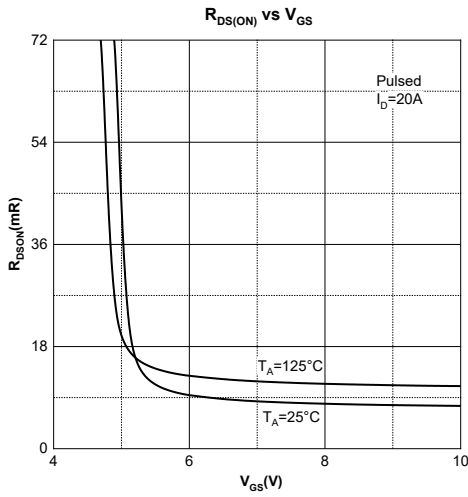
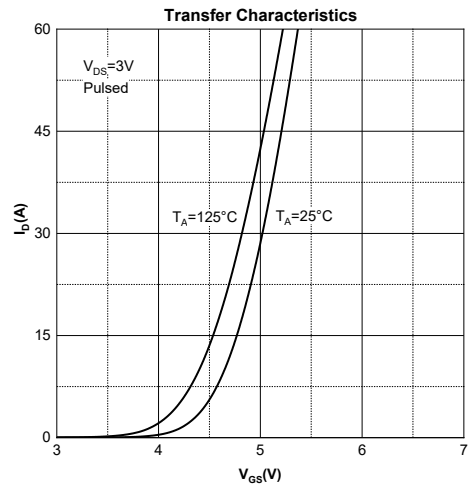
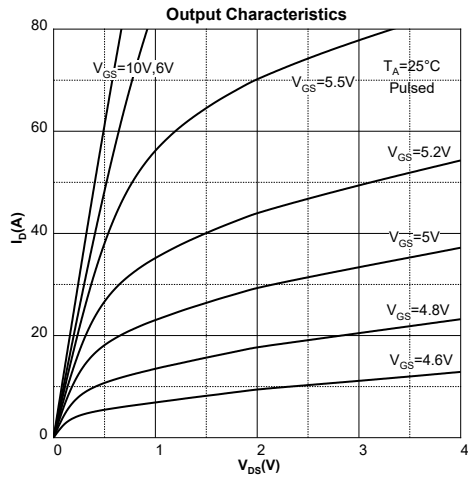
Electrical Characteristics ($T_A=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	200			V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 200V, V_{GS} = 0V$			1	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS} = \pm 20V, V_{DS} = 0V$			± 100	nA
On Characteristics⁴						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	2	3.1	4	V
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 20A$		8.6	10	m Ω
Dynamic Characteristics						
Input Capacitance	C_{iss}	$V_{DS} = 100V, V_{GS} = 0V, f = 1MHz$		5164		pF
Output Capacitance	C_{oss}			425		
Reverse Transfer Capacitance	C_{rss}			18		
Gate Resistance	R_g	$V_{DS} = 0V, V_{GS} = 0V, f = 1MHz$		3.5		Ω
Switching Characteristics						
Total Gate Charge	Q_g	$V_{DS} = 100V, V_{GS} = 10V, I_D = 20A$		77		nC
Gate-Source Charge	Q_{gs}			24.6		
Gate-Drain Charge	Q_{gd}			19.3		
Gate Plateau Voltage	$V_{plateau}$			4.8		V
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 100V, V_{GS} = 10V, I_D = 20A,$ $R_G = 3.0\Omega$		19		ns
Turn-On Rise Time	t_r			30		
Turn-Off Delay Time	$t_{d(off)}$			40		
Turn-Off Fall Time	t_f			20		
Source-Drain Diode Characteristics						
Diode Forward Voltage ⁴	V_{SD}	$V_{GS} = 0V, I_S = 20A$			1.2	V
Diode Continuous Forward Current ¹	I_S	$T_C = 25^\circ\text{C}$			115	A
Diode Pulse Forward Current ²	I_{SM}	$T_C = 25^\circ\text{C}$			460	A
Diode Reverse Recovery Time	t_{rr}	$I_F = 20A, dI/dt = 100A/\mu s$		120		ns
Diode Reverse Recovery Charge	Q_{rr}	$I_F = 20A, dI/dt = 100A/\mu s$		650		nC

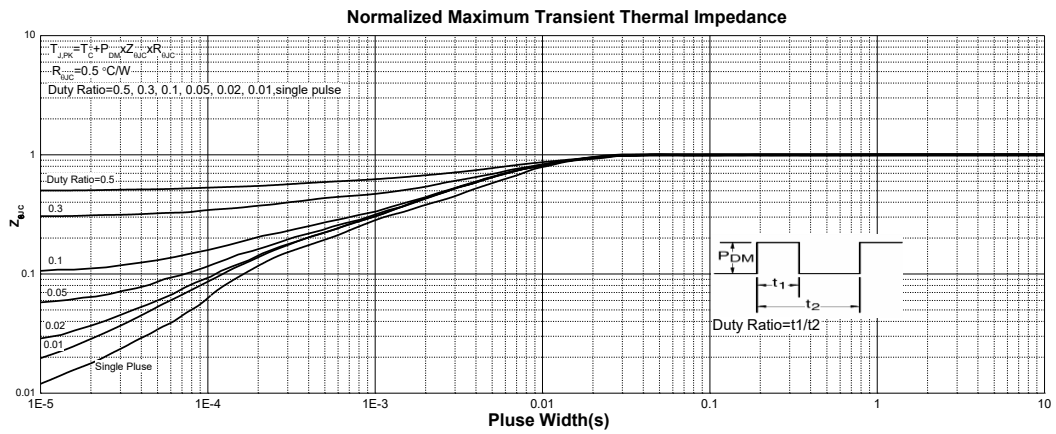
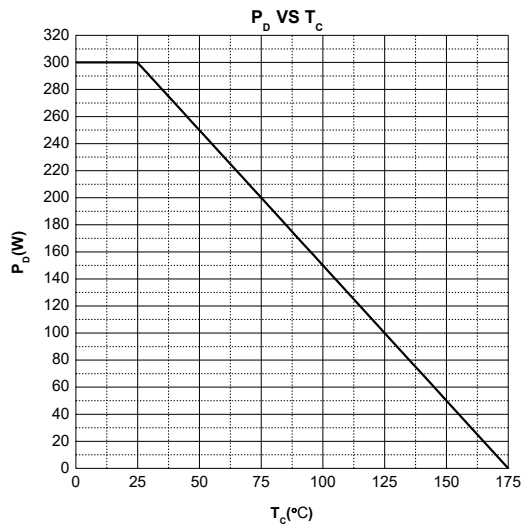
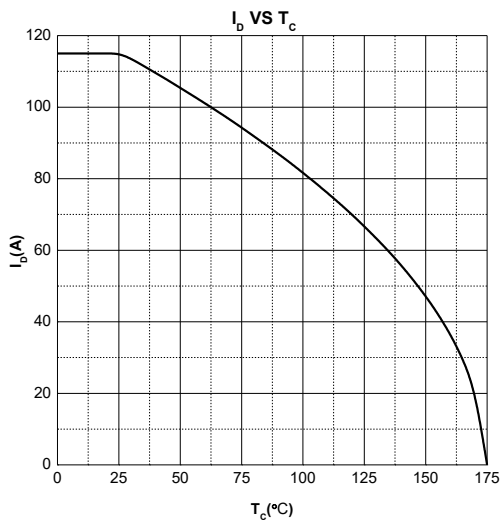
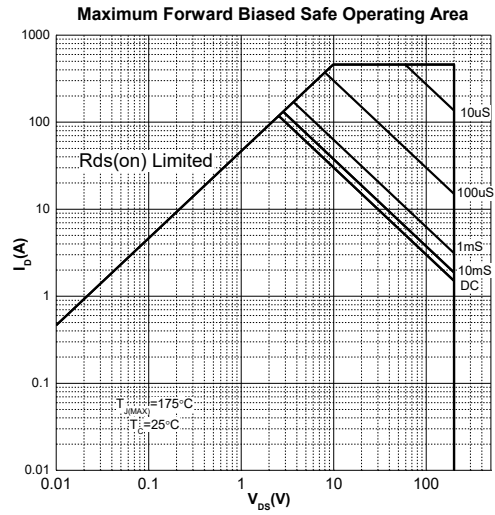
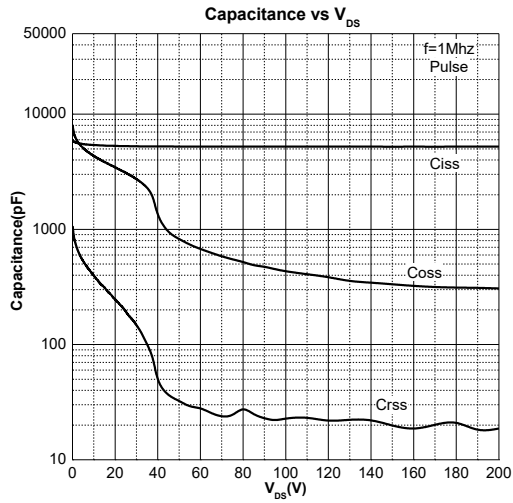
Notes :

- 1.The maximum current rating is limited by package.And device mounted on a large heatsink
- 2.Pulse Test : Pulse Width $\leq 10\mu s$, duty cycle $\leq 1\%$.
- 3.EAS condition: $V_{DD} = 100V, V_{GS} = 10V, L = 0.5mH, R_G = 25\Omega$ Starting $T_J = 25^\circ\text{C}$.
- 4.Pulse Test : Pulse Width $\leq 300\mu s$, duty cycle $\leq 2\%$.
- 5.The power dissipation P_D is limited by $T_{J(MAX)} = 175^\circ\text{C}$.And device mounted on a large heatsink
- 6.Device mounted on 1in² FR-4 board with 2oz. Copper, in a still air environment with $T_A = 25^\circ\text{C}$.

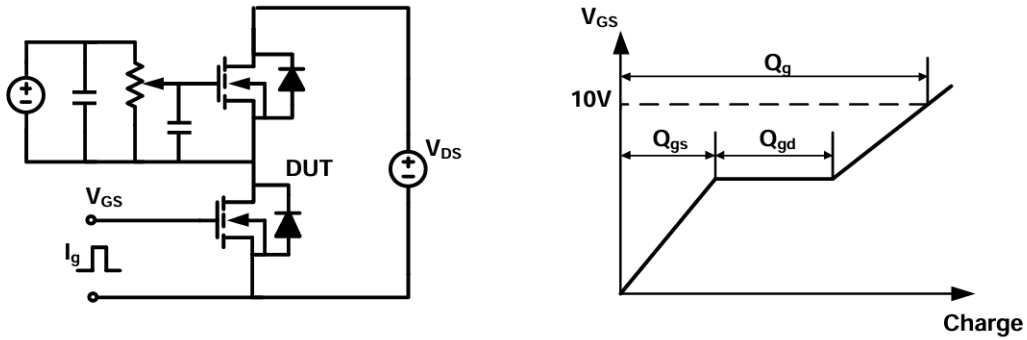
Typical Characteristics



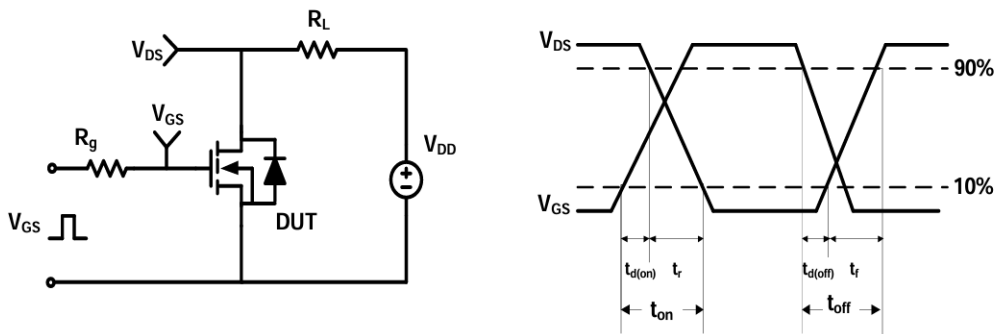
Typical Characteristics



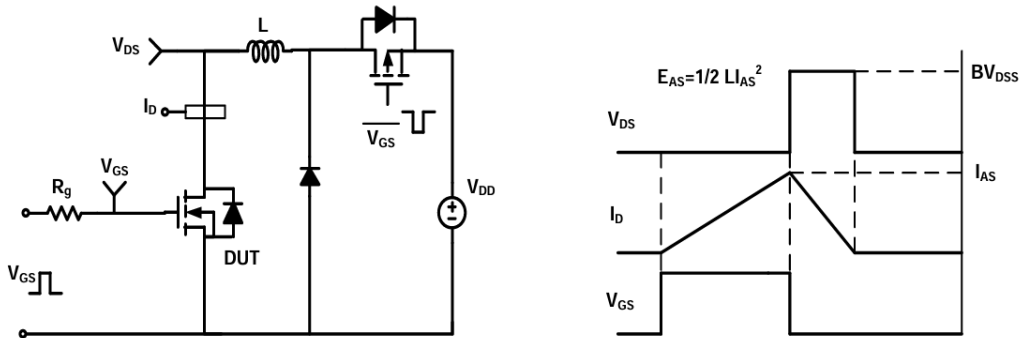
Gate Charge Test Circuit & Waveform



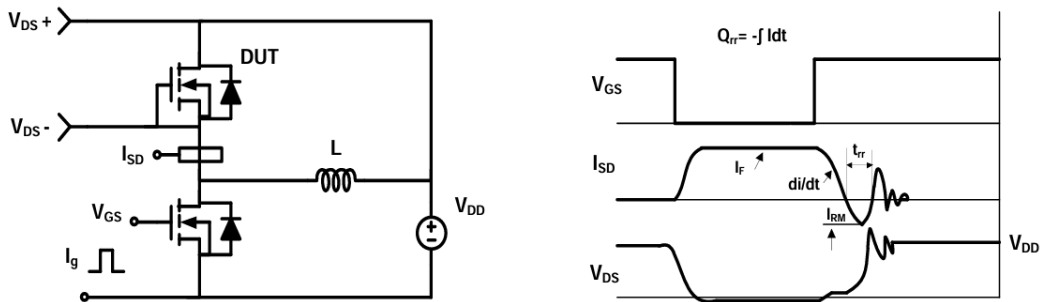
Resistive Switching Test Circuit & Waveform

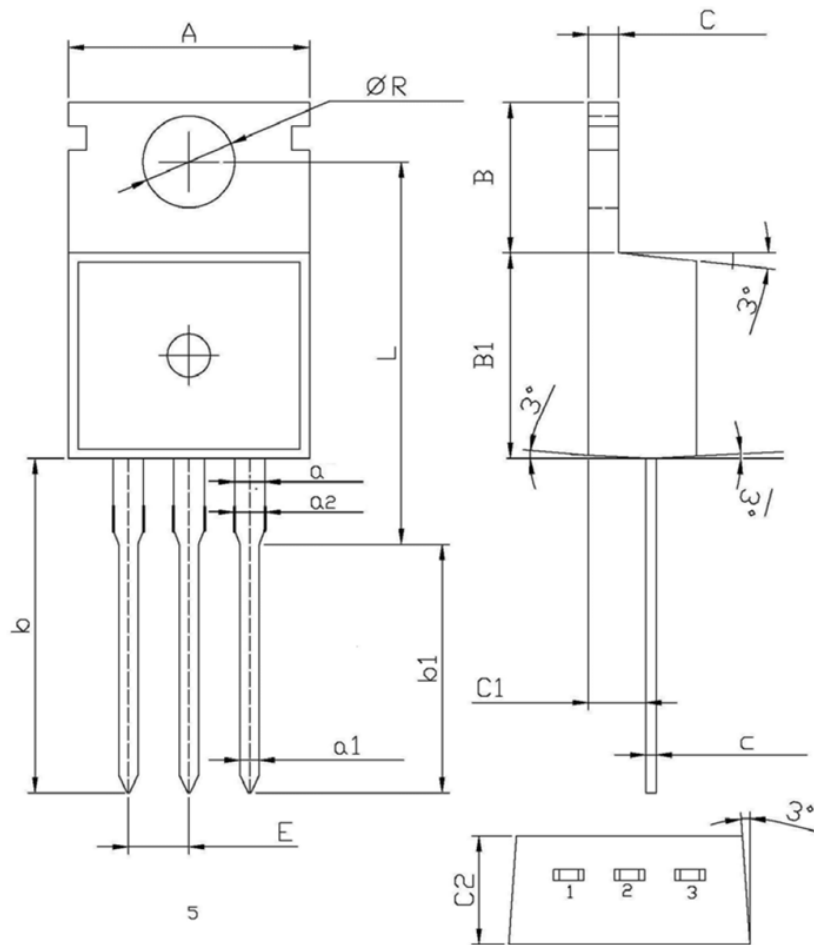


Unclamped Inductive Switching (UIS) Test Circuit & Waveform



Diode Recovery Test Circuit & Waveform





Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	9.800	10.200	0.386	0.402
R	3.560	3.640	0.140	0.143
L	15.700	16.100	0.618	0.634
b	12.600	13.600	0.496	0.535
b1	9.600	10.600	0.378	0.417
a	1.220	1.320	0.048	0.052
E	2.340	2.740	0.092	0.108
a2	1.250	1.620	0.049	0.064
C	1.200	1.400	0.047	0.055
B	5.900	6.700	0.232	0.264
B1	9.000	9.400	0.354	0.370
C1	2.200	2.600	0.087	0.102
a1	0.700	0.900	0.028	0.035
c	0.400	0.600	0.016	0.024
C2	4.300	4.700	0.169	0.185