

WNM12N65/WNM12N65F

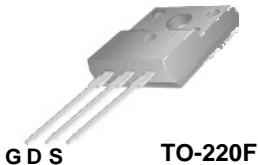
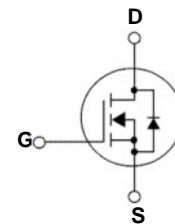
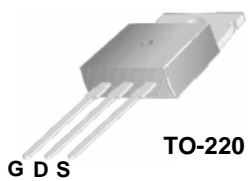
650V N-Channel MOSFET

Description

The WNM12N65/WNM12N65F is N-Channel enhancement MOS Field Effect Transistor. Uses advanced high voltage MOSFET Process and design to provide excellent $R_{DS(ON)}$ with low gate charge. This device is suitable for use in popular AC-DC applications, power switching application and a wide variety of other applications.

Features

- 650V@ $T_J=25^\circ\text{C}$
- Typ. $R_{DS(on)}=0.57$
- Low gate charge
- 100% avalanche tested
- 100% R_g tested



WNM12N65 =Devices code

WNM12N65F =Devices code

Y Y =Year
WW =Week

Y Y =Year
WW =Week

Order Information

Device	Package	Units/Tube
WNM12N65_3/T	TO-220	50
WNM12N65F_3/T	TO-220-F	50

Absolution Maximum Ratings $T_A=25^\circ\text{C}$ unless otherwise noted					
Parameter	Symbol	WNM12N65	WNM12N65F	Unit	
Drain-Source Voltage	V_{DS}	650	650	V	
Gate-Source Voltage	V_{GS}	± 30	± 30		
Continuous Drain Current	I_D	$T_C=25^\circ\text{C}$	12	12*	A
		$T_C=100^\circ\text{C}$	7.5	7.5*	
Pulsed Drain Current	I_{DM}	48		A	
Single Pulsed Avalanche Energy ^C	E_{AS}	165		mJ	
Peak diode recovery dv/dt	dv/dt	5		V/ns	
Power Dissipation ^B	P_D	$T_C=25^\circ\text{C}$	192	39	W
		Derate above 25°C	1.53	0.31	W/°C
Operating and Storage Temperature Range	T_J, T_{STG}	-55~150		°C	
Lead Temperature	T_L	260		°C	
Thermal Resistance Ratings					
Maximum Junction-to-Ambient ^A	R_{JA}	65	65	°C/W	
Maximum Case to Sink	R_{CS}	0.5			
Maximum Junction-to-Case	R_{JC}	0.65	3.2		

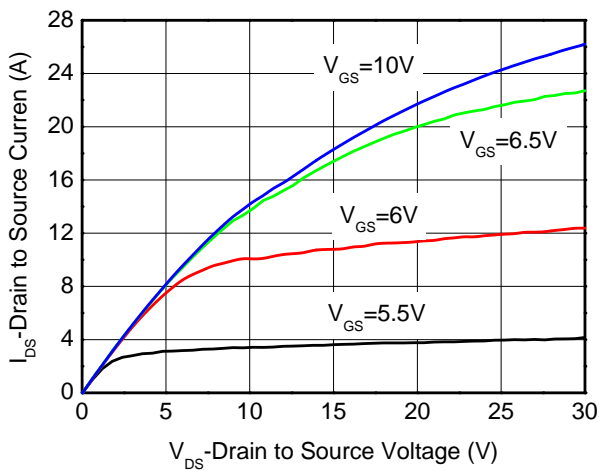
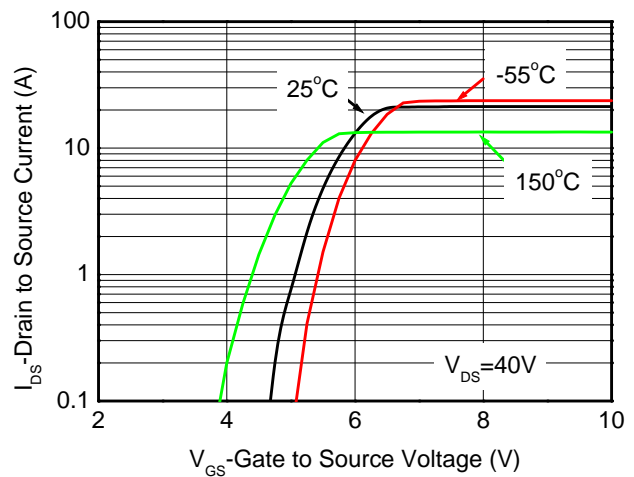
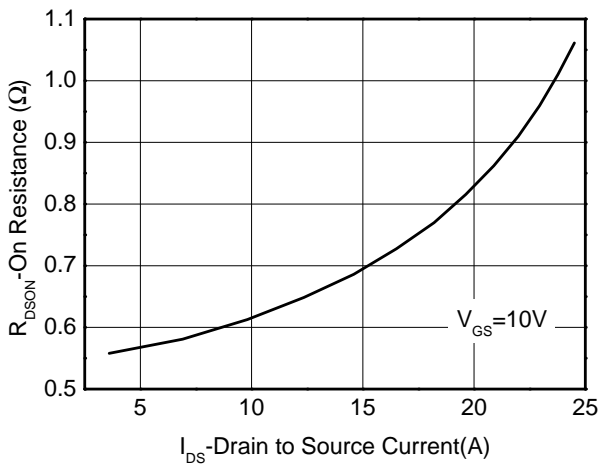
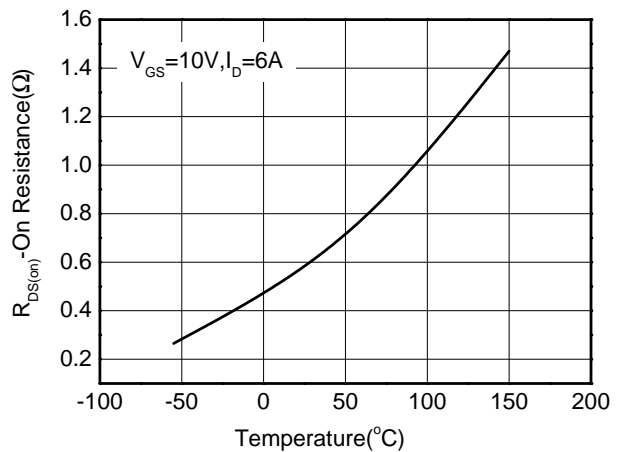
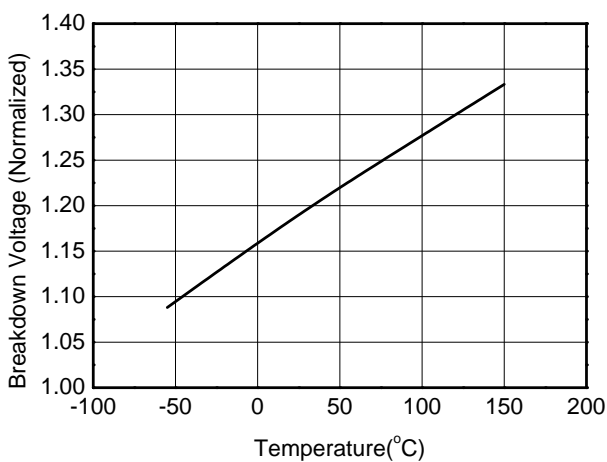
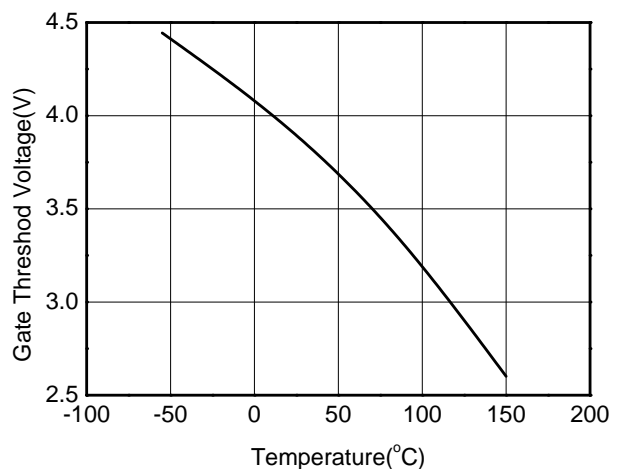
*Drain current limited by maximum junction temperature.

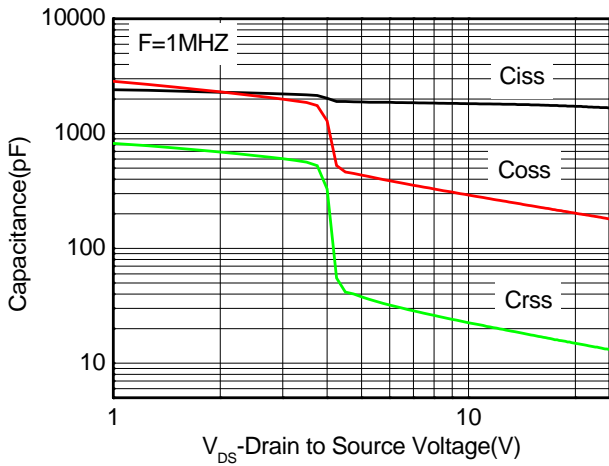
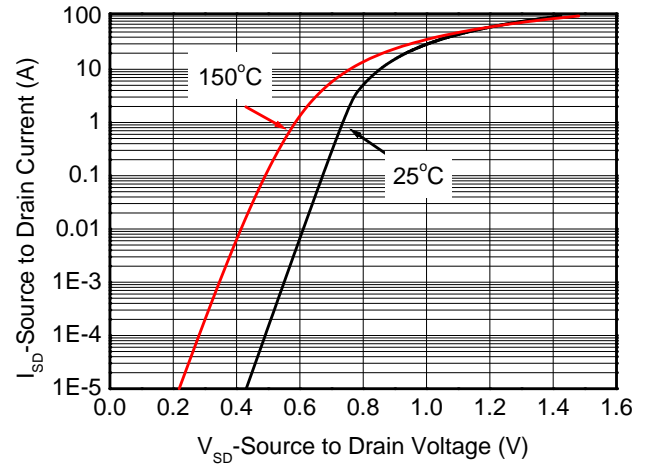
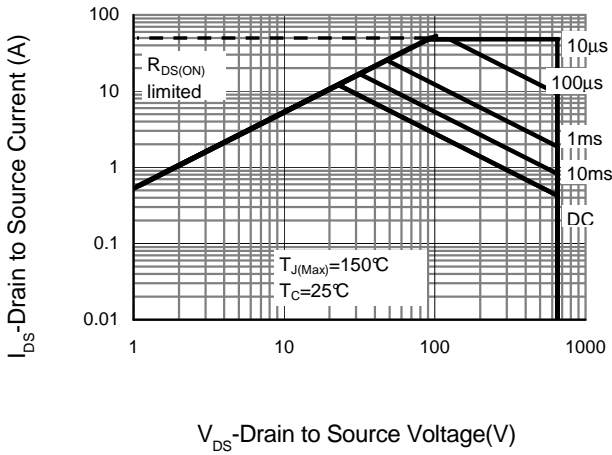
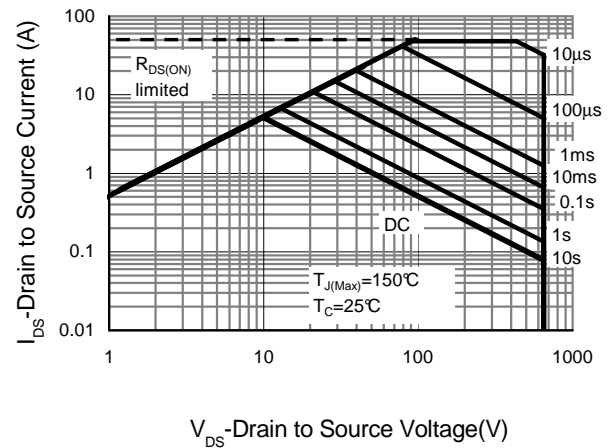
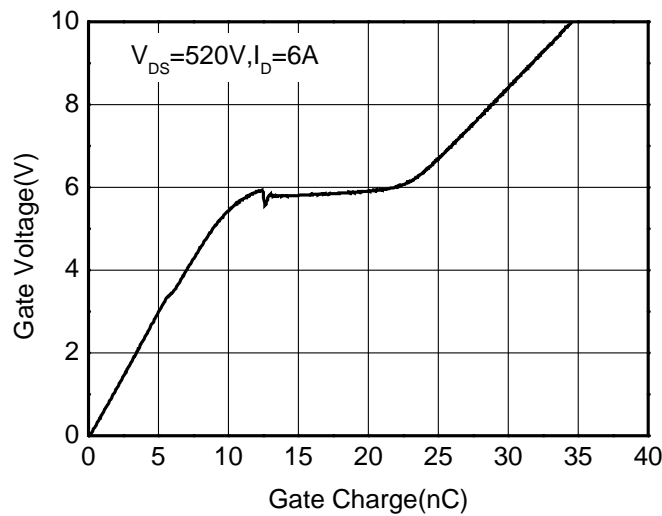
Electronics Characteristics (T_A=25°C, unless otherwise noted)

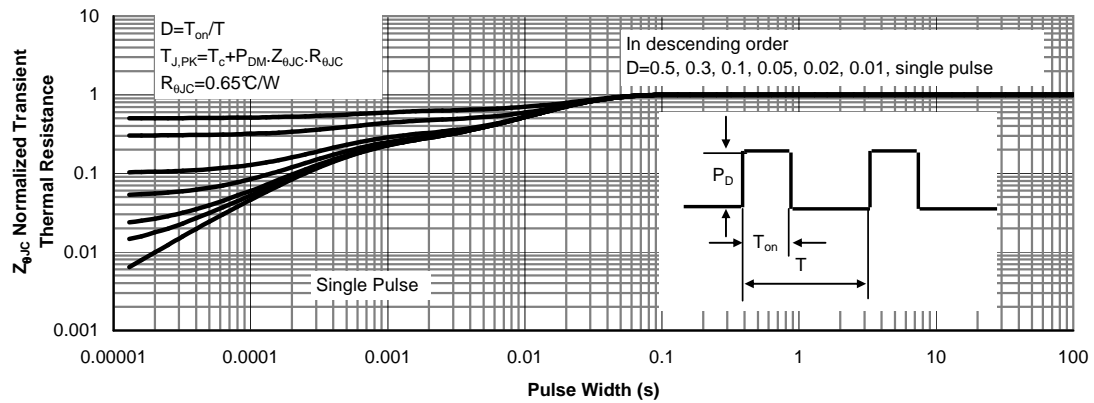
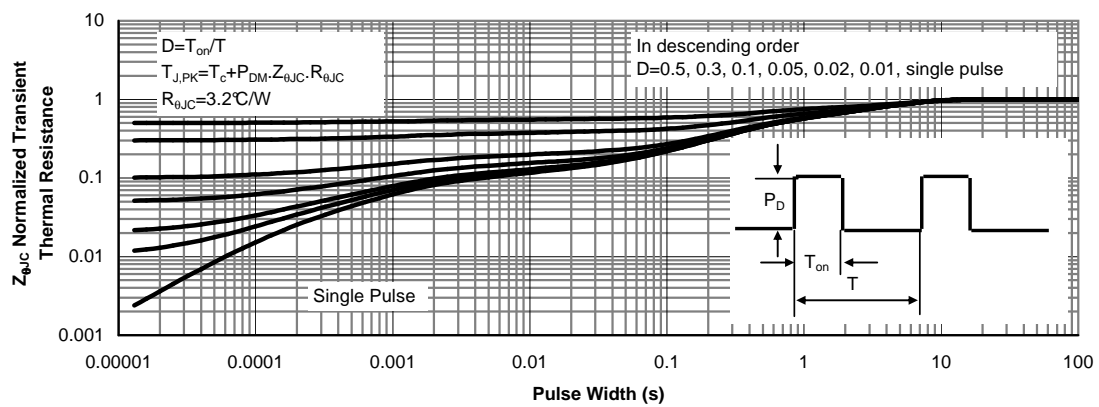
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Drain-to-Source Breakdown Voltage	BV _{DSS}	V _{GS} = 0 V, I _D = 250uA	650			V
Breakdown Voltage Temperature Coefficient	$\frac{\Delta BV_{DSS}}{\Delta T_J}$	I _D = 250uA, Referenced to 25°C		0.72		V/ ⁰ C
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 650V, V _{GS} = 0V			1	uA
Gate-to-source Leakage Current	I _{GSS}	V _{DS} = 0 V, V _{GS} = ± 30 V			± 100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	V _{GS(TH)}	V _{GS} = V _{DS} , I _D = 250uA	3.0	4.0	5.0	V
Drain-to-source On-resistance ^D	R _{DS(on)}	V _{GS} = 10V, I _D = 6.0A		0.57	0.70	
DYNAMIC PARAMETERS						
Input Capacitance	C _{ISS}	V _{GS} = 0 V, f = 1.0 MHz, V _{DS} = 25 V		1670		pF
Output Capacitance	C _{OSS}			181		
Reverse Transfer Capacitance	C _{RSS}			13		
Total Gate Charge	Q _{G(TOT)}	V _{GS} = 10 V, V _{DS} = 520 V, I _D = 6.0A		34.5		nC
Threshold Gate Charge	Q _{G(TH)}			6.9		
Gate-to-Source Charge	Q _{GS}			10.5		
Gate-to-Drain Charge	Q _{GD}			12.5		
Gate resistance	R _g	V _{GS} =0V, V _{DS} =0V, F=1MHZ		4.5		
Turn-On and Turn-Off Characteristics						
Turn-On Delay Time	t _{d(on)}	V _{GS} = 10V, V _{DS} = 325 V, I _D = 12A, R _G =25		39.5		ns
Rise Time	t _r			103		
Turn-Off Delay Time	t _{d(off)}			83.2		
Fall Time	t _f			64		
Drain to Source Diode Characteristics and Maximum Ratings						
Forward Voltage	V _{SD}	V _{GS} = 0 V, I _S = 1.0A		0.7	1.5	V
Maximum Body-Diode Continuous Current	I _S				12	A
Maximum Body-Diode Pulsed Current	I _{SM}				48	A
Body Diode Reverse Recovery Time	T _{rr}	I _F =12A, di/dt=100A/us, V _{DS} =100V		490.7		nS
Body Diode Reverse Recovery Charge	Q _{rr}	I _F =12A, di/dt=100A/us, V _{DS} =100V		3.97		uC

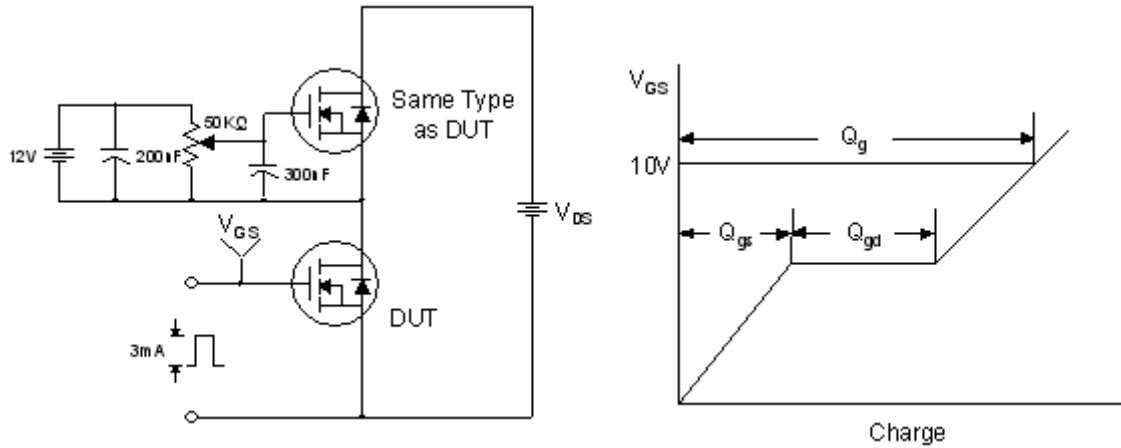
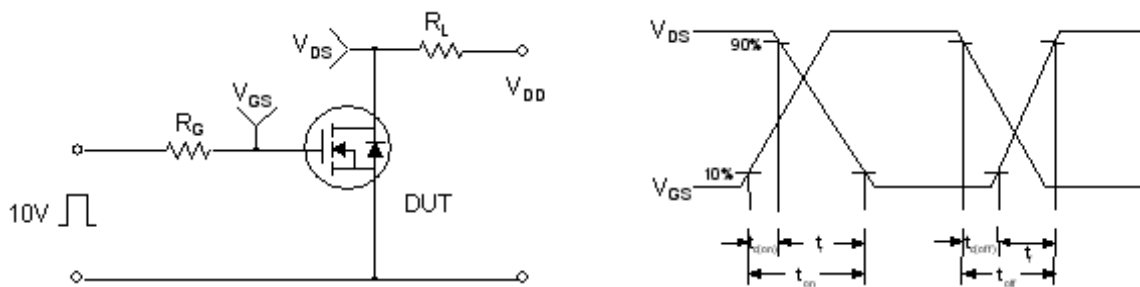
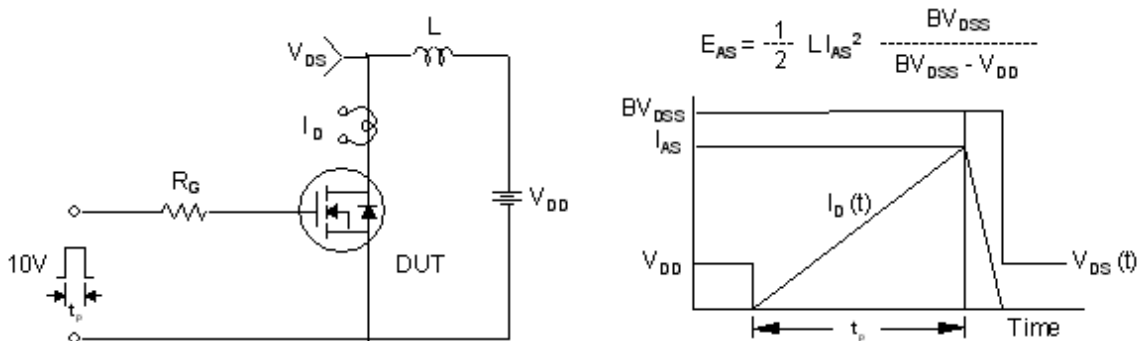
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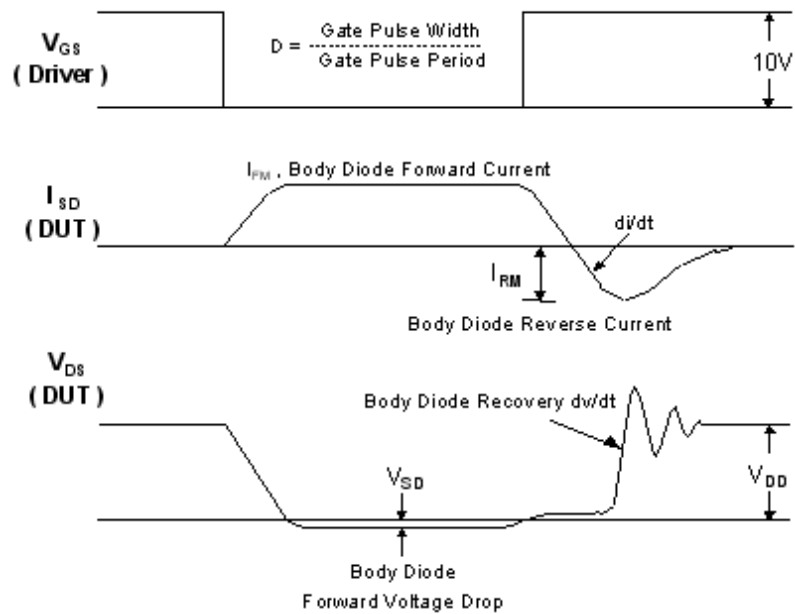
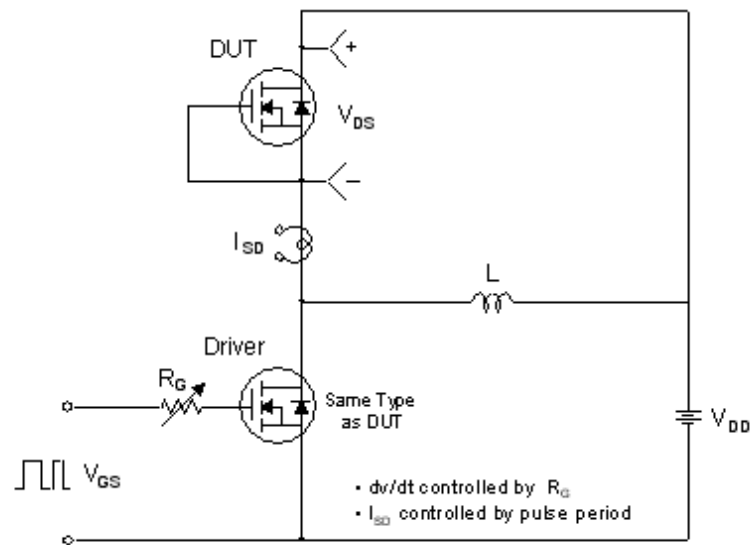
- The value of R_{JA} is measured with the device in a still air environment with T_A =25°C.
- The power dissipation P_D is based on T_{J(MAX)} =150°C, using junction-to-case thermal resistance.
- L=7.85mH, I_{AS}=6.5A, V_{DD}=50V, R_G=25 , Starting T_J=25°C.
- Pulse width 380s, Duty Cycle 2%.

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

Output characteristics

Transfer characteristics

On-Resistance vs. Drain current

On-Resistance vs. Junction temperature

Breakdown Voltage vs. Junction temperature

Threshold voltage vs. Temperature


Capacitance

Body diode forward voltage

Safe Operating Power (WNM12N65F)

Safe Operating Power (WNM12N65)

Gate charge Characteristics

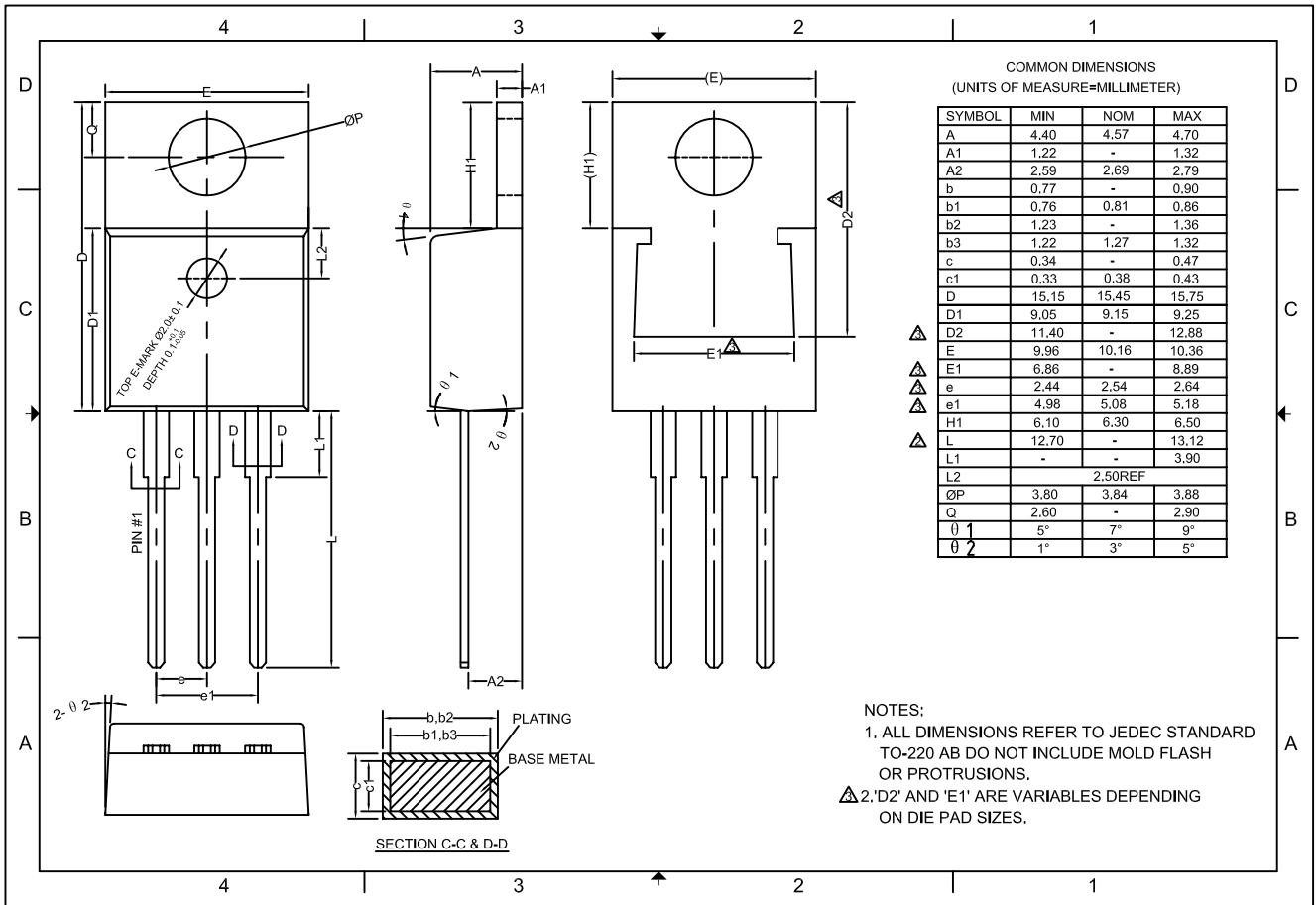

Transient thermal response (Junction-to-Case WNM12N65)

Transient thermal response (Junction-to-Case WNM12N65F)

Gate Charge Test Circuit & Waveform

Resistive Switching Test Circuit & Waveforms

Unclamped Inductive Switching Test Circuit & Waveforms


Peak Diode Recovery dv/dt Test Circuit & Waveforms


Package outline dimensions

TO-220



TO-220F

