

WNM05N60/WNM05N60F

600V N-Channel Power MOSFET

Description

The WNM05N60/WNM05N60F series 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@ $T_J=150^{\circ}\text{C}$
- Typ. $R_{DS(on)}=1.7\Omega$
- Low gate charge(typ. $Q_g=18.5\text{nC}$)
- 100% avalanche tested
- 100% R_g tested

Order Information

Device	Package	Marking	Units/Tube
WNM05N60-3/T	TO-220	WNM05N60TOYW	50
WNM05N60F-3/T	TO-220-F	WNM05N60TFYW	50



Note 1: WNM05N60=Device code ;TO=Special Code ; Y=Year ;W=Week (A~z);
 Note 2: WNM05N60=Device code ;TF=Special Code ; Y=Year ;W=Week (A~z);

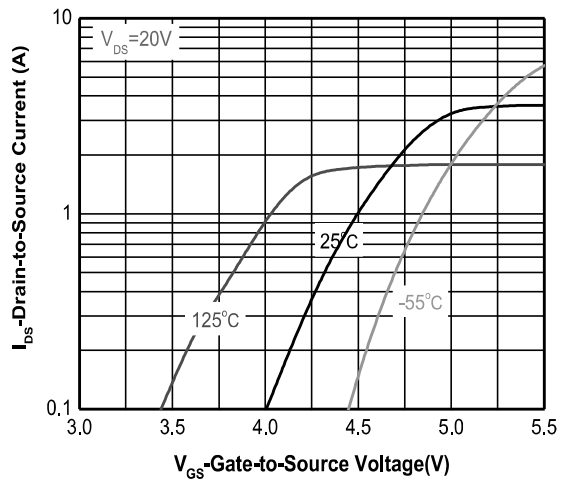
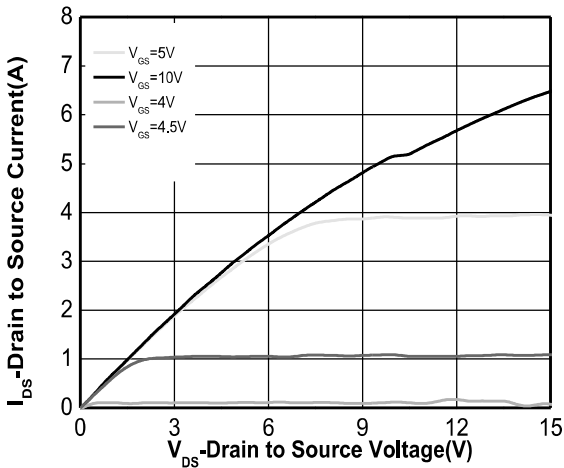
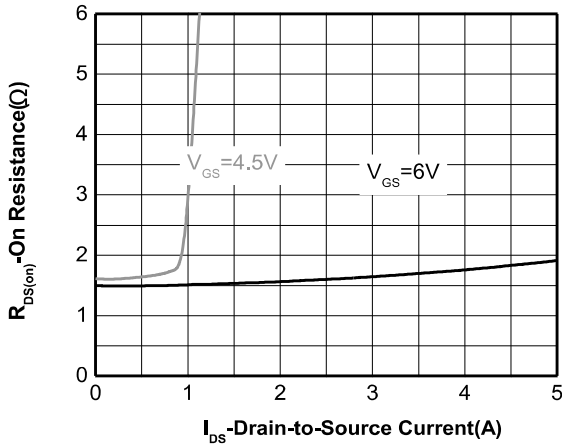
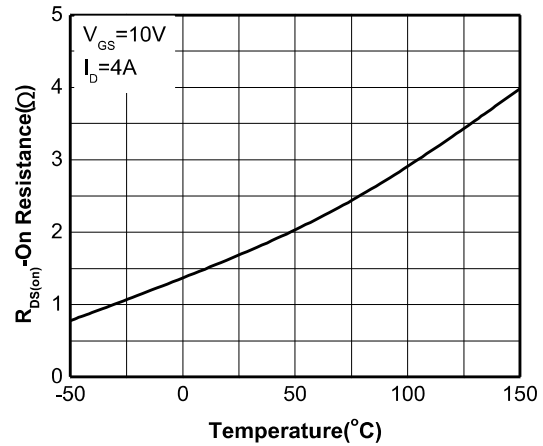
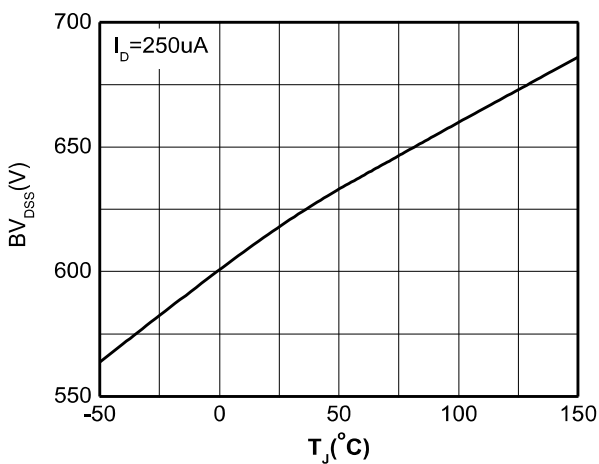
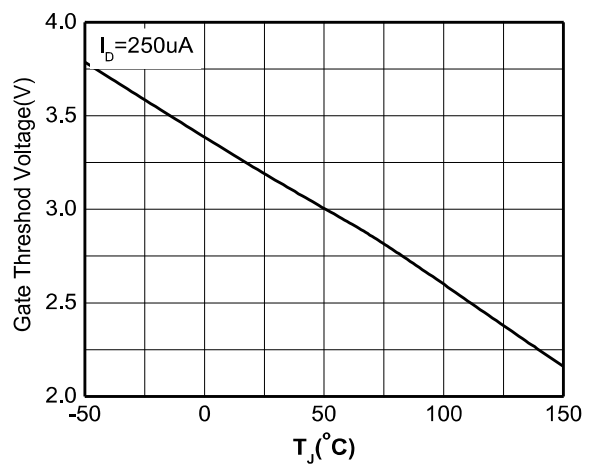
Absolusion Maximum Ratings $T_A=25^{\circ}\text{C}$ unless otherwise noted					
Parameter	Symbol	WNM05N60	WNM05N60F	Unit	
Drain-Source Voltage	V_{DS}	600		V	
Gate-Source Voltage	V_{GS}	± 30			
Continuous Drain Current ^A	I_D	$T_C=25^{\circ}\text{C}$	5	A	
		$T_C=100^{\circ}\text{C}$	3.1		
Pulsed Drain Current ^B	I_{DM}	12		A	
Single Pulsed Avalanche Energy ^C	E_{AS}	137.9		mJ	
Avalanche Current ^B	I_{AR}	5.8		A	
Repetitive Avalanche Energy ^B	E_{AR}	0.42		mJ	
Power Dissipation	P_D	$T_C=25^{\circ}\text{C}$	104	35	W
		Derate above 25°C	0.8	0.3	W/ $^{\circ}\text{C}$
Operating and Storage Temperature Range	T_J, T_{STG}	-55~150		$^{\circ}\text{C}$	
Lead Temperature	T_L	260		$^{\circ}\text{C}$	
Thermal Resistance Ratings					
Maximum Junction-to-Ambient	$R_{\theta JA}$	60	60	$^{\circ}\text{C}/\text{W}$	
Maximum Case to Sink	$R_{\theta CS}$	0.5			
Maximum Junction-to-Case	$R_{\theta JC}$	1.2	3.6		

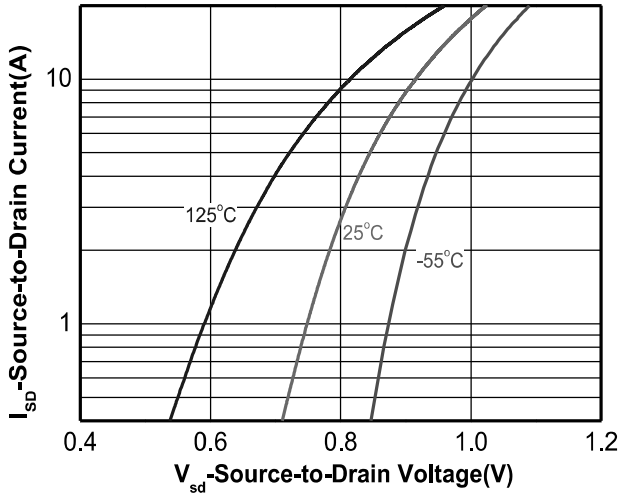
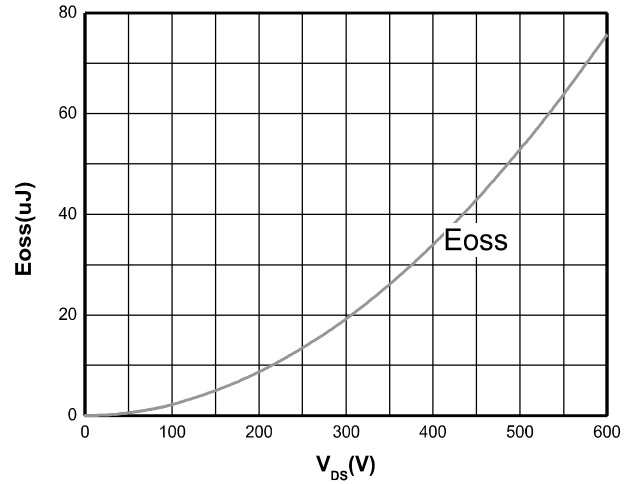
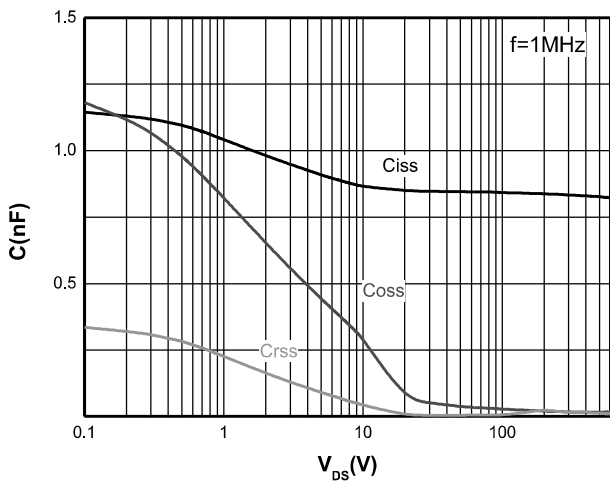
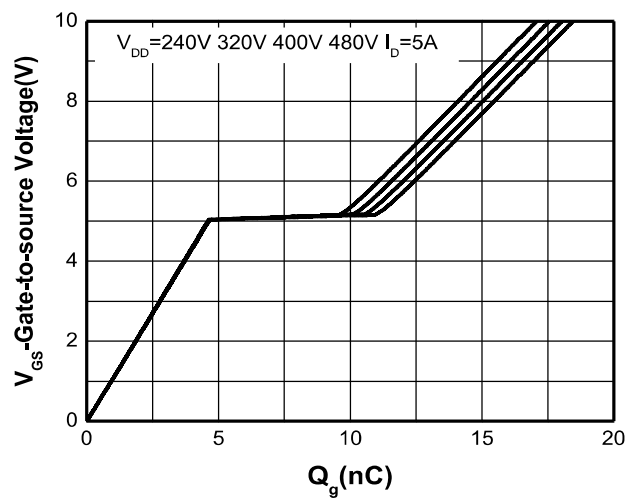
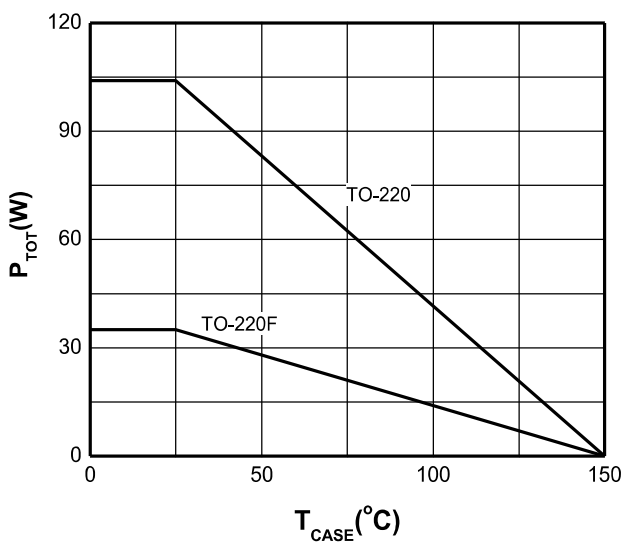
Electronics Characteristics (T_A=25°C, unless otherwise noted)

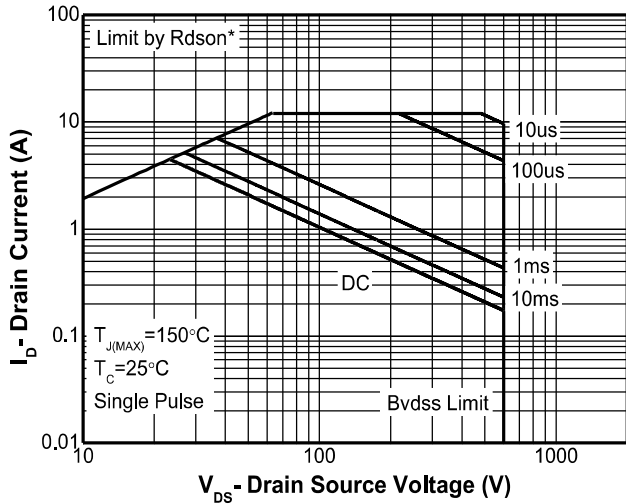
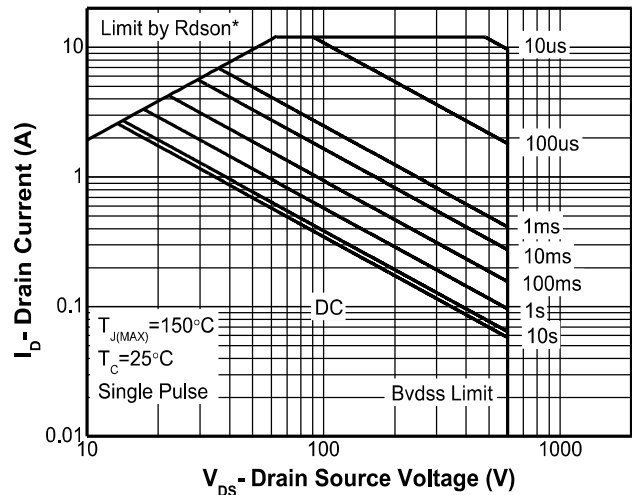
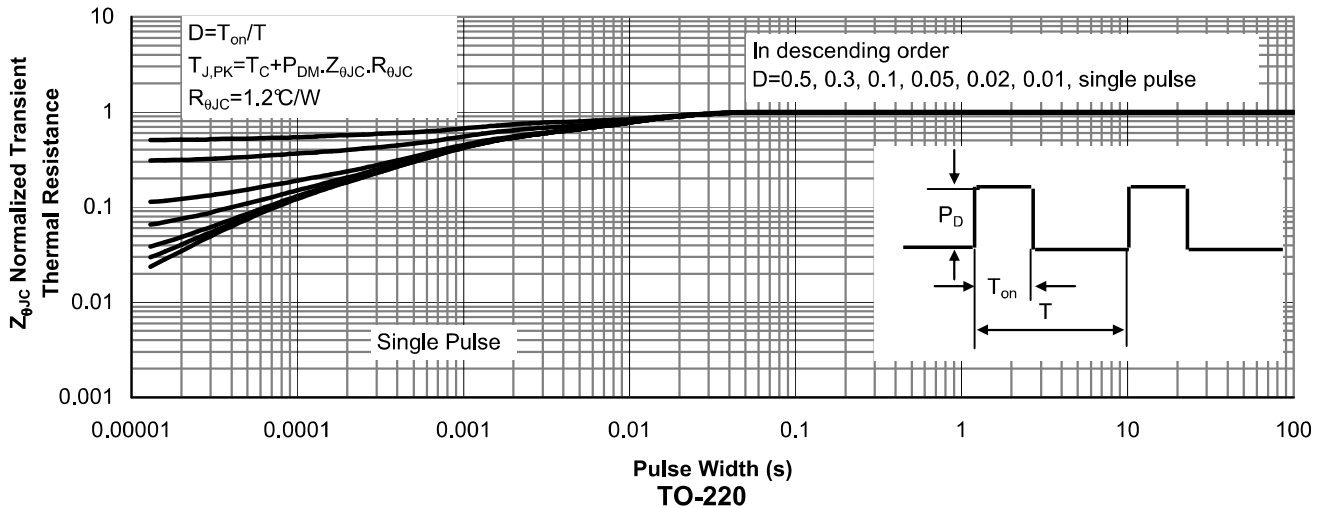
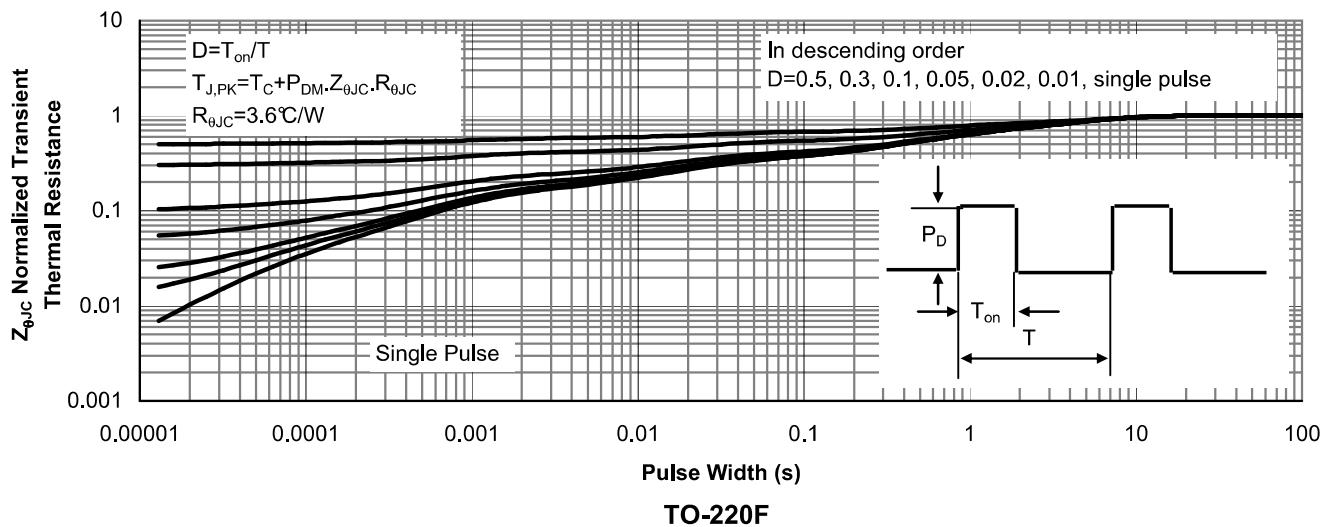
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit	
OFF CHARACTERISTICS							
Drain-to-Source Breakdown Voltage	BV _{DSS}	V _{GS} = 0 V, I _D = 250uA, T _J =25°C	600			V	
		V _{GS} = 0 V, I _D = 250uA, T _J =150°C		650		V	
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 600V, V _{GS} = 0V, T _J =25°C			1	uA	
		V _{DS} = 480V, V _{GS} = 0V, T _J =125°C			10	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	2.5	3.2	4.5	V	
Drain-to-source On-resistance	R _{DS(on)}	V _{GS} = 10V, I _D = 2.5A		1.7	2.2	Ω	
Forward Transconductance	g _{FS}	V _{DS} = 40V, I _D = 2.5A (NOTE D)		3.7	10	s	
DYNAMIC PARAMETERS							
Input Capacitance	C _{ISS}	V _{GS} = 0 V, f = 1.0 MHz, V _{DS} = 20 V		847		pF	
Output Capacitance	C _{OSS}			52			
Reverse Transfer Capacitance	C _{RSS}			5			
Total Gate Charge	Q _{G(TOT)}	V _{GS} = 10 V, V _{DS} = 480 V, I _D = 5.0A (NOTE D, E)		18.44		nC	
Gate-to-Source Charge	Q _{GS}			4.67			
Gate-to-Drain Charge	Q _{GD}			6.27			
Gate resistance	R _g	V _{GS} =0V, V _{DS} =0V, F=1MHZ		2		Ω	
SWITCHING CHARACTERISTICS							
Turn-On Delay Time	t _{d(on)}	V _{GS} = 10V, V _{DS} = 400 V, I _D = 5A, R _G =20 Ω (NOTE D, E)		20.4		ns	
Rise Time	t _r			19.7			
Turn-Off Delay Time	t _{d(off)}			46.9			
Fall Time	t _f			23.4			
Drain to Source Diode Characteristics and Maximum Ratings							
Forward Voltage	V _{SD}	V _{GS} = 0 V, I _S = 2.5A			1.5	V	
Body-Diode Continuous Current	I _S				5	A	
Body-Diode Pulsed Current	I _{SM}				12	A	
Body Diode Reverse Recovery Time	T _{rr}	I _F =5A, dI/dt=100A/us, V _{DS} =100V(NOTE D)		253		nS	
Body Diode Reverse Recovery Charge	Q _{rr}				1.16		uC
Peak reverse recovery Current	I _{rrm}				9.2		A

NOTES:

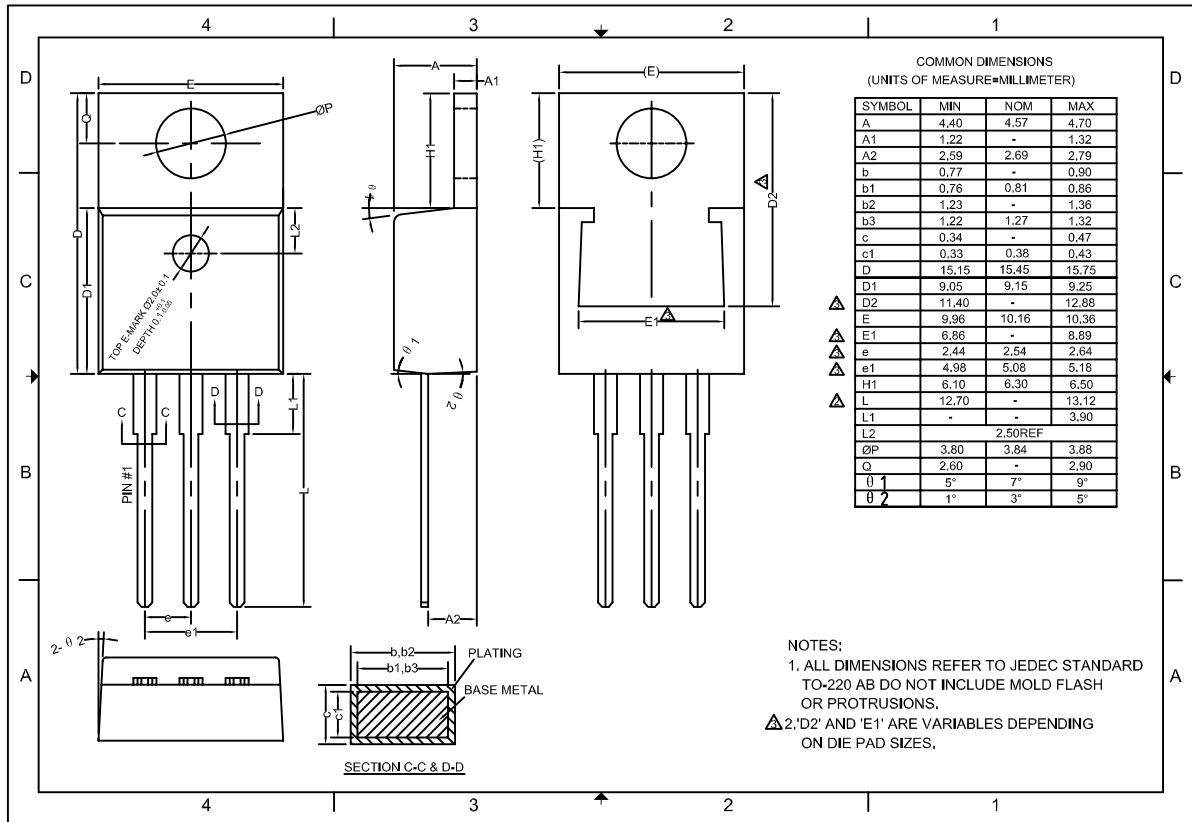
- Drain current limited by maximum junction temperature. Maximum duty cycle D=0.75
- Pulse width limited by maximum junction temperature
- L=8.2mH, I_{AS}=5.8A, V_{DD}=50V, R_G=25 Ω, Starting T_J=25°C
- Pulse Test: Pulse width ≤ 300us, Duty Cycle ≤ 2%
- Essentially Independent of Operating Temperature Typical Characteristics
- These curves are based on the junction-to-case thermal impedance which is measured with the device mounted to a large heat sink, assuming a maximum junction temperature of T_{J(MAX)}=150°C. The SOA curve provides a single pulse rating.

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

Output characteristics

On-Resistance vs. Drain current
Transfer characteristics

On-Resistance vs. Junction temperature

Breakdown Voltage vs. Junction temperature

Threshold voltage vs. Junction temperature


Body diode forward voltage

Coss stored Energy

Capacitance

Gate charge Characteristics

Power dissipation


TO-220
Safe Operating Area(Note F)

TO-220F
Safe Operating Area(Note F)

Transient thermal response (Junction-to-Case)(Note F)

Transient thermal response (Junction-to-Case)(Note F)

Package outline dimensions

TO-220

TO-220F
