WCR470N60T/WCR470N60TF
600V N-Channel Super Junction MOSFET

Description

The WCR470N60T/WCR470N60TF series is new generation of high voltage MOSFET family that is utilizing an advanced charge balance mechanism for outstanding low on-resistance and lower gate charge performance. This advanced technology has been tailored to minimize conduction loss, provide superior switching performance, and withstand extreme dv/dt rate and higher avalanche energy. This device is suitable for various AC/DC power conversion in switching mode operation for higher efficiency.

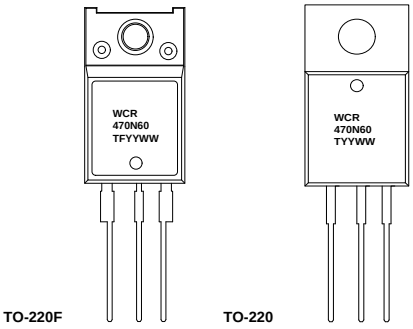
Features

- 650V@T_J=150°C
- Typ.$R_{DS(on)}$=0.42Ω
- Low gate charge(typ. Qg= 12.6nC)
- 100% avalanche tested
- 100% R_g tested

Order Information

Device	Package	Marking	Units/Tube
WCR470N60T-3/T	TO-220	WCR470N60TYYWW	50
WCR470N60TF-3/T	TO-220F	WCR470N60TFYYWW	50

Note 1: WCR470N60T=Device code ; YY=Year ;WW=Week (A~z);
Note 2: WCR470N60TF=Device code ; YY=Year ;WW=Week (A~z);



TO-220F TO-220

Absolution Maximum Ratings T_A=25°C unless otherwise noted					
Parameter		**Symbol**	**WCR470N60T**	**WCR470N60TF**	**Unit**
Drain-Source Voltage		V_{DS}	600		V
Gate-Source Voltage		V_{GS}	±30		
Continuous Drain Current [A]	T_C=25°C	I_D	9.4		A
	T_C=100°C		5.9		
Pulsed Drain Current [B]		I_{DM}	25		A
Single Pulsed Avalanche Energy [C]		E_{AS}	120		mJ
Avalanche Current [B]		I_{AR}	2		A
Repetitive Avalanche Energy [B]		E_{AR}	0.28		mJ
Power Dissipation	T_C=25°C	P_D	73.5	29.8	W
	Derate above 25°C		0.58	0.24	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		$R_{\theta JA}$	60	80	°C/W
Maximum Junction-to-Case		$R_{\theta JC}$	1.7	4.2	

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	3.7	4.5	V
Drain-to-source On-resistance	$R_{DS(on)}$	V_{GS} = 10V, I_D = 5A		0.42	0.47	Ω
Forward Transconductance	gFS	V_{DS}= 40V, I_D= 5A (NOTE D)			20	s
DYNAMIC PARAMETERS						
Input Capacitance	C_{ISS}	V_{GS} = 0 V, f = 1.0 MHz, V_{DS} = 30 V		547		pF
Output Capacitance	C_{OSS}			123		
Reverse Transfer Capacitance	C_{RSS}			6		
Total Gate Charge	$Q_{G(TOT)}$	V_{GS} = 10 V, V_{DS} = 480 V,I_D = 10A (NOTE D、E)		12.6		nC
Gate-to-Source Charge	Q_{GS}			4.1		
Gate-to-Drain Charge	Q_{GD}			5.1		
Gate resistance	R_g	V_{GS}=0V,V_{DS}=0V,F=1MHZ		4.7		Ω
SWITCHING CHARACTERISTICS						
Turn-On Delay Time	$t_{d(on)}$	V_{GS} = 10V, V_{DS} = 400 V, I_D = 5 A, R_G=20 Ω (NOTE D、E		20		ns
Rise Time	t_r			19		
Turn-Off Delay Time	$t_{d(off)}$			39		
Fall Time	t_f			14		
Drain to Source Diode Characteristics and Maximum Ratings						
Forward Voltage	V_{SD}	V_{GS} = 0 V, I_S = 10.0A			1.5	V
Body-Diode Continuous Current	I_S				9.4	A
Body-Diode Pulsed Current	I_{SM}				26	A
Body Diode Reverse Recovery Time	T_{rr}	I_F=9.5A,dI/dt=100A/us, V_{DS}=100V(NOTE D)		346		nS
Body Diode Reverse Recovery Charge	Q_{rr}			2.25		uC
Peak reverse recovery current	I_{rr}			13		A

NOTES:

A. Drain current limited by maximum junction temperature. Maximum duty cycle D=0.75

B. Pulse width limited by maximum junction temperature

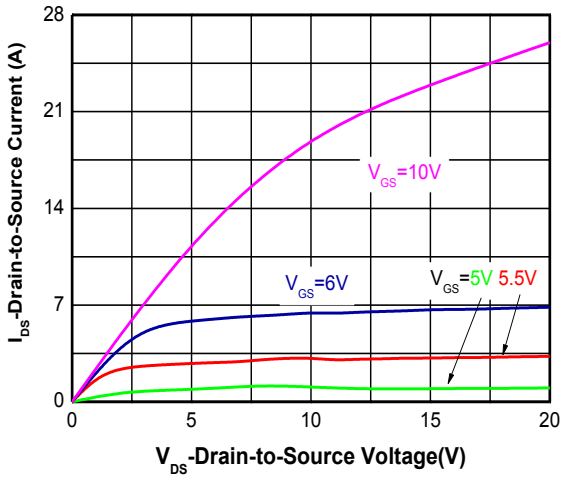
C. L=60mH, I_{AS}=2A, V_{DD}=150V, Starting T_J=25℃

D. Pulse Test: Pulse width≤300us, Duty Cycle ≤2%

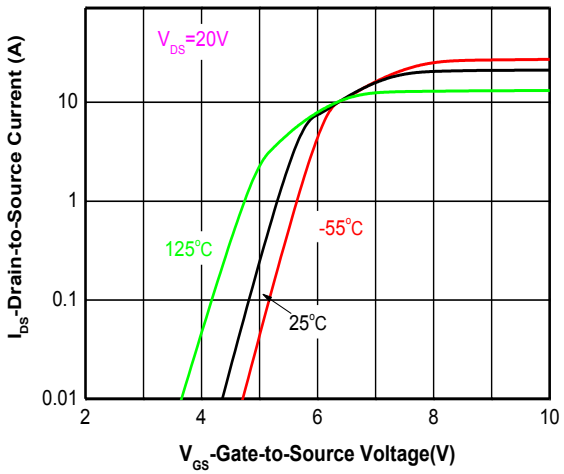
E. Essentially Independent of Operating Temperature Typical Characteristics

F. 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.

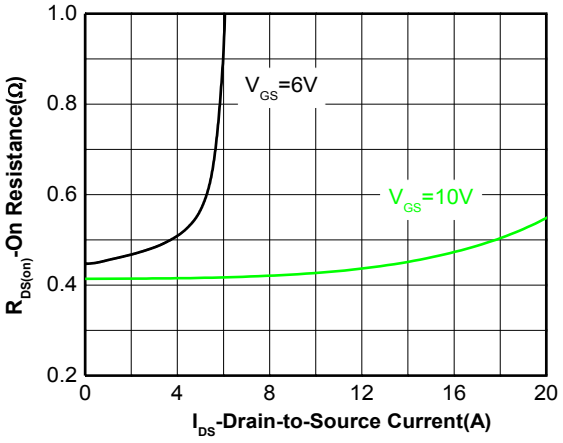
Typical Characteristics (T_A=25°C, unless otherwise noted)



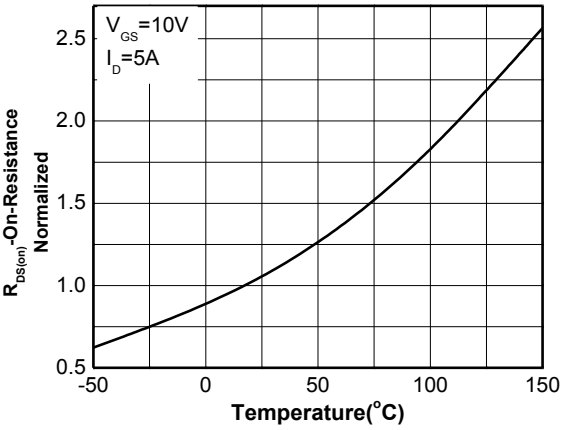
Output characteristics



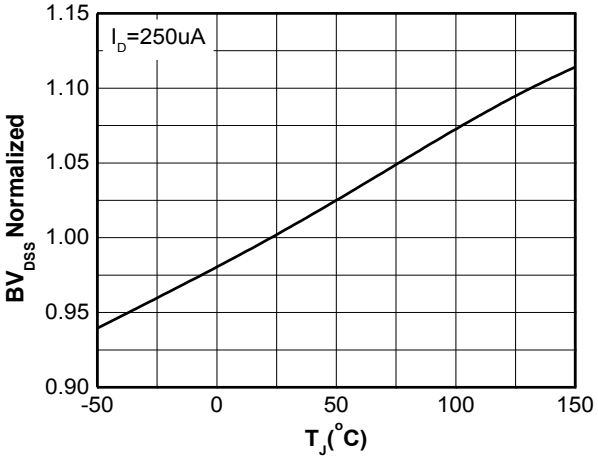
Transfer characteristics



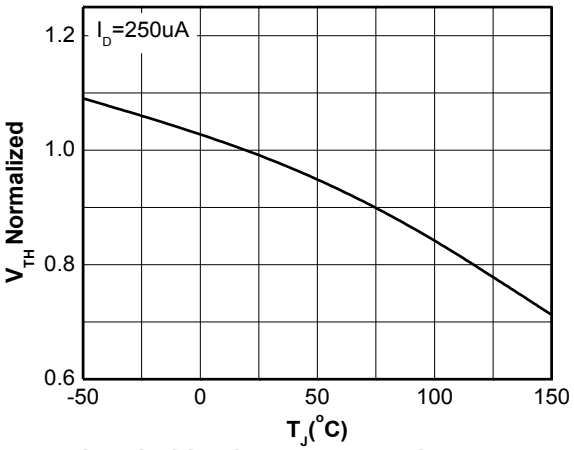
On-Resistance vs. Drain current



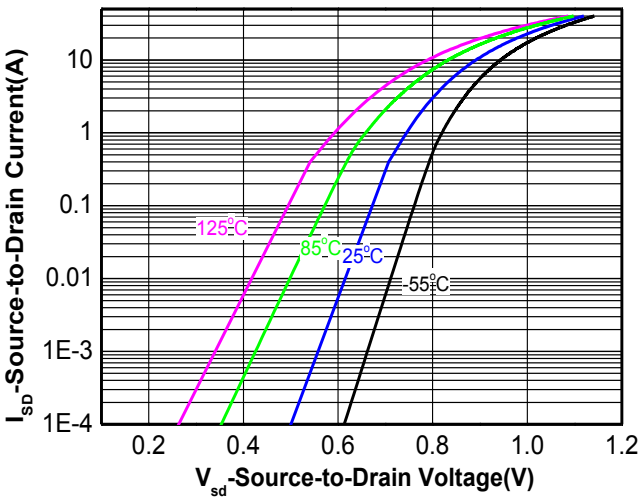
On-Resistance vs. Junction temperature



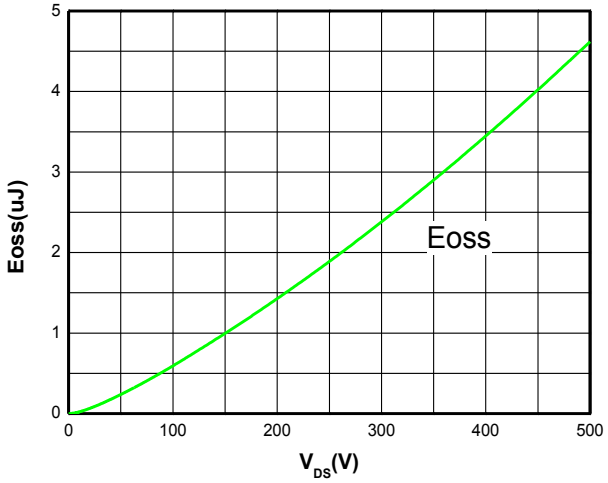
Breakdown Voltage vs. Junction temperature



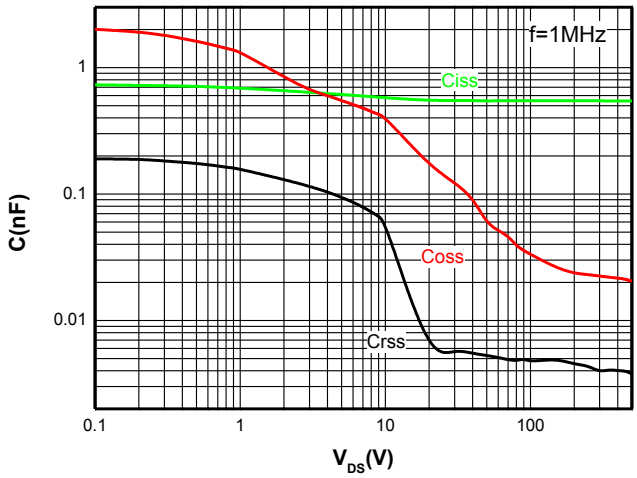
Threshold voltage vs. Junction temperature



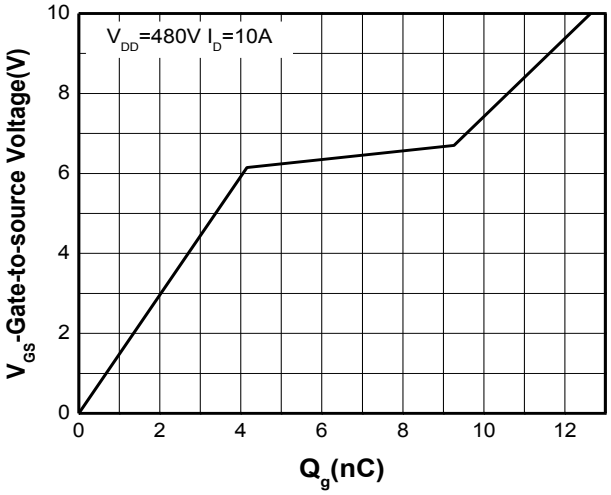
Body diode forward voltage



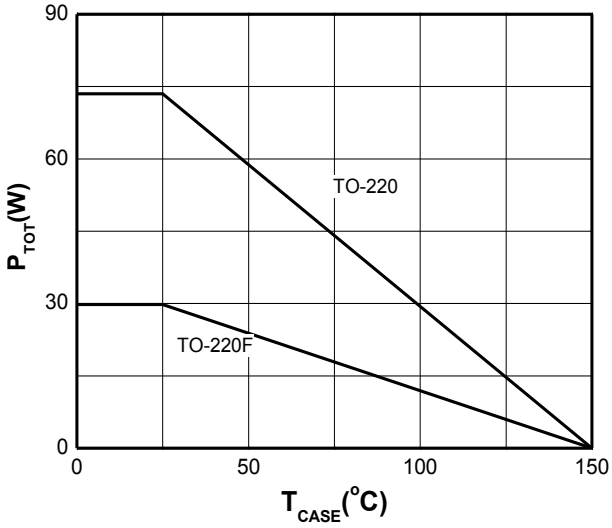
Coss stored Energy



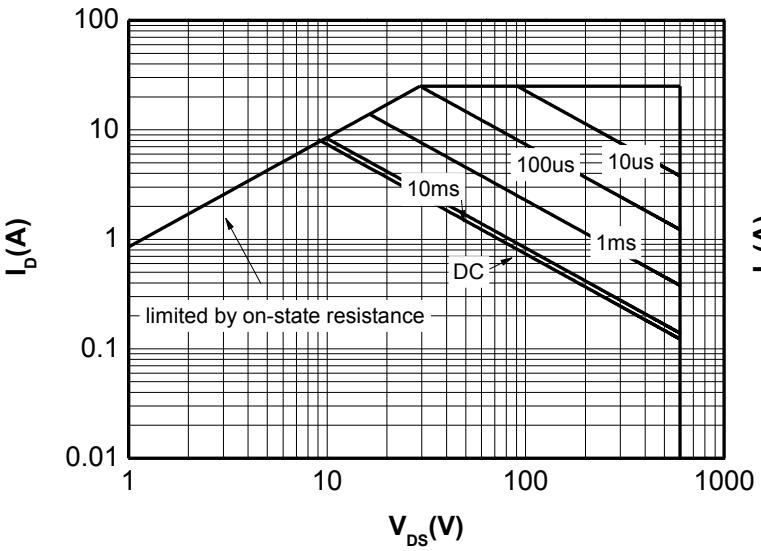
Capacitance



Gate charge Characteristics

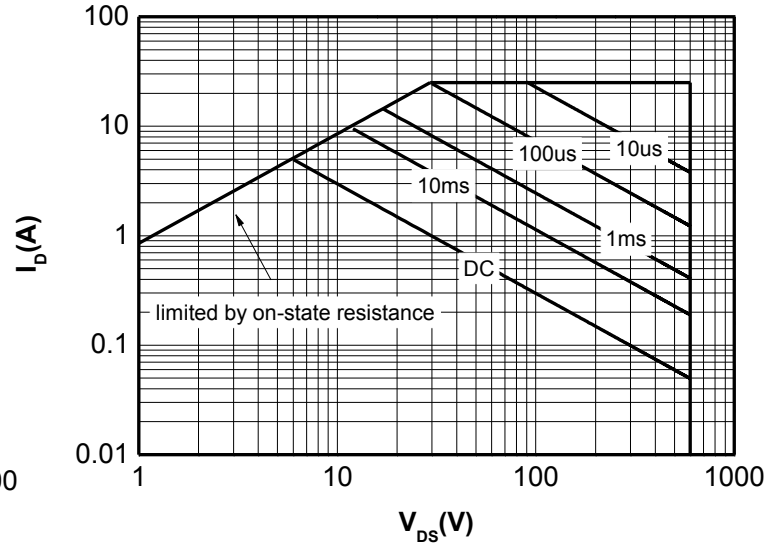


Power dissipation



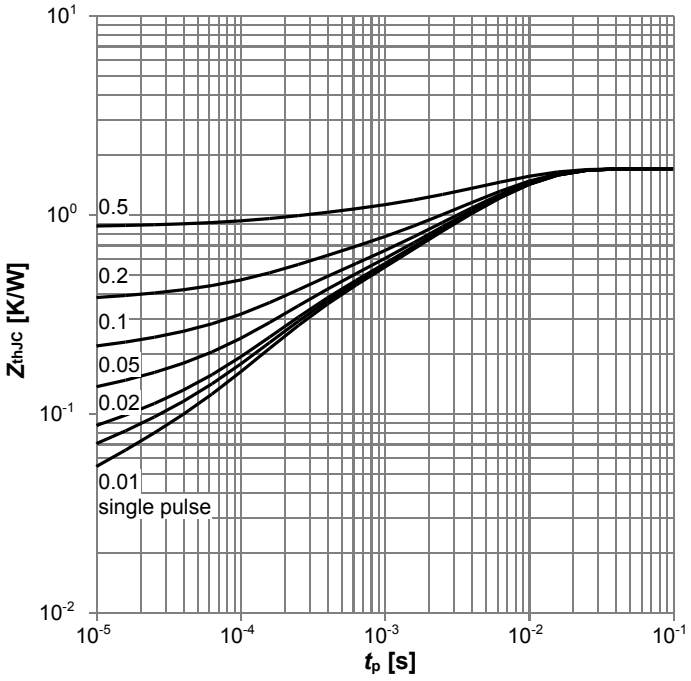
TO-220

Safe Operating Area(Note F)



TO-220F

Safe Operating Area(Note F)



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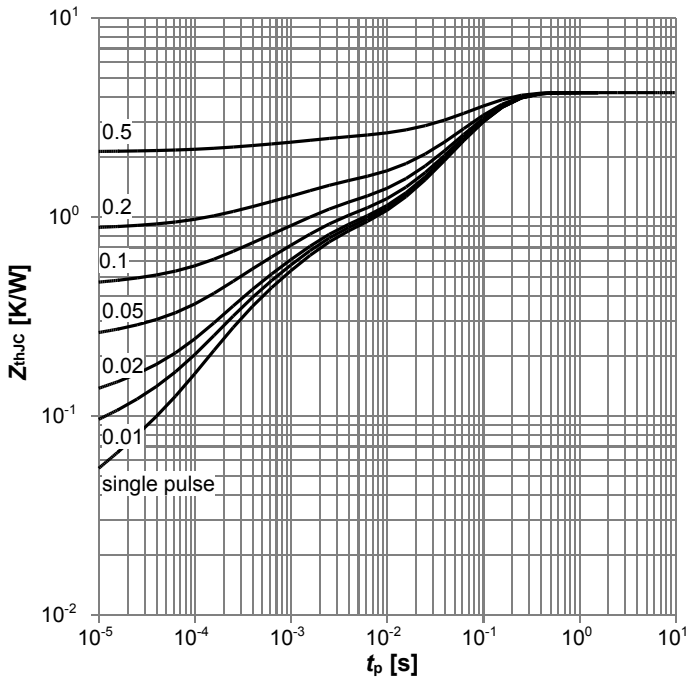
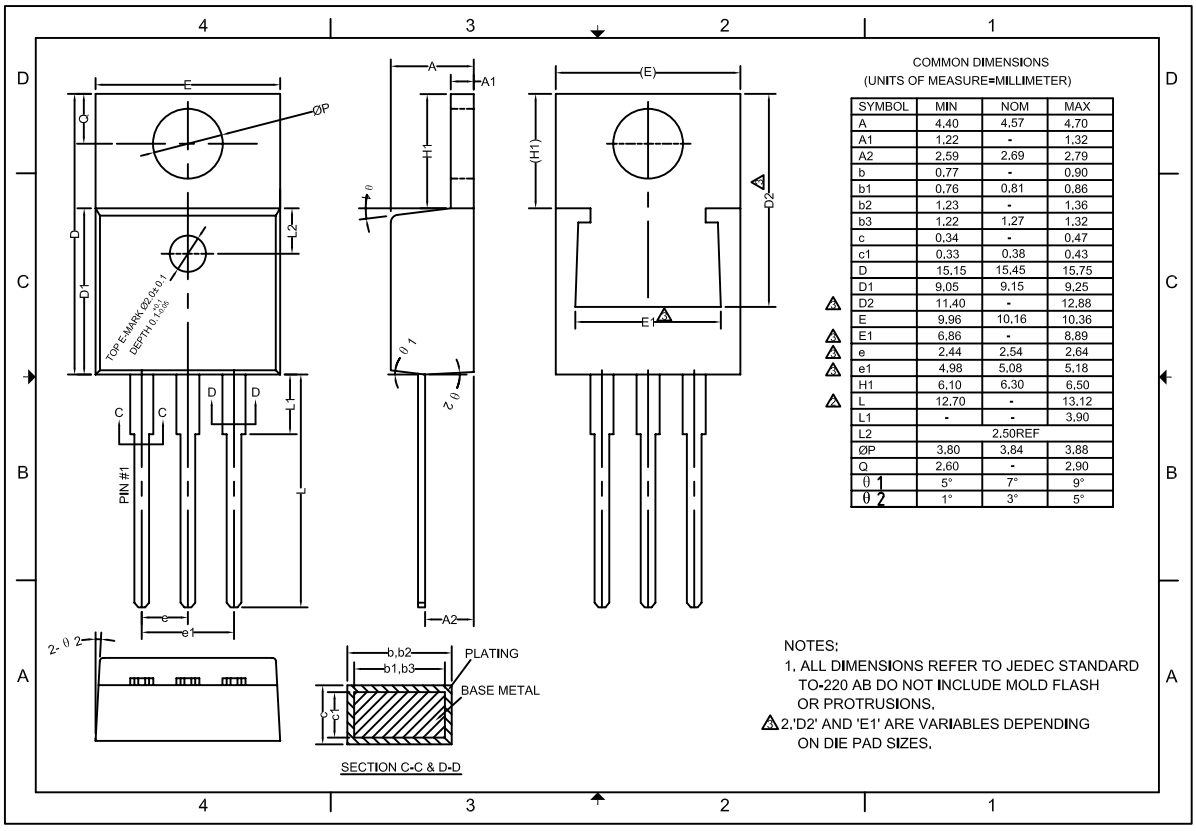


TO-220F

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

Package outline dimensions

TO-220



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