

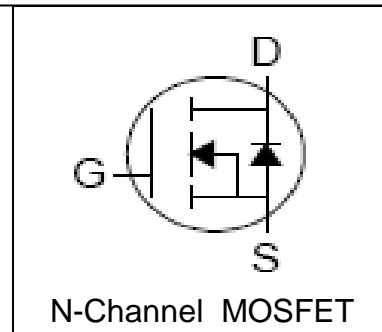
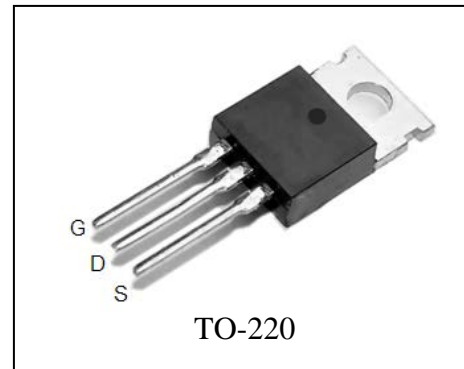
Features

- 150V/120A
 $R_{DS(ON)}=15m\Omega(Typ.) @ V_{GS}=10V$
- Avalanche Rated
- Reliable and Rugged
- Lead Free and Green Devices Available

Applications

- Automotive applications and a wide variety of other applications
- High Efficiency Synchronous in SMPS
- High Speed Power Switching

Pin Description



Absolute Maximum Ratings

Symbol	Parameter		Rating	Unit
Common Ratings ($T_A=25^\circ\text{C}$ Unless Otherwise Noted)				
V_{DSS}	Drain-Source Voltage		150	V
V_{GSS}	Gate-Source Voltage		± 25	
T_J	Maximum Junction Temperature		175	$^\circ\text{C}$
T_{STG}	Storage Temperature Range		-55 to 175	$^\circ\text{C}$
I_S	Diode Continuous Forward Current	$T_C=25^\circ\text{C}$	120 ^①	A
Mounted on Large Heat Sink				
I_{DP}	300 μs Pulsed Drain Current Tested	$T_C=25^\circ\text{C}$	400 ^②	A
I_D	Continue Drain Current	$T_C=25^\circ\text{C}$	120 ^①	
		$T_C=100^\circ\text{C}$	100 ^①	
P_D	Maximum Power Dissipation	$T_C=25^\circ\text{C}$	312	W
		$T_C=100^\circ\text{C}$	156	
$R_{\theta JC}$	Thermal Resistance -Junction to Case		0.48	$^\circ\text{C}/\text{W}$
Drain-Source Avalanche Ratings				
E_{AS} ^③	Avalanche Energy ,Single Pulsed		441	mJ

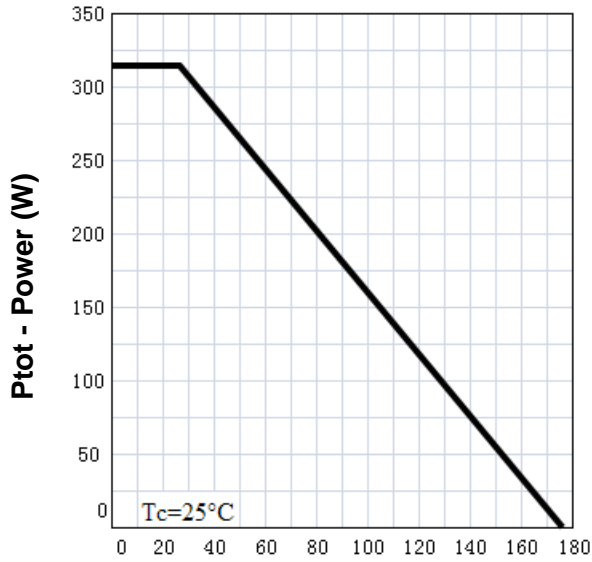
Electrical Characteristics ($T_A=25^\circ\text{C}$ Unless Otherwise Noted)

Symbol	Parameter	Test Condition	RU120N15R			Unit
			Min.	Typ.	Max.	
Static Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_{DS}=250\mu A$	150			V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=150V, V_{GS}=0V$			1	μA
		$T_J=85^\circ C$			30	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_{DS}=250\mu A$	2	3	4	V
I_{GSS}	Gate Leakage Current	$V_{GS}=\pm 25V, V_{DS}=0V$			± 100	nA
$R_{DS(ON)}^{(4)}$	Drain-Source On-state Resistance	$V_{GS}=10V, I_{DS}=60A$		15	17	$m\Omega$
Diode Characteristics						
$V_{SD}^{(4)}$	Diode Forward Voltage	$I_{SD}=60A, V_{GS}=0V$			1.2	V
t_{rr}	Reverse Recovery Time	$I_{SD}=60A, dI_{SD}/dt=100A/\mu s$		68		ns
q_{rr}	Reverse Recovery Charge			130		nC
Dynamic Characteristics ⁽⁵⁾						
R_G	Gate Resistance	$V_{GS}=0V, V_{DS}=0V, F=1MHz$		1.0		Ω
C_{iss}	Input Capacitance	$V_{GS}=0V, V_{DS}=30V, \text{Frequency}=1.0MHz$		6600		pF
C_{oss}	Output Capacitance			900		
C_{riss}	Reverse Transfer Capacitance			480		
$t_{d(ON)}$	Turn-on Delay Time	$V_{DD}=35V, R_L=35\Omega, I_{DS}=1A, V_{GEN}=10V, R_G=6\Omega$		21		ns
t_r	Turn-on Rise Time			40		
$t_{d(OFF)}$	Turn-off Delay Time			110		
t_f	Turn-off Fall Time			69		
Gate Charge Characteristics ⁽⁵⁾						
Q_g	Total Gate Charge	$V_{DS}=30V, V_{GS}=10V, I_{DS}=60A$		155		nC
Q_{gs}	Gate-Source Charge			45		
Q_{gd}	Gate-Drain Charge			48		

- Notes:
- ① Calculated continuous current based on maximum allowable junction temperature. The package limitation current is 75A.
 - ② Pulse width limited by safe operating area.
 - ③ Limited by T_{Jmax} , $I_{AS}=30A, V_{DD}=48V, R_G=47\Omega$, Starting $T_J=25^\circ C$.
 - ④ Pulse test; Pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
 - ⑤ Guaranteed by design, not subject to production testing.

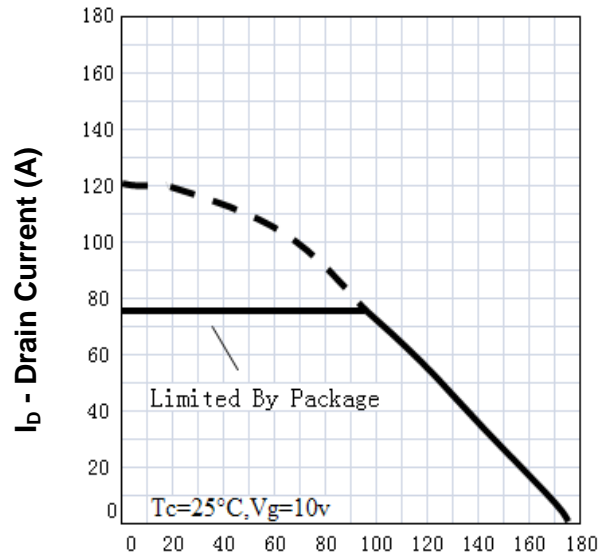
Typical Characteristics

Power Dissipation



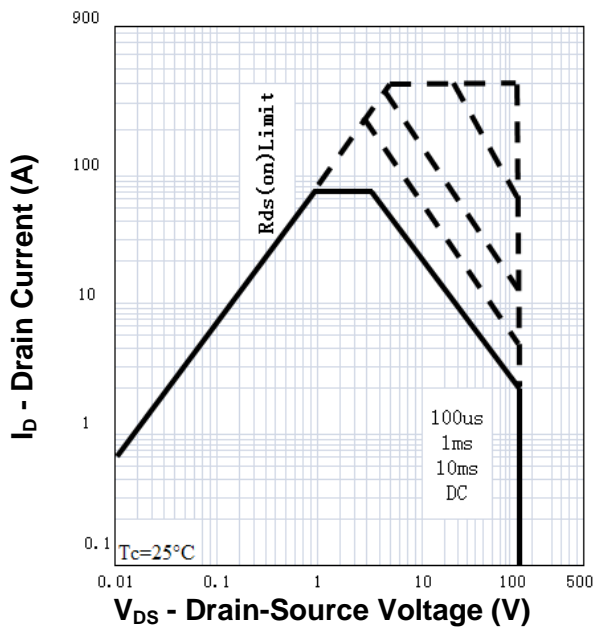
Tj - Junction Temperature (°C)

Drain Current

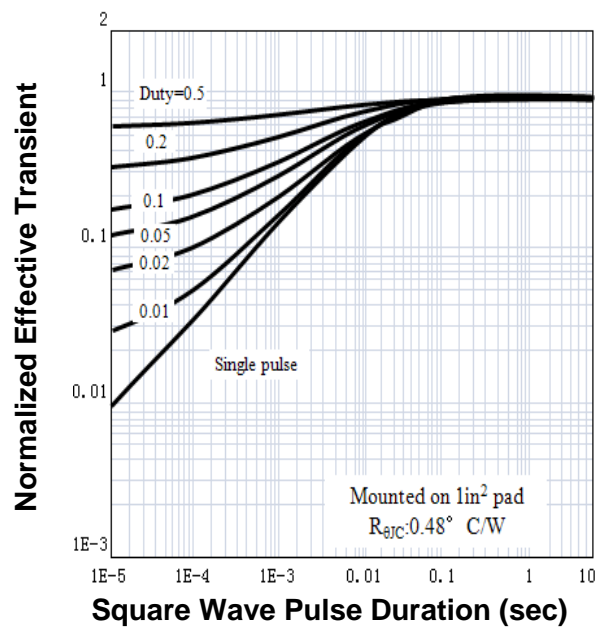


Tj - Junction Temperature (°C)

Safe Operation Area

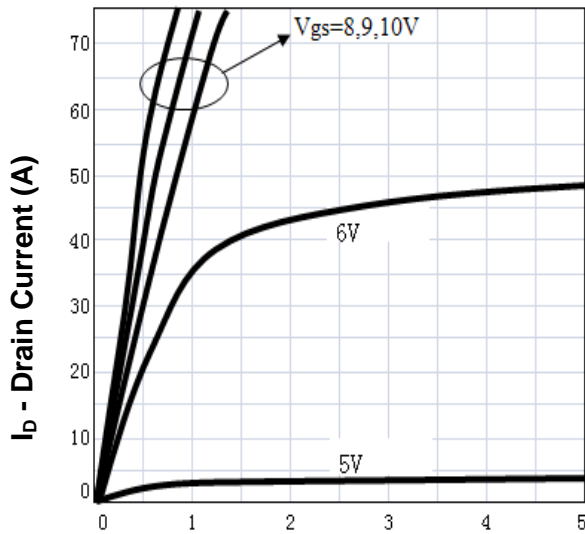


Thermal Transient Impedance



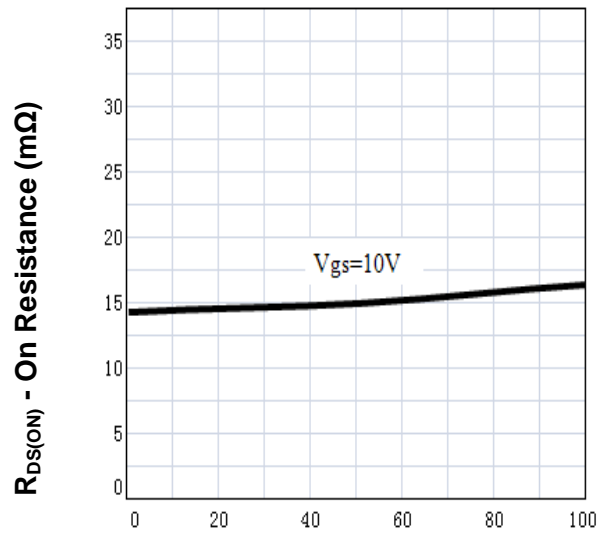
Typical Characteristics

Output Characteristics



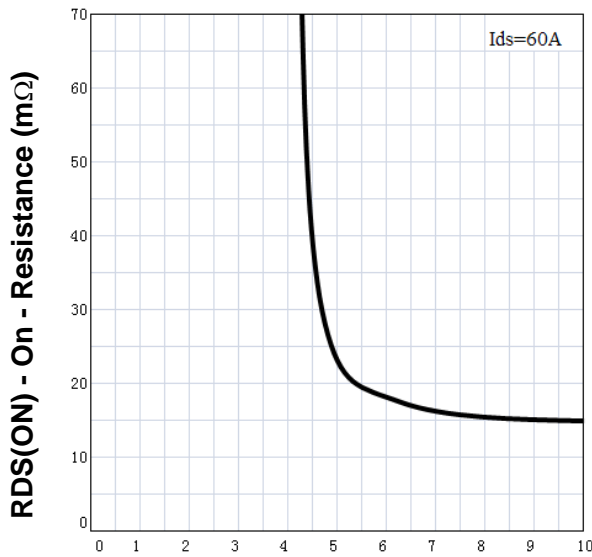
V_{DS} - Drain-Source Voltage (V)

Drain-Source On Resistance



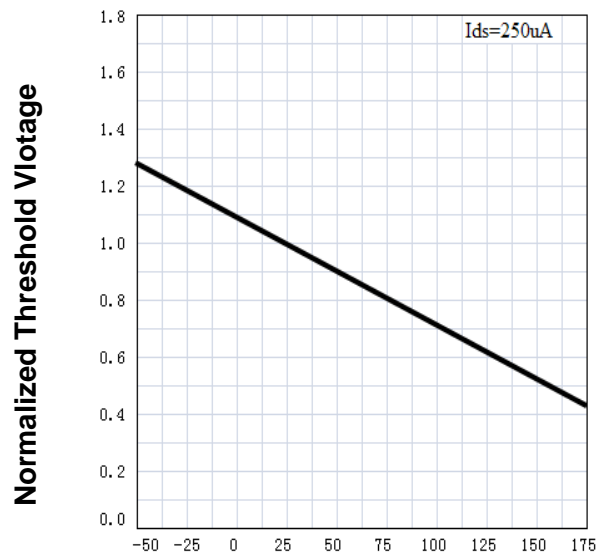
I_D - Drain Current (A)

Drain-Source On Resistance



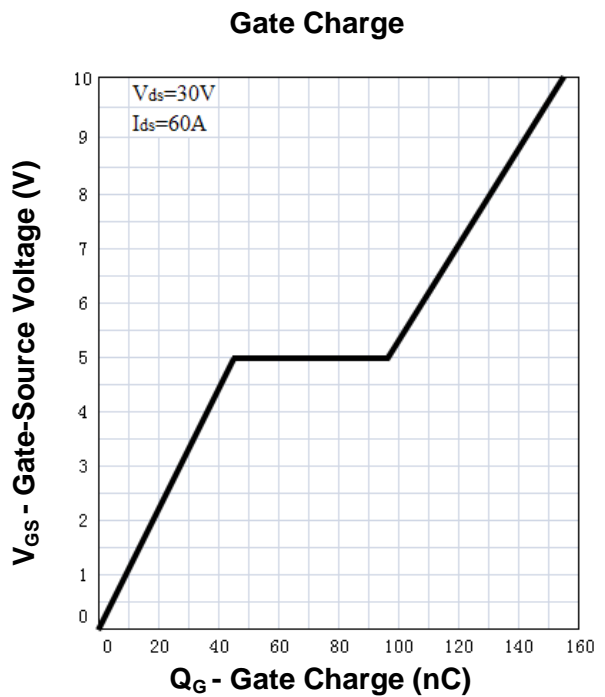
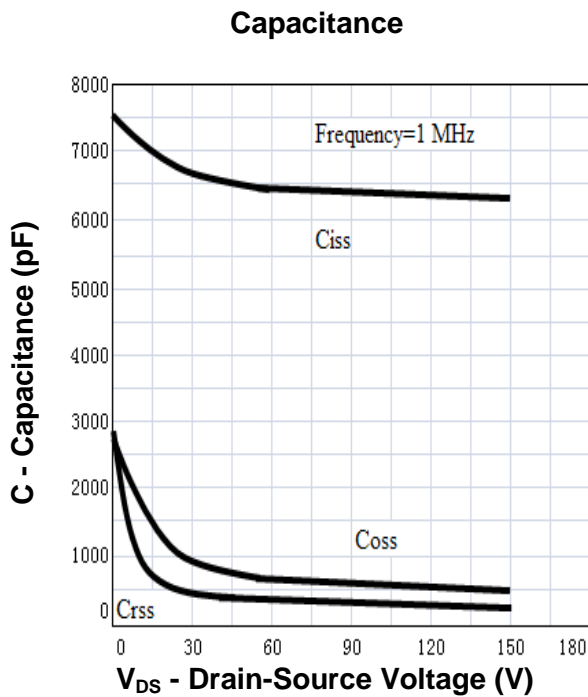
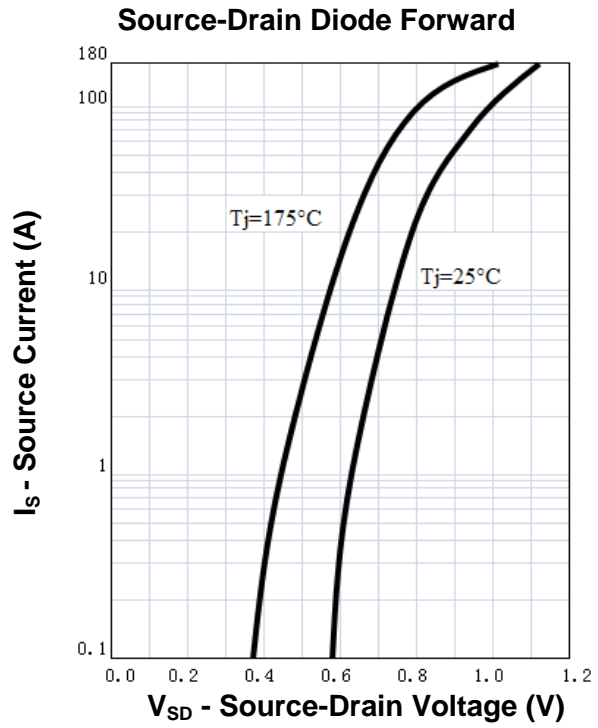
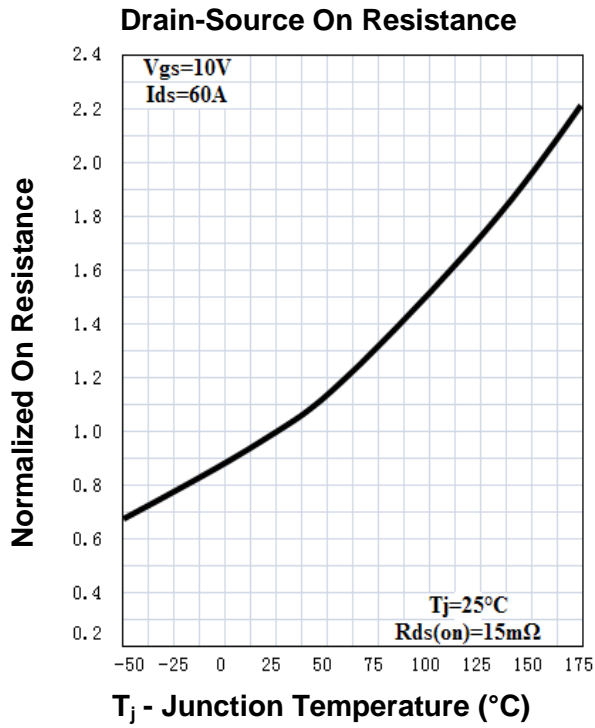
V_{GS} - Gate - Source Voltage (V)

Gate Threshold Voltage

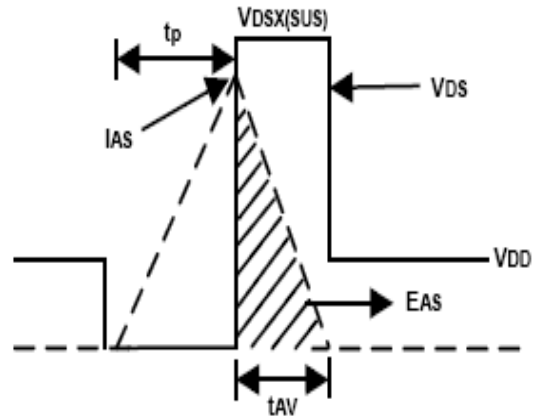
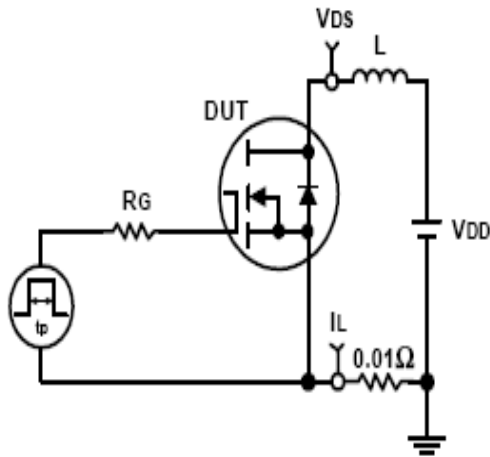


T_j - Junction Temperature ($^{\circ}C$)

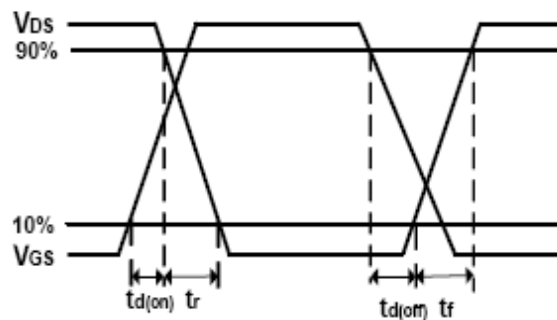
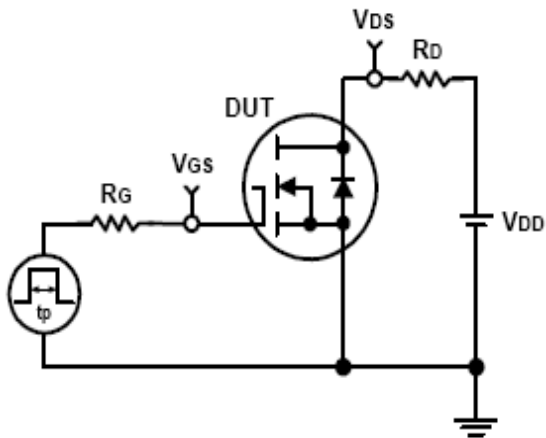
Typical Characteristics



Avalanche Test Circuit and Waveforms



Switching Time Test Circuit and Waveforms

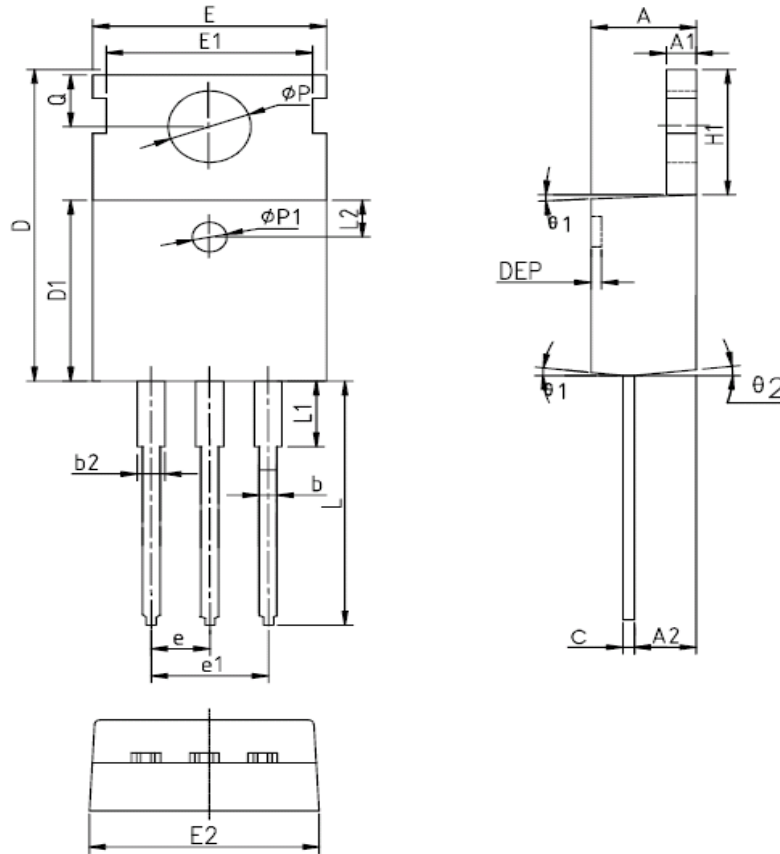


Ordering and Marking Information

Device	Marking	Package	Packaging	Quantity	Reel Size	Tape width
RU120N15R	RU120N15R	TO-220	Tube	50	-	-

Package Information

TO-220FB-3L



SYMBOL	MM			INCH			SYMBOL	MM			INCH		
	MIN	NOM	MAX	MIN	NOM	MAX		MIN	NOM	MAX	MIN	NOM	MAX
A	4.40	4.57	4.70	0.173	0.180	0.185	$\phi p1$	1.40	1.50	1.60	0.055	0.059	0.063
A1	1.27	1.30	1.33	0.050	0.051	0.052	e	2.54BSC			0.1BSC		
A2	2.35	2.40	2.50	0.093	0.094	0.098	e1	5.08BSC			0.2BSC		
b	0.77	-	0.90	0.030	-	0.035	H1	6.40	6.50	6.60	0.252	0.256	0.260
b2	1.23	-	1.36	0.048	-	0.054	L	12.75	-	13.17	0.502	-	0.519
C	0.48	0.50	0.52	0.019	0.020	0.021	L1	-	-	3.95	-	-	0.156
D	15.40	15.60	15.80	0.606	0.614	0.622	L2	2.50REF.			0.098REF.		
D1	9.00	9.10	9.20	0.354	0.358	0.362	ϕp	3.57	3.60	3.63	0.141	0.142	0.143
DEP	0.05	0.10	0.20	0.002	0.004	0.008	Q	2.73	2.80	2.87	0.107	0.110	0.113
E	9.70	9.90	10.10	0.382	0.389	0.398	$\theta 1$	5°	7°	9°	5°	7°	9°
E1	-	8.70	-	-	0.343	-	$\theta 2$	1°	3°	5°	1°	3°	5°
E2	9.80	10.00	10.20	0.386	0.394	0.401							

ALL DIMENSIONS REFER TO JEDEC STANDARD
DO NOT INCLUDE MOLD FLASH OR PROTRUSIONS

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