

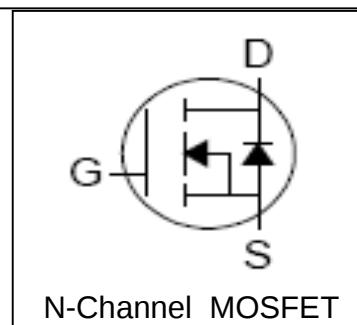
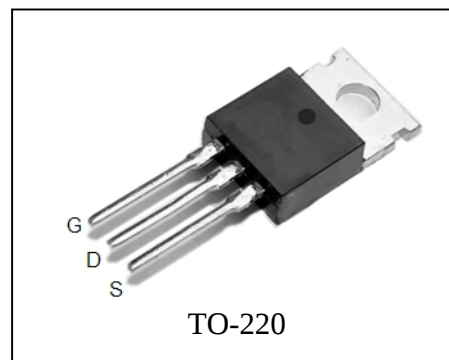
Features

- 100V/190A
 $R_{DS(on)}=6.5m\Omega(Typ.) @ V_{GS}=10V$
- 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°C Unless Otherwise Noted)				
V _{DSS}	Drain-Source Voltage		100	V
V _{GSS}	Gate-Source Voltage		±25	
T _J	Maximum Junction Temperature		175	°C
T _{STG}	Storage Temperature Range		-55 to 175	°C
I _S	Diode Continuous Forward Current	T _C =25°C	190 ^①	A
Mounted on Large Heat Sink				
I _{DP}	300μs Pulsed Drain Current Tested	T _C =25°C	700 ^②	A
I _D	Continue Drain Current(V _{GS} =10V)	T _C =25°C	190 ^①	
		T _C =100°C	140 ^①	
P _D	Maximum Power Dissipation	T _C =25°C	312	W
		T _C =100°C	156	
R _{θJC}	Thermal Resistance -Junction to Case		0.48	°C/W
Drain-Source Avalanche Ratings				
E _{AS} ^③	Avalanche Energy ,Single Pulsed		625	mJ

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

Symbol	Parameter	Test Condition	RU190N10R			Unit
			Min.	Typ.	Max.	
Static Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _{DS} =250μA	100			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 100V, V _{GS} =0V			1	μA
		T _J =85°C			30	
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =250μA	2	3	4	V
I _{GSS}	Gate Leakage Current	V _{GS} =±25V, V _{DS} =0V			±100	nA
R _{DS(ON)} ^④	Drain-Source On-state Resistance	V _{GS} = 10V, I _{DS} =60A		6.5	8.0	mΩ
Diode Characteristics						
V _{SD} ^④	Diode Forward Voltage	I _{SD} =60 A, V _{GS} =0V			1.2	V
t _{rr}	Reverse Recovery Time	I _{SD} =60A, dI _{SD} /dt=100A/μs		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, Frequency=1.0MHz		6700		pF
C _{oss}	Output Capacitance			1000		
C _{rss}	Reverse Transfer Capacitance			510		
t _{d(ON)}	Turn-on Delay Time	V _{DD} =35V, R _L =35Ω, I _{DS} = 1A, V _{GEN} = 10V, R _G =6Ω		23		ns
t _r	Turn-on Rise Time			42		
t _{d(OFF)}	Turn-off Delay Time			120		
t _f	Turn-off Fall Time			75		
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.

② Pulse width limited by safe operating area.

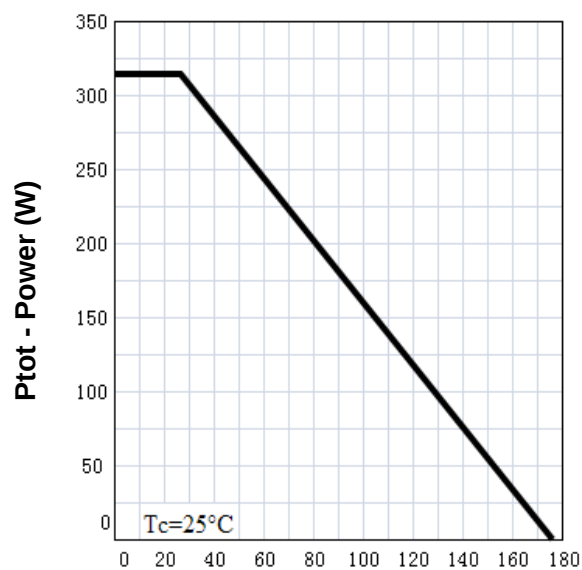
③ Limited by T_{Jmax} , $I_{AS}=50A$, $V_{DD}=48V$, $R_G=50\Omega$, Starting $T_J=25^{\circ}\text{C}$.

④ Pulse test; Pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.

⑤ Guaranteed by design, not subject to production testing.

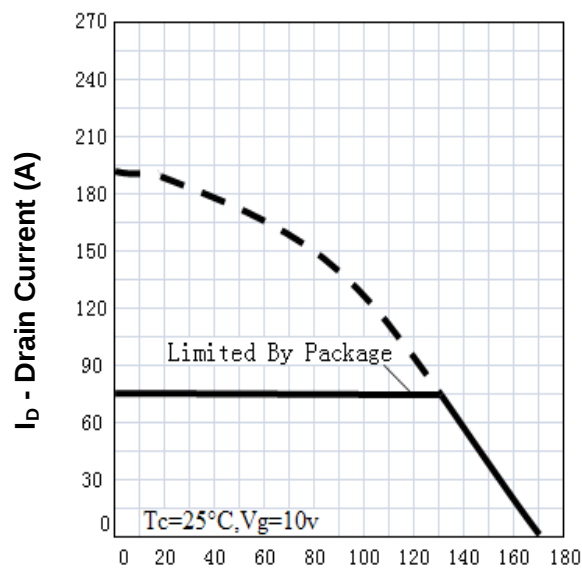
Typical Characteristics

Power Dissipation



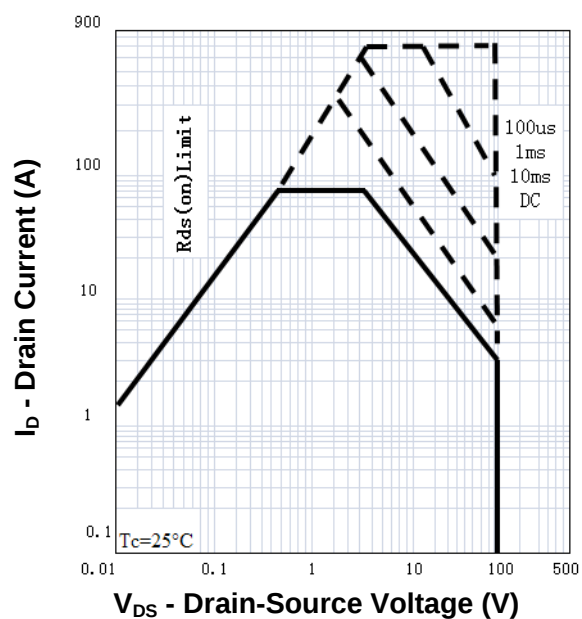
T_j - Junction Temperature ($^{\circ}\text{C}$)

Drain Current



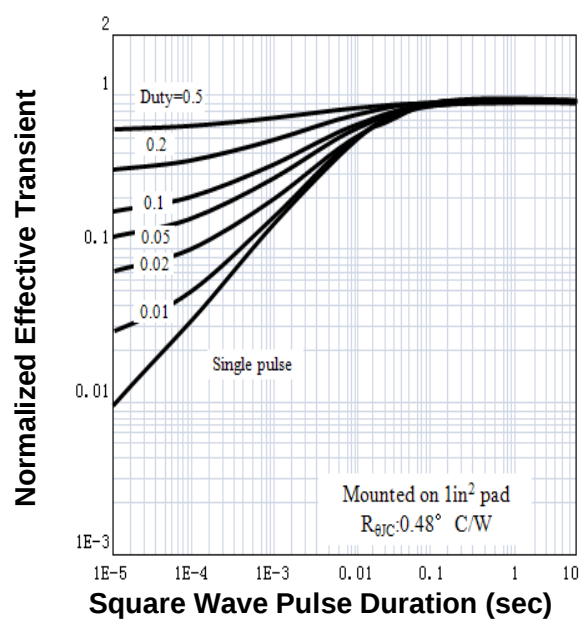
T_j - Junction Temperature ($^{\circ}\text{C}$)

Safe Operation Area



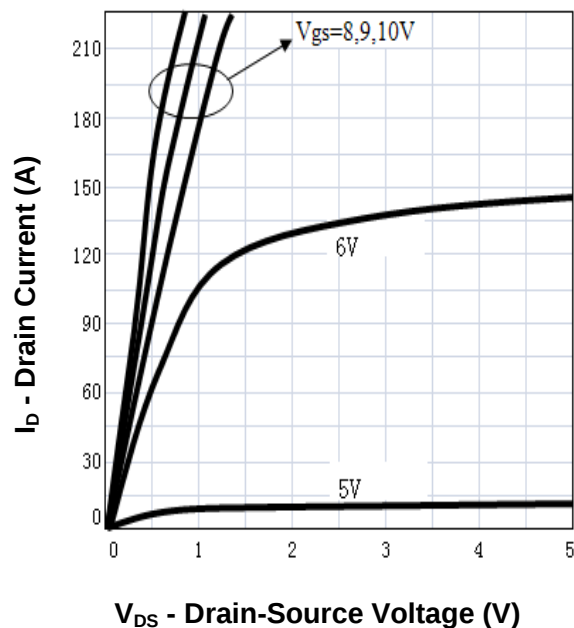
V_{DS} - Drain-Source Voltage (V)

Thermal Transient Impedance

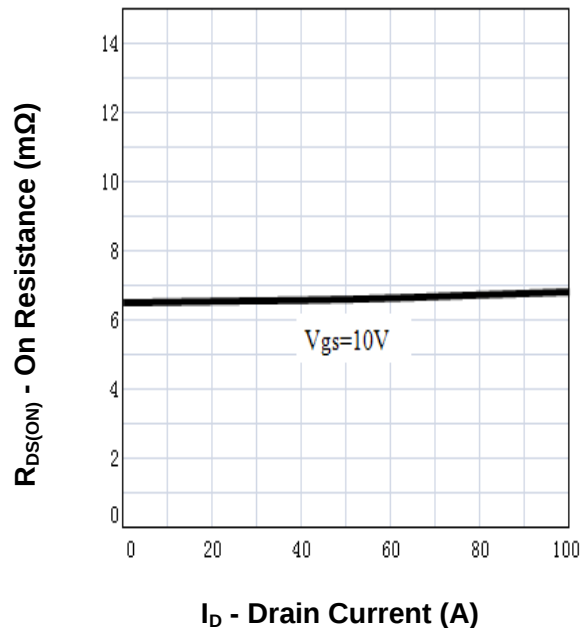


Typical Characteristics

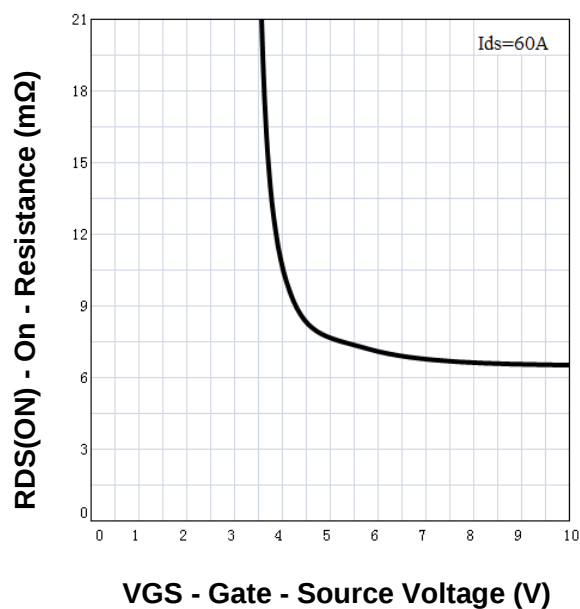
Output Characteristics



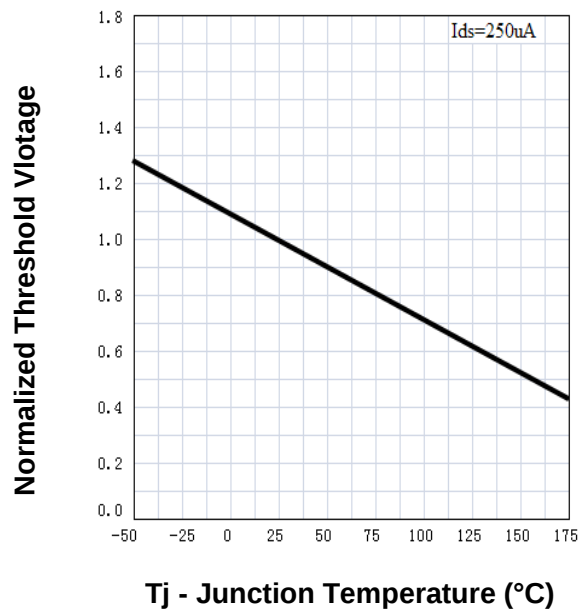
Drain-Source On Resistance



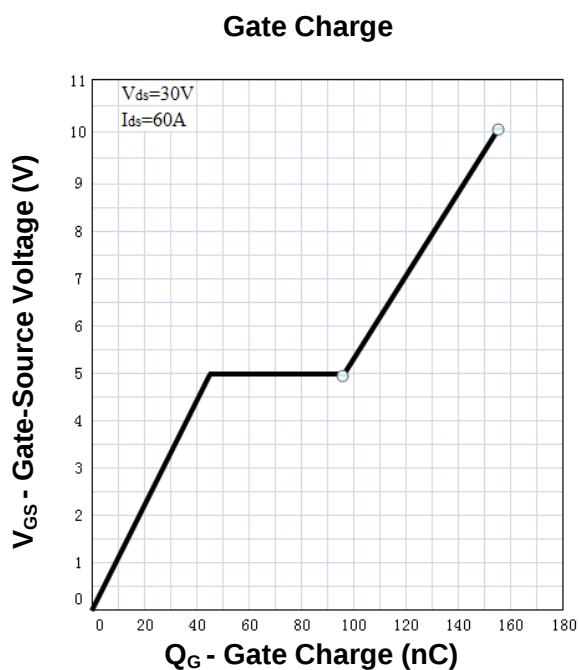
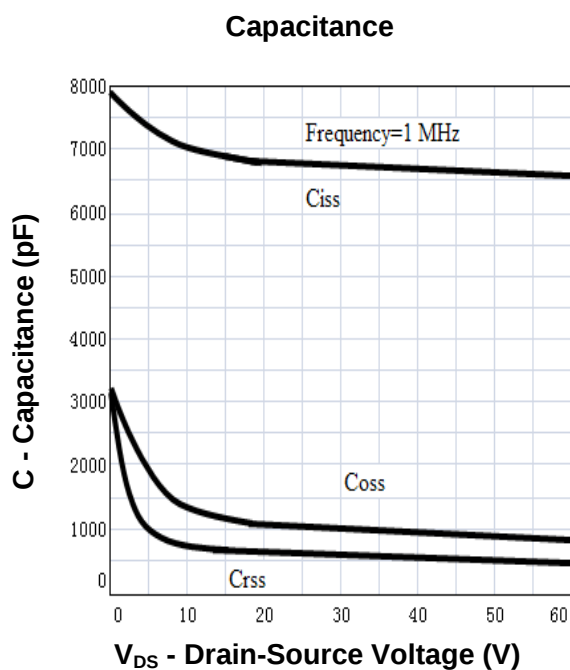
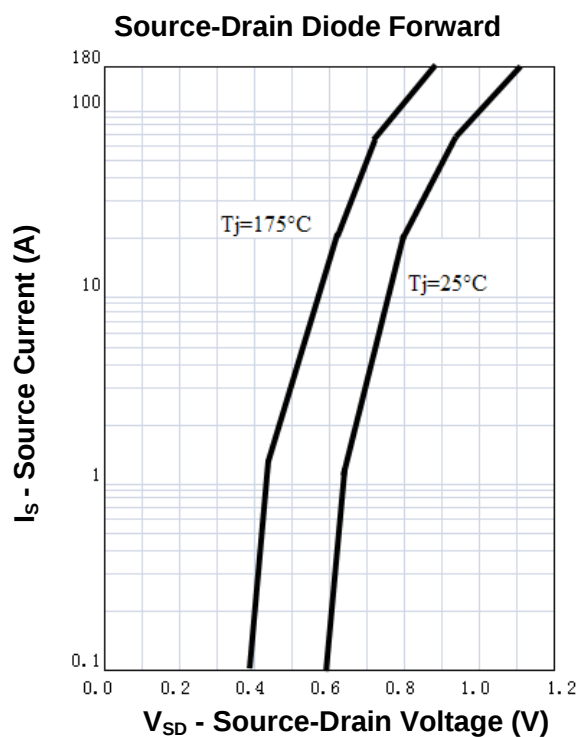
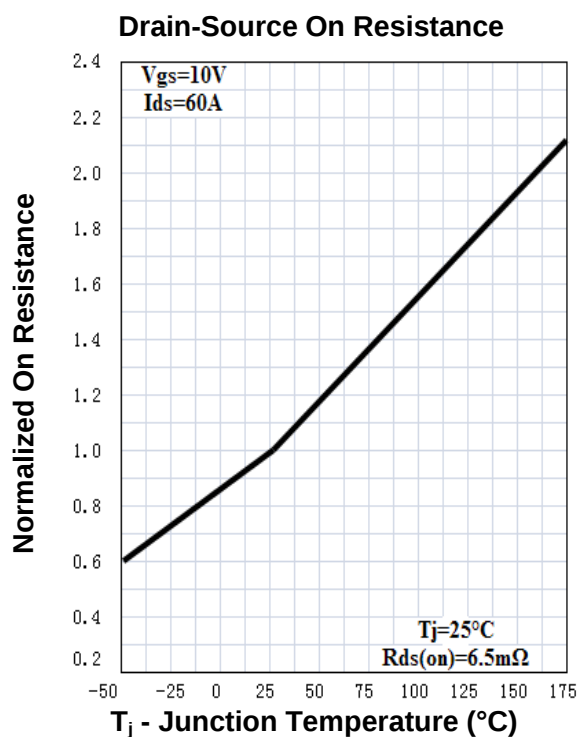
Drain-Source On Resistance



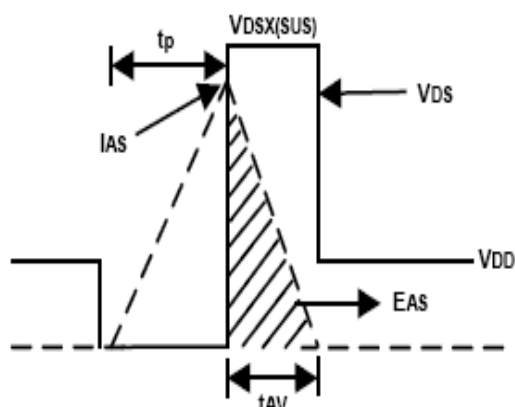
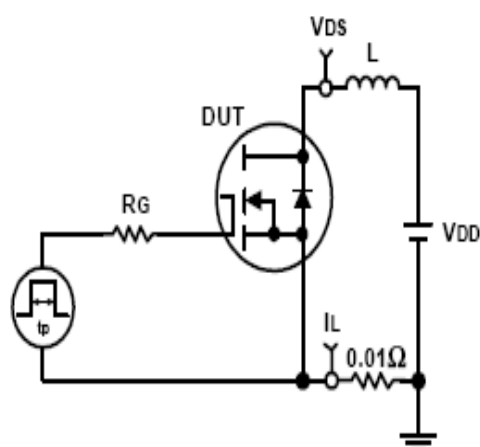
Gate Threshold Voltage



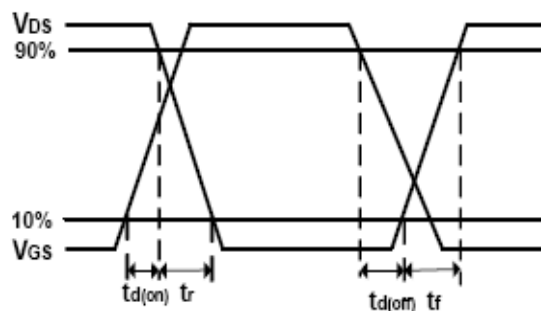
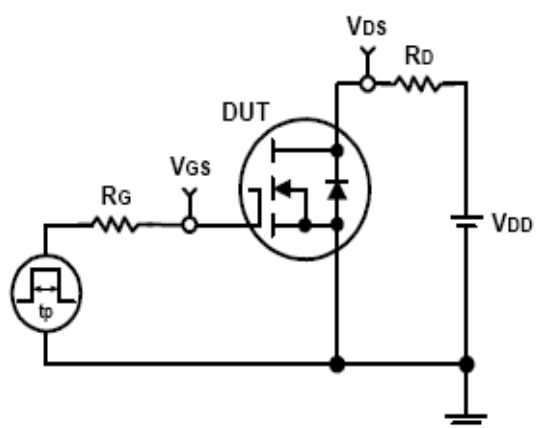
Typical Characteristics



Avalanche Test Circuit and Waveforms



Switching Time Test Circuit and Waveforms

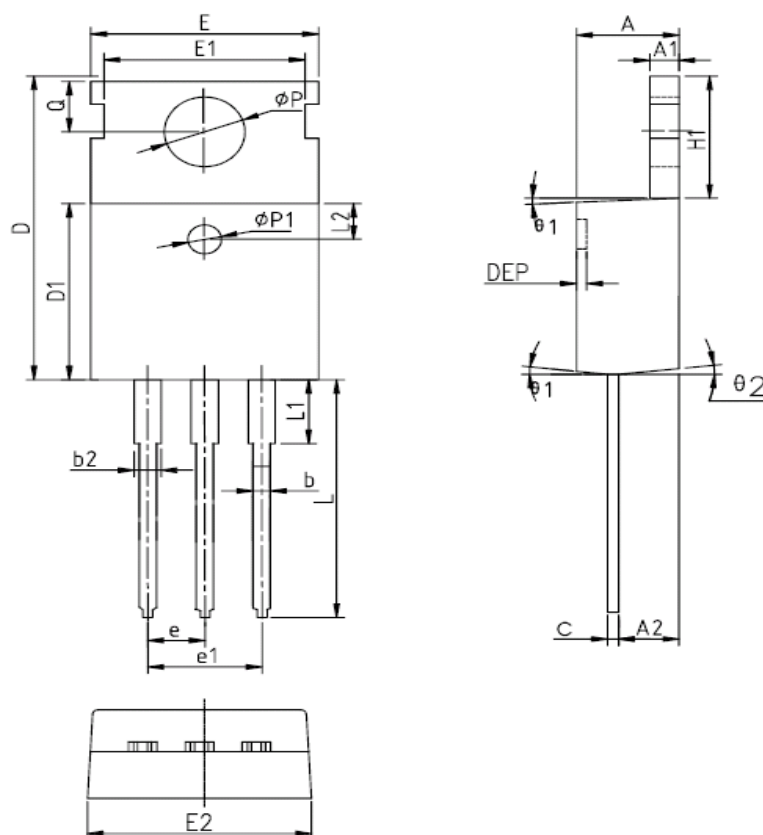


Ordering and Marking Information

Device	Marking	Package	Packaging	Quantity	Reel Size	Tape width
RU190N10R	RU190N10R	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	Øp1	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	Øp	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	θ 1	5°	7°	9°	5°	7°	9°
E1	-	8.70	-	-	0.343	-	θ 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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