RU190N10Q

N-Channel Advanced Power MOSFET

Features

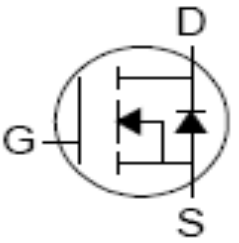
- 100V/190A
  $R_{DS\ (ON)}$=6.5mΩ(Typ.) @ V_{GS}=10V
- Avalanche Rated
- Reliable and Rugged
- Lead Free and Green Devices Available

Applications

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

Pin Description

TO-247



N-Channel MOSFET

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	
$R_{\theta JC}$	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°C Unless Otherwise Noted)

Symbol	Parameter	Test Condition	RU190N10Q			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: ①Calculated continuous current based on maximum allowable junction temperature.The package limitation current is 90A

②Pulse width limited by safe operating area.

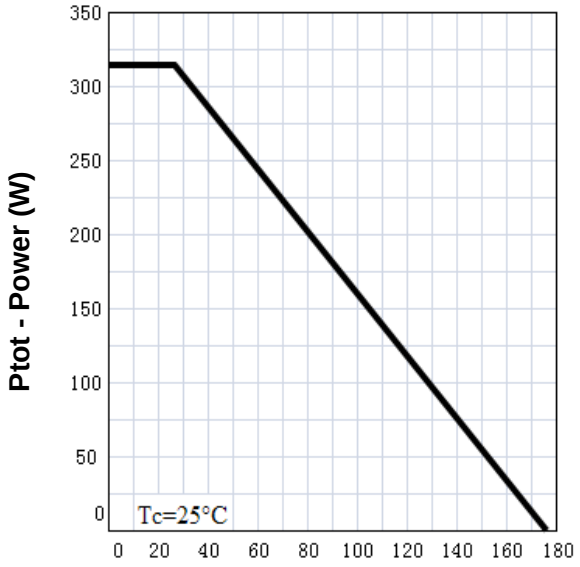
③Limited by T_{Jmax}, I_{AS} =50A, V_{DD} = 48V, R_G = 50Ω , Starting T_J = 25°C.

④Pulse test ; Pulse width≤300μs, duty cycle≤2%.

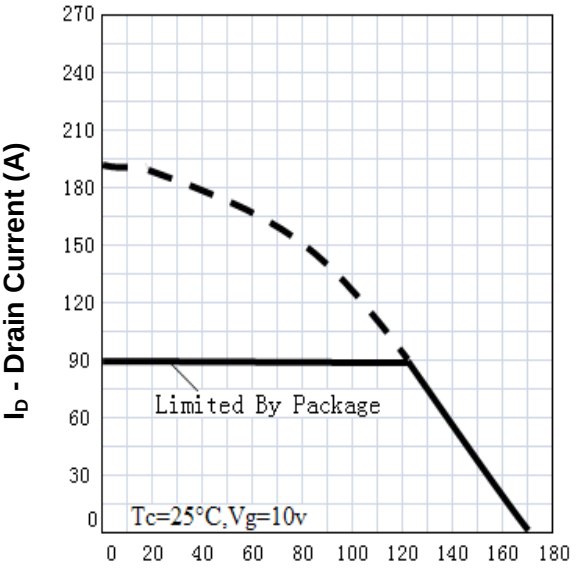
⑤Guaranteed by design, not subject to production testing.

Typical Characteristics

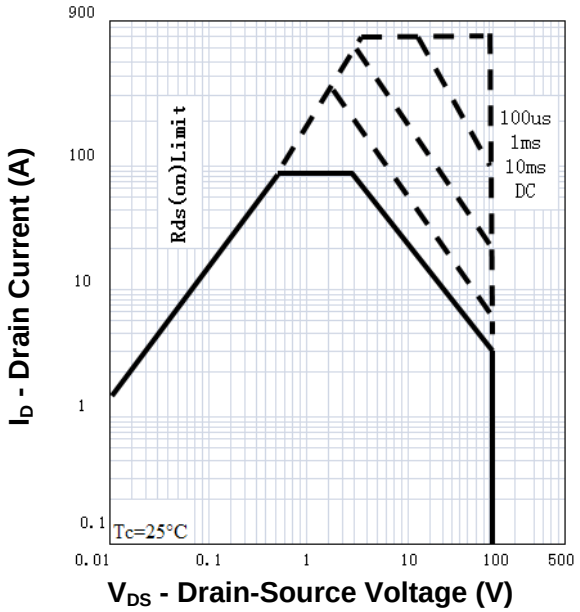
Power Dissipation



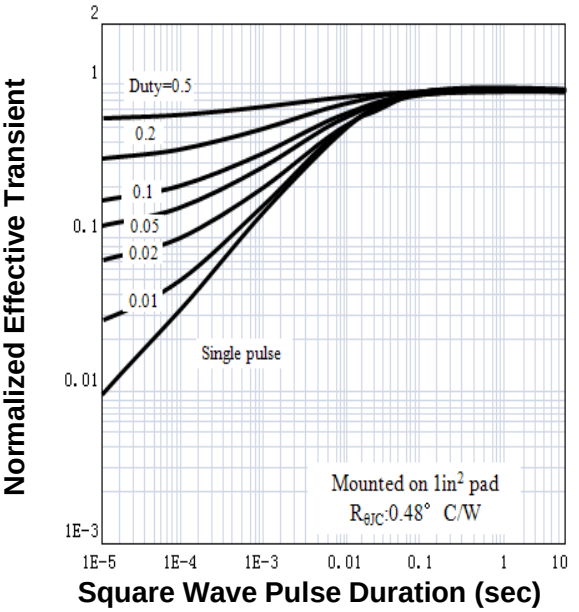
Drain Current



Safe Operation Area

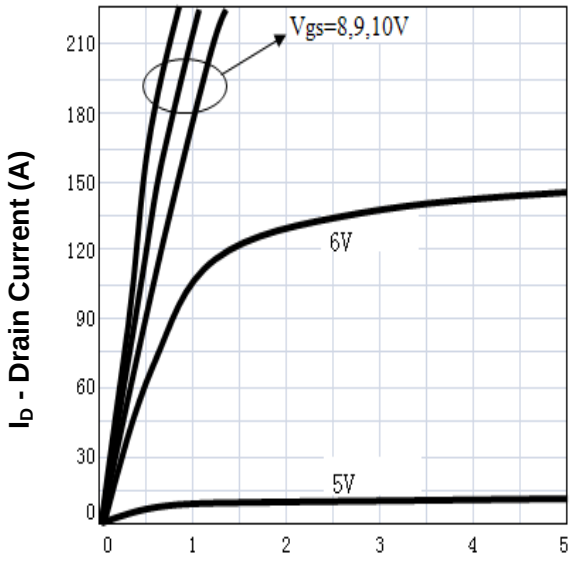


Thermal Transient Impedance



Typical Characteristics

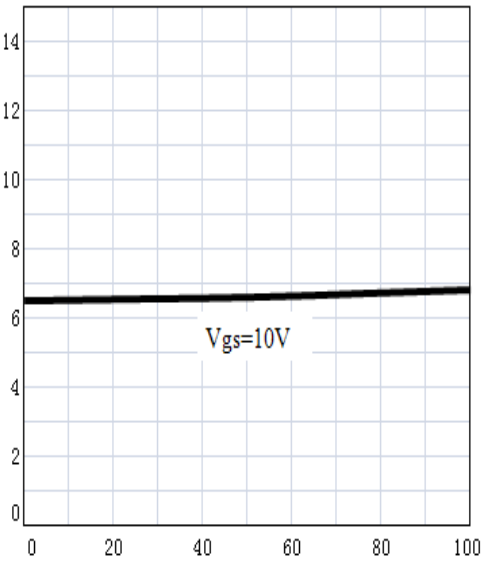
Output Characteristics



I_D - Drain Current (A)

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

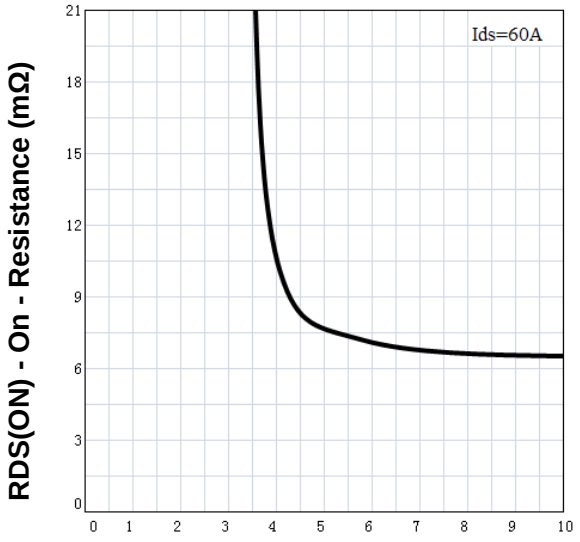
Drain-Source On Resistance



$R_{DS(ON)}$ - On Resistance (mΩ)

I_D - Drain Current (A)

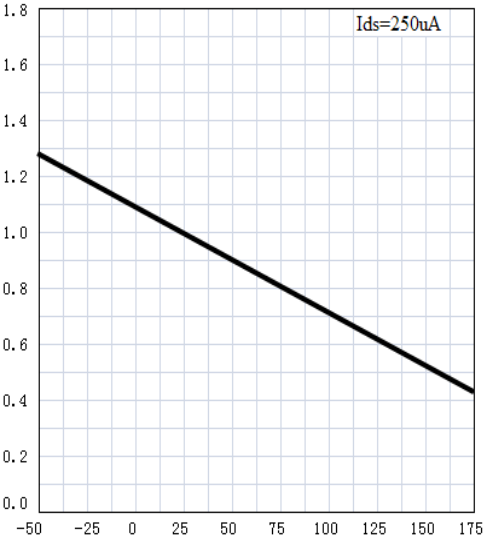
Drain-Source On Resistance



RDS(ON) - On - Resistance (mΩ)

VGS - Gate - Source Voltage (V)

Gate Threshold Voltage

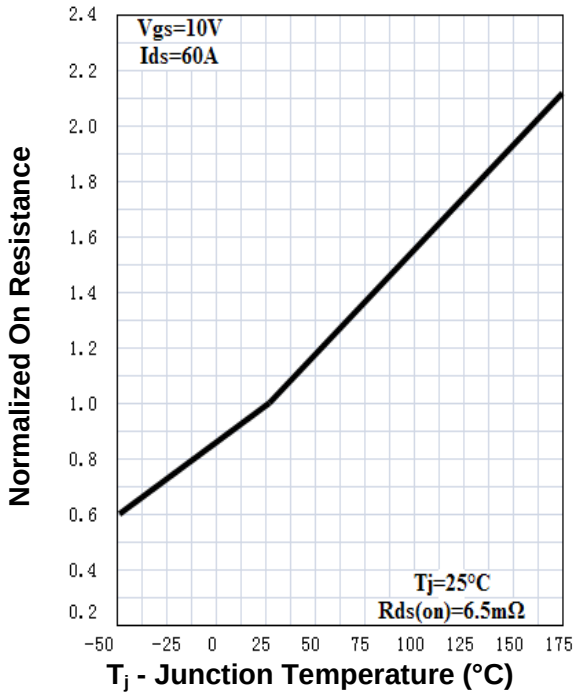


Normalized Threshold Vlotage

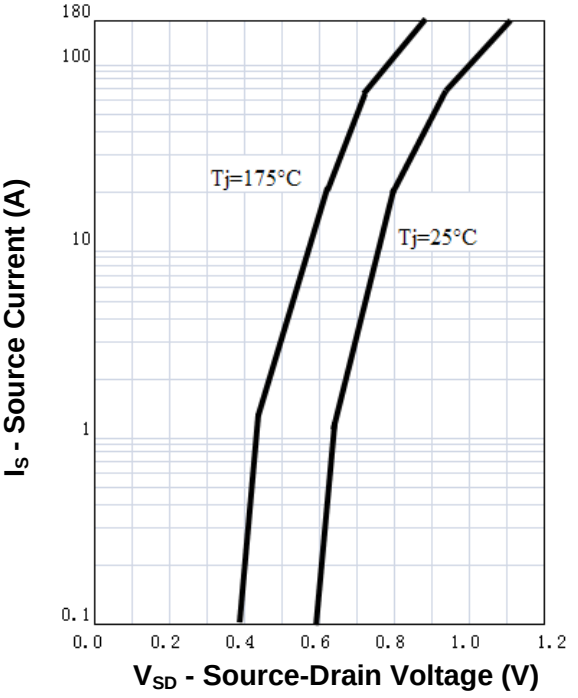
Tj - Junction Temperature (°C)

Typical Characteristics

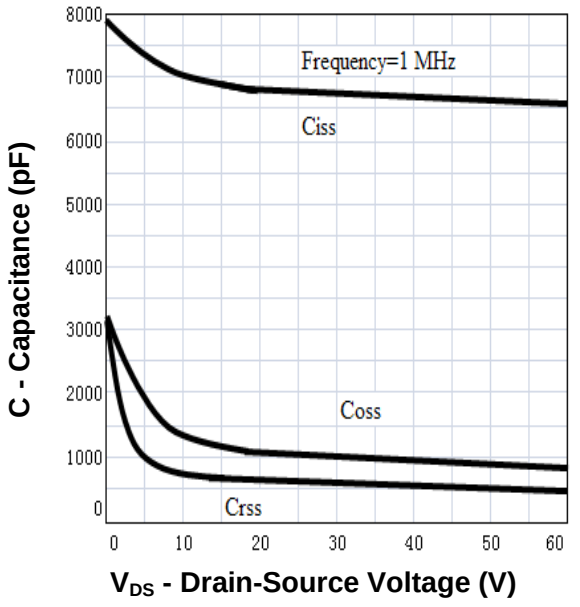
Drain-Source On Resistance



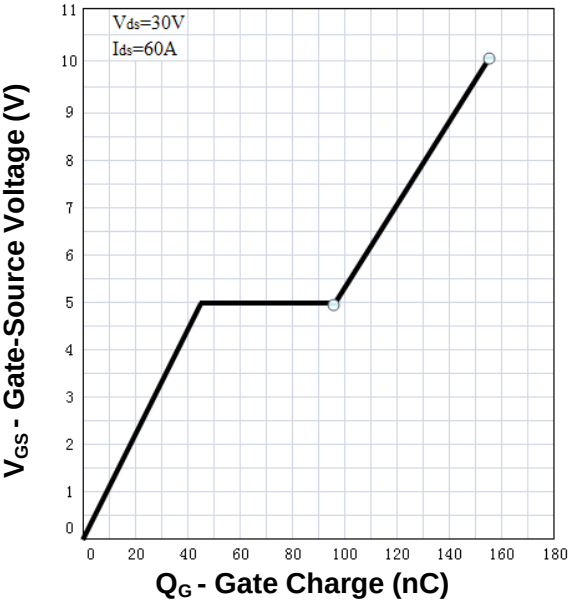
Source-Drain Diode Forward



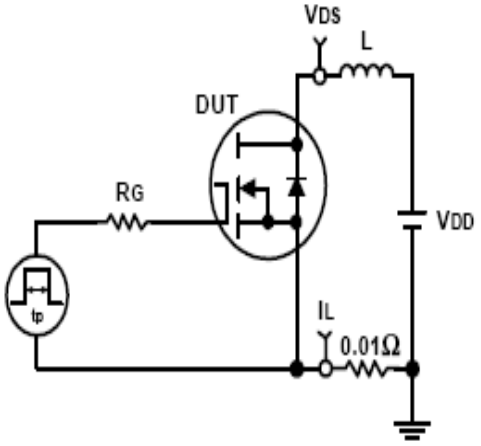
Capacitance

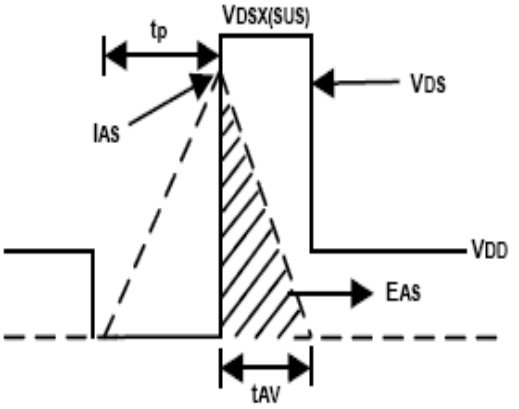


Gate Charge

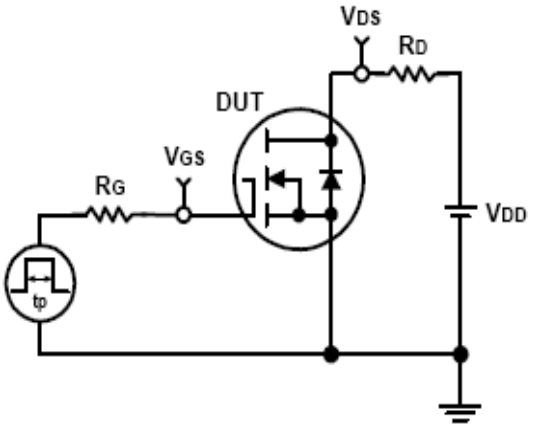


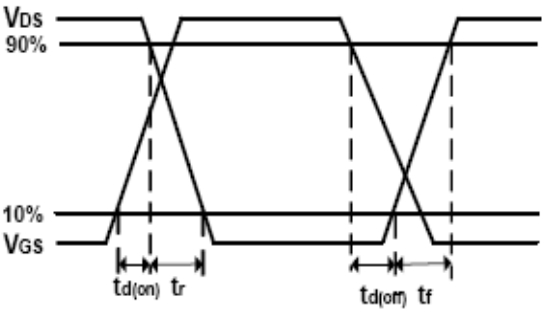
Avalanche Test Circuit and Waveforms





Switching Time Test Circuit and Waveforms



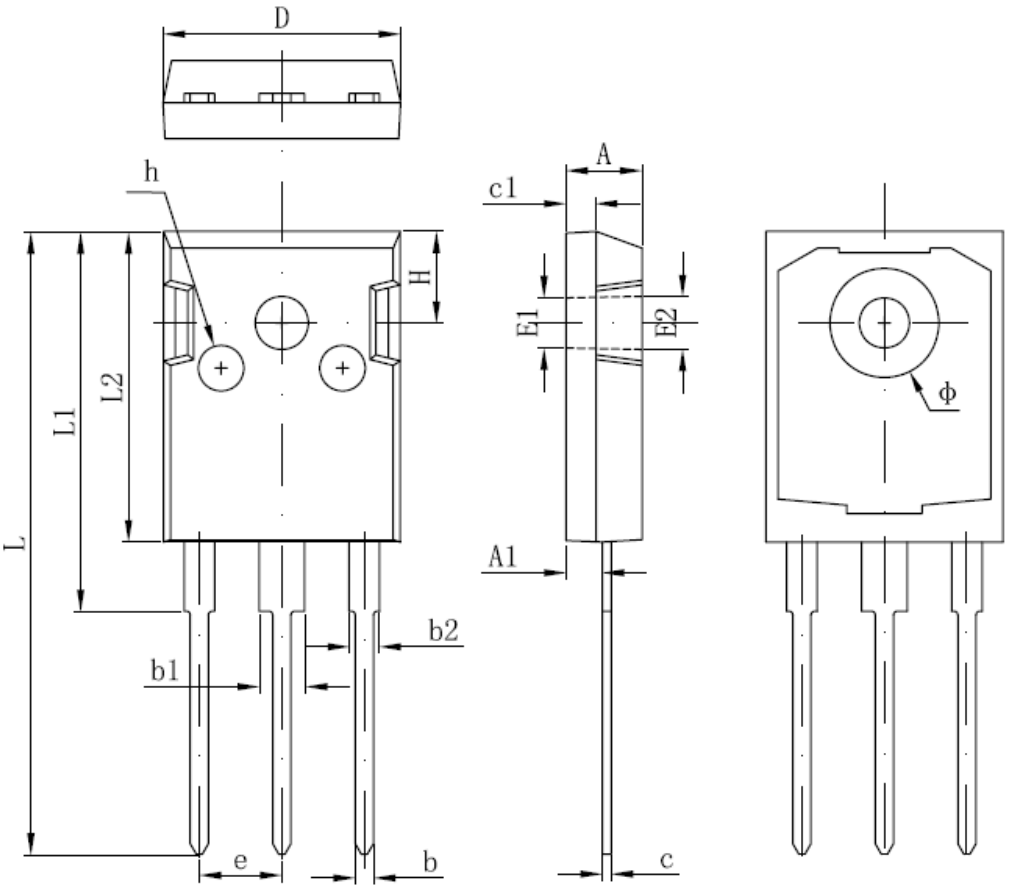


Ordering and Marking Information

Device	Marking	Package	Packaging	Quantity	Reel Size	Tape width
RU190N10Q	RU190N10Q	TO-247	Tube	30	-	-

Package Information

TO-247



SYMBOL	MM		INCH		SYMBOL	MM		INCH	
	MIN	MAX	MIN	MAX		MIN	MAX	MIN	MAX
A	4.850	5.150	0,191	0.200	E2	3.600 REF		0.142 REF	
A1	2.200	2.600	0.087	0.102	L	40.900	41.300	1.610	1.626
B	1.000	1.400	0.039	0.055	L1	24.800	25.100	0.976	0.988
b1	2.800	3.200	0.110	0.126	L2	20.300	20.600	0.799	0.811
b2	1.800	2.200	0.071	0.087	Φ	7.100	7.300	0.280	0.287
c	0.500	0.700	0.020	0.028	e	5.450 TYP		0.215 TYP	
c1	1.900	2.100	0.075	0.083	H	5.980 REF.		0.235 REF.	
D	15.450	15.750	0.608	0.620	h	0.000	0.300	0.000	0.012
E1	3.500 REF.		0.138 REF.						

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

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