RU6199R

N-Channel Advanced Power MOSFET

Features

- 60V/200A
  $R_{DS\ (ON)}$=2.8 mΩ(Typ.) @ V_{GS}=10V
- Avalanche Rated
- Reliable and Rugged
- Lead Free and Green Devices Available

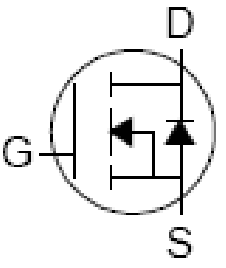
Applications

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

Pin Description



TO-220



N-Channel MOSFET

Absolute Maximum Ratings

Symbol	Parameter		Rating	Unit
Common Ratings (T_A=25°C Unless Otherwise Noted)				
V_{DSS}	Drain-Source Voltage		60	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	200 ①	A
Mounted on Large Heat Sink				
I_{DP}	300μs Pulsed Drain Current Tested	T_C=25°C	800 ②	A
I_D	Continue Drain Current(V_{GS}=10V)	T_C=25°C	200 ①	
		T_C=100°C	140 ①	
P_D	Maximum Power Dissipation	T_C=25°C	300	W
		T_C=100°C	150	
$R_{\theta JC}$	Thermal Resistance -Junction to Case		0.5	°C/W
Drain-Source Avalanche Ratings				
E_{AS} ③	Avalanche Energy ,Single Pulsed		1500	mJ

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Electrical Characteristics (T_A=25°C Unless Otherwise Noted)

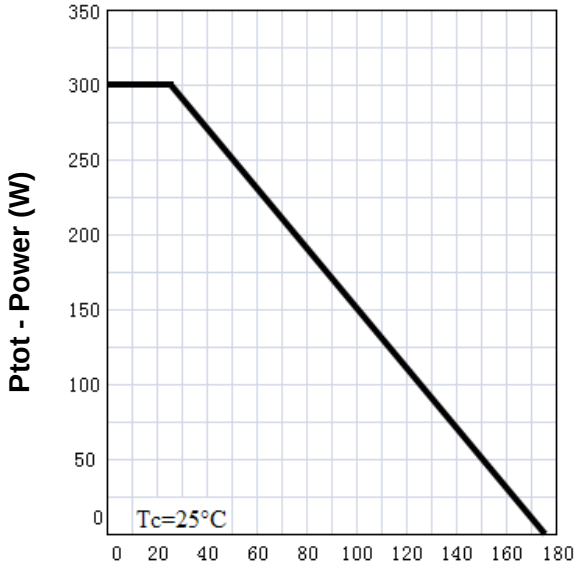
Symbol	Parameter	Test Condition	RU6199R			Unit
			Min.	Typ.	Max.	
Static Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_{DS}=250μA	60			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}= 60V, V_{GS}=0V			1	μA
		T_J=85°C			30	
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, 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}=40A		2.8	3.7	mΩ
Diode Characteristics						
V_{SD} ④	Diode Forward Voltage	I_{SD}=40 A, V_{GS}=0V			1.3	V
t_{rr}	Reverse Recovery Time	I_{SD}=40A, dI_{SD}/dt=100A/μs		75		ns
q_{rr}	Reverse Recovery Charge			150		nC
Dynamic Characteristics ⑤						
R_G	Gate Resistance	V_{GS}=0V,V_{DS}=0V,F=1MHz		1.4		Ω
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}= 30V, Frequency=1.0MHz		5800		pF
C_{oss}	Output Capacitance			1500		
C_{rss}	Reverse Transfer Capacitance			490		
$t_{d(ON)}$	Turn-on Delay Time	V_{DD}=35V, R_L=35Ω, I_{DS}= 1A, V_{GEN}= 10V, R_G=6Ω		22		ns
t_r	Turn-on Rise Time			38		
$t_{d(OFF)}$	Turn-off Delay Time			75		
t_f	Turn-off Fall Time			120		
Gate Charge Characteristics ⑤						
Q_g	Total Gate Charge	V_{DS}=30V, V_{GS}= 10V, I_{DS}=40A		155		nC
Q_{gs}	Gate-Source Charge			45		
Q_{gd}	Gate-Drain Charge			48		

Notes: ①Calculated continuous current based on maximum allowable junction temperature. Package limitation current is 75A.
②Pulse width limited by safe operating area.
③Limited by T_{Jmax}, I_{AS} =60A, 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.

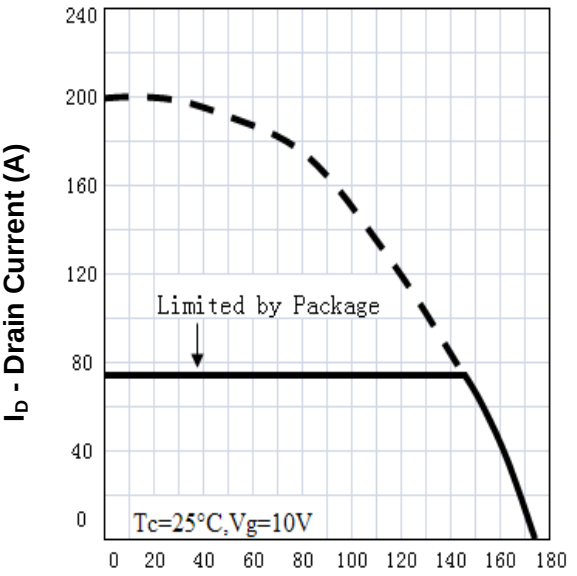
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Typical Characteristics

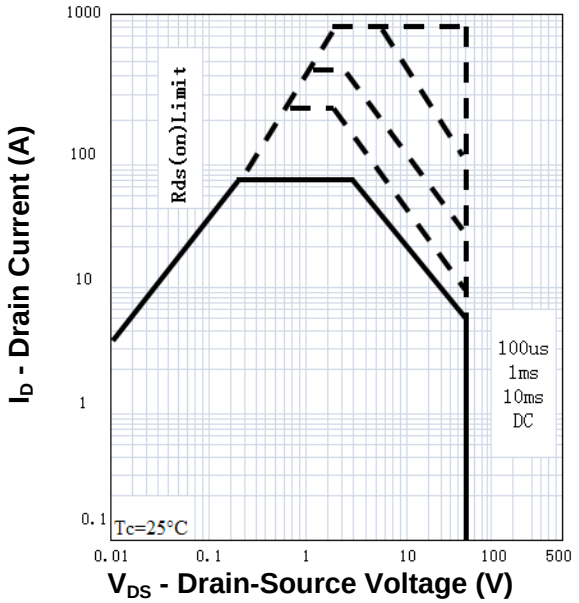
Power Dissipation



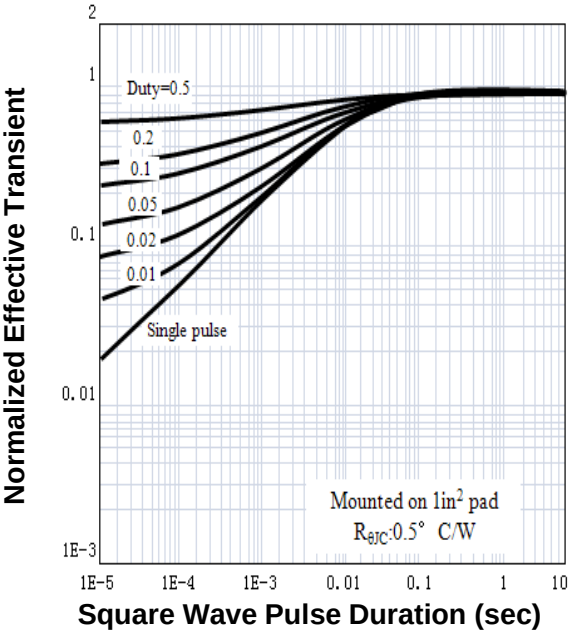
Drain Current



Safe Operation Area

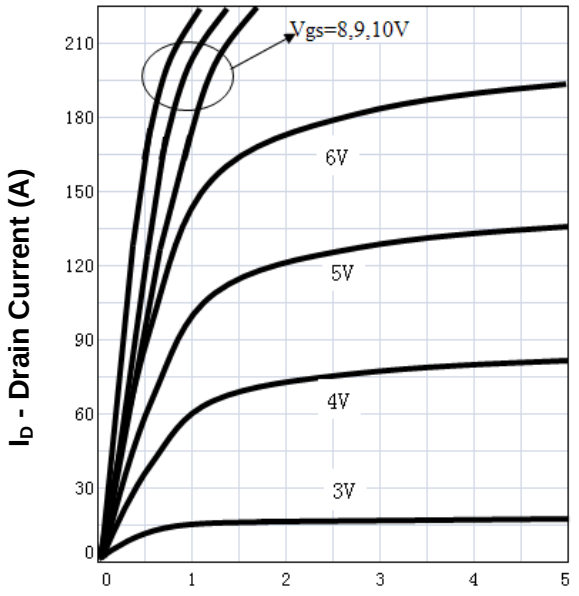


Thermal Transient Impedance

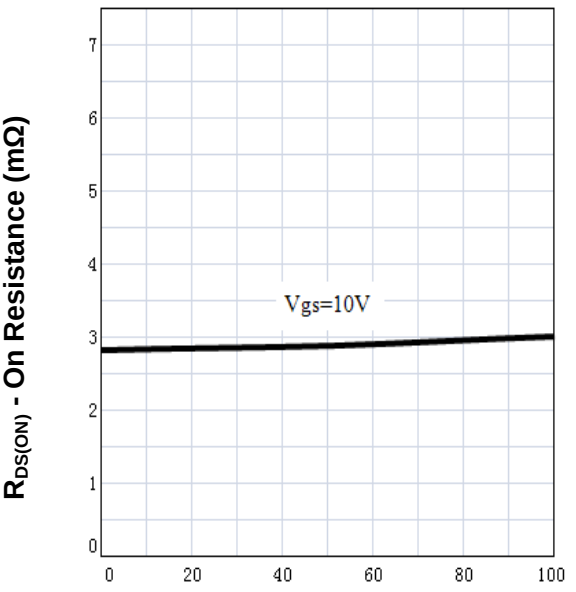


Typical Characteristics

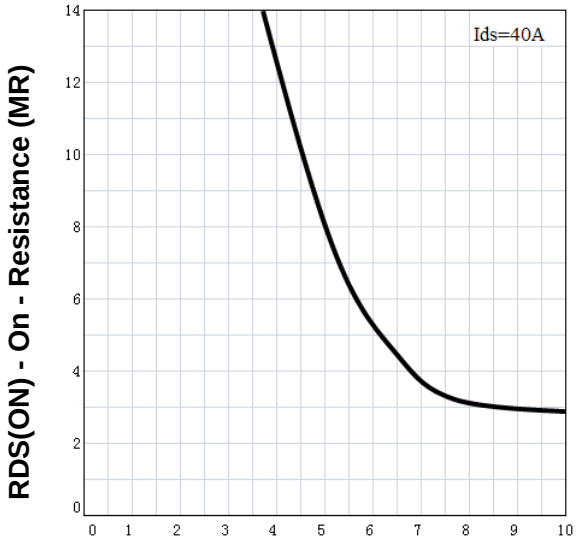
Output Characteristics



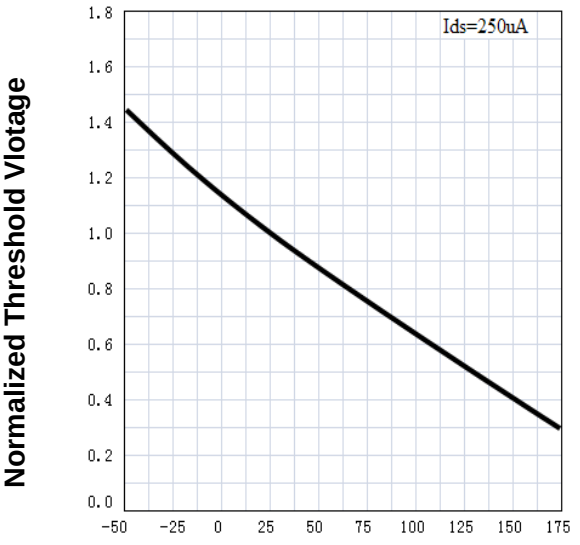
Drain-Source On Resistance



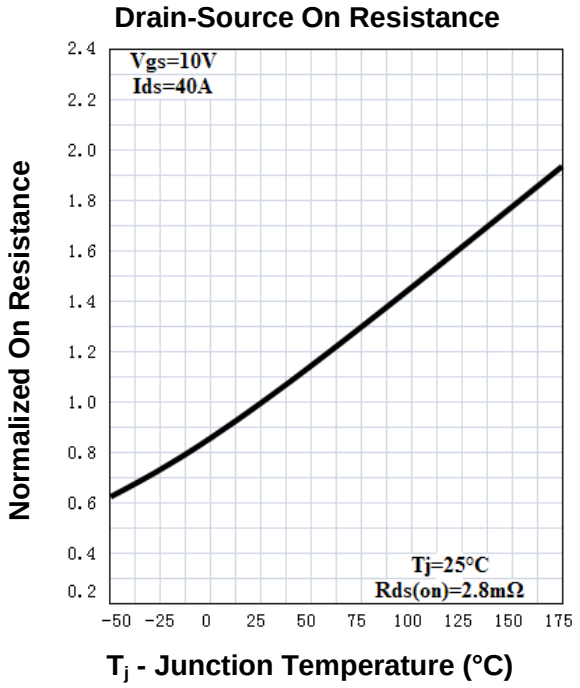
Drain-Source On Resistance

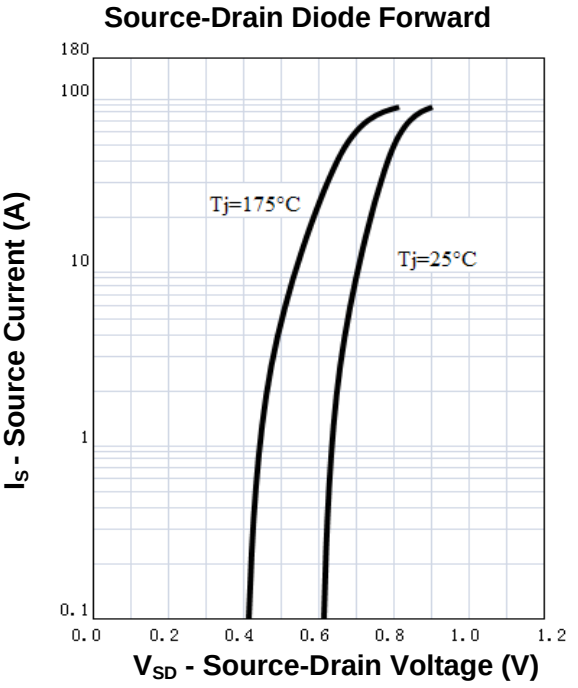


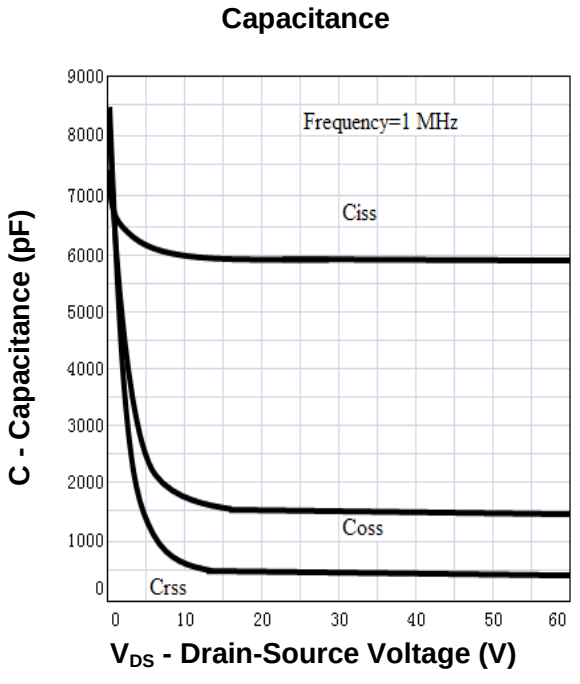
Gate Threshold Voltage

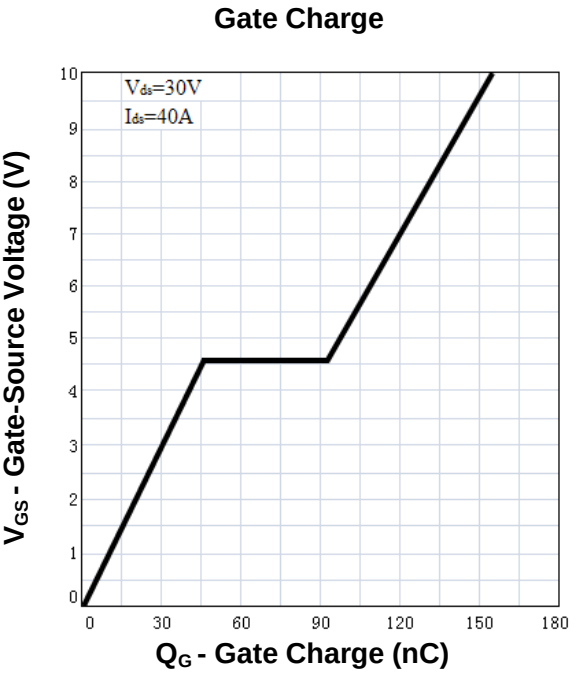


Typical Characteristics

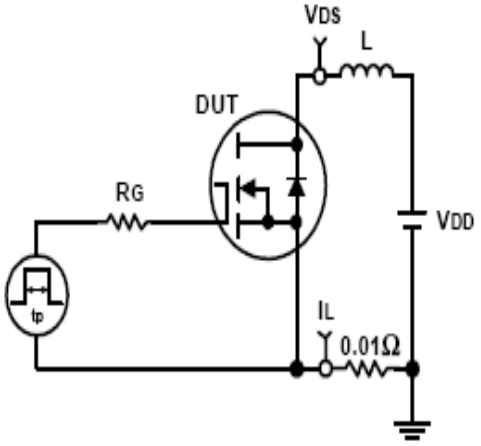


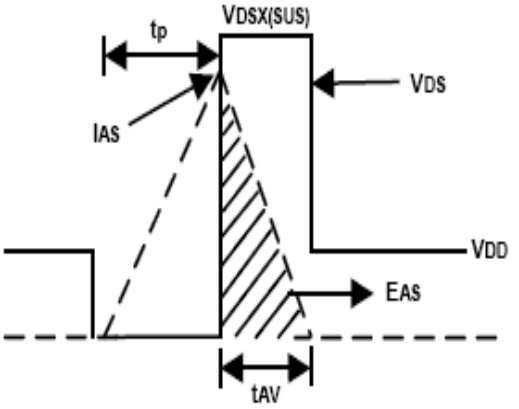




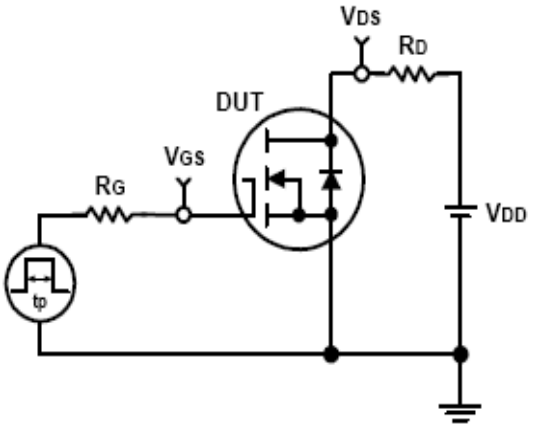


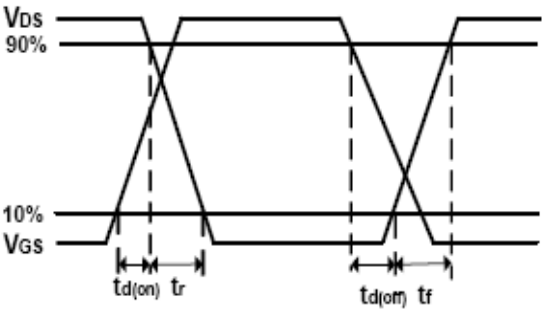
Avalanche Test Circuit and Waveforms





Switching Time Test Circuit and Waveforms



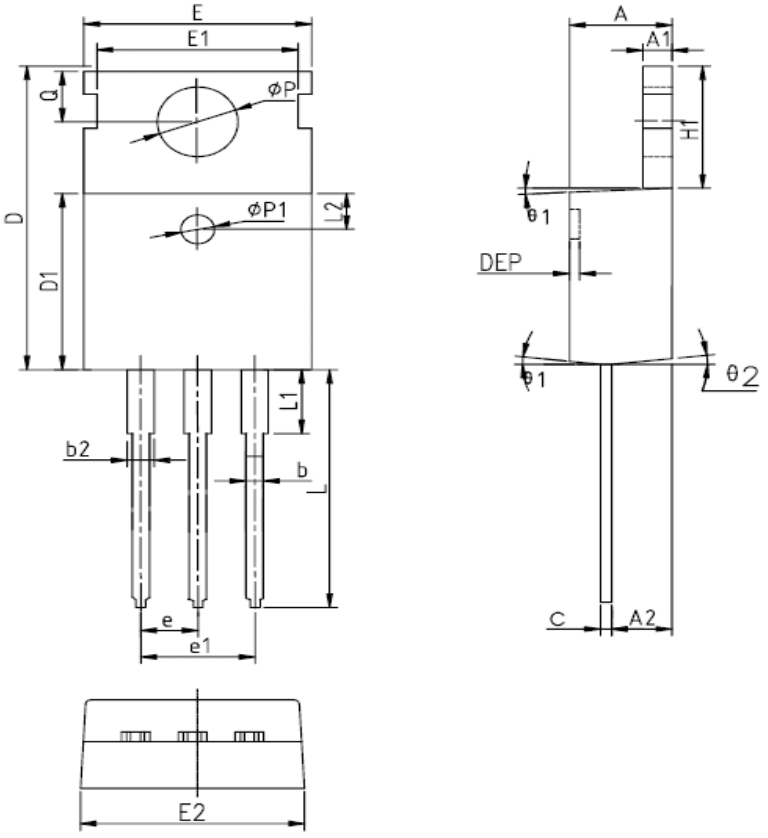


Ordering and Marking Information

Device	Marking	Package	Packaging	Quantity	Reel Size	Tape width
RU6199R	RU6199R	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