Features

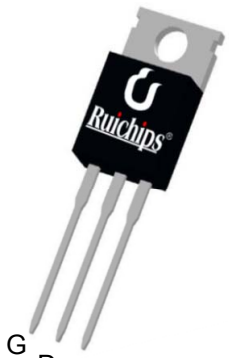
- 85V/210A,
  $R_{DS\ (ON)}$ =2.8mΩ(Typ.)@V_{GS}=10V
- Uses Ruichips advanced SGT™ Technology
- Ultra Low On-Resistance
- Excellent Q_gx$R_{DS(on)}$ Product
- 100% Avalanche Tested
- Fast Switching and Fully Avalanche Rated
- Lead Free and Green Devices (RoHS Compliant)

Pb-Free RoHS HF Halogen-Free

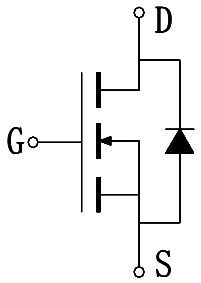
Applications

- Motor Drives
- Uninterruptible Power Supplies
- DC/DC Converter
- General Purpose Applications

Pin Description



TO220



N-Channel MOSFET

Absolute Maximum Ratings

Symbol	Parameter		Rating	Unit
Common Ratings (T_C=25°C Unless Otherwise Noted)				
V_{DSS}	Drain-Source Voltage		85	V
V_{GSS}	Gate-Source Voltage		±20	
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	210	A
Mounted on Large Heat Sink				
I_{DP} ①	300μs Pulse Drain Current Tested	T_C=25°C	840	A
I_D ②	Continuous Drain Current(V_{GS}=10V)	T_C=25°C	210	A
		T_C=100°C	148	
P_D	Maximum Power Dissipation	T_C=25°C	320	W
		T_C=100°C	159	
$R_{\theta JC}$	Thermal Resistance-Junction to Case		0.47	°C/W
$R_{\theta JA}$	Thermal Resistance-Junction to Ambient		53	°C/W
Drain-Source Avalanche Ratings				
E_{AS} ③	Avalanche Energy, Single Pulsed		1056	mJ

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

Symbol	Parameter	Test Condition	RUH85210R			Unit
			Min.	Typ.	Max.	
Static Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_{DS}=250μA	85			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=85V, V_{GS}=0V			1	μA
		T_J=125°C			30	
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_{DS}=250μA	2		4	V
I_{GSS}	Gate Leakage Current	V_{GS}=±20V, V_{DS}=0V			±100	nA
$R_{DS(ON)}$ ④	Drain-Source On-state Resistance	V_{GS}=10V, I_{DS}=75A		2.8	3.5	mΩ
		T_J=150°C		4.7	6	
Diode Characteristics						
V_{SD} ④	Diode Forward Voltage	I_{SD}=75A, V_{GS}=0V		0.9	1.2	V
t_{rr}	Reverse Recovery Time	I_{SD}=75A, dI_{SD}/dt=100A/μs		72	90	ns
Q_{rr}	Reverse Recovery Charge			68	90	nC
Dynamic Characteristics ⑤						
R_G	Gate Resistance	V_{GS}=0V,V_{DS}=0V,F=1MHz		2.1	3	Ω
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=40V, Frequency=1.0MHz		4750	5500	pF
C_{oss}	Output Capacitance			1750	2200	
C_{rss}	Reverse Transfer Capacitance			26	50	
$t_{d(ON)}$	Turn-on Delay Time	V_{DD}=40V,I_{DS}=75A, V_{GEN}=10V,R_G=4.7Ω		25	45	ns
t_r	Turn-on Rise Time			51	75	
$t_{d(OFF)}$	Turn-off Delay Time			27	50	
t_f	Turn-off Fall Time			25	45	
Gate Charge Characteristics ⑤						
Q_g	Total Gate Charge	V_{DS}=68V, V_{GS}=10V, I_{DS}=75A		74	100	nC
Q_{gs}	Gate-Source Charge			21	45	
Q_{gd}	Gate-Drain Charge			15	30	

Notes:

①Pulse width limited by safe operating area.

②Calculated continuous current based on maximum allowable junction temperature. The package limitation current is 75A.

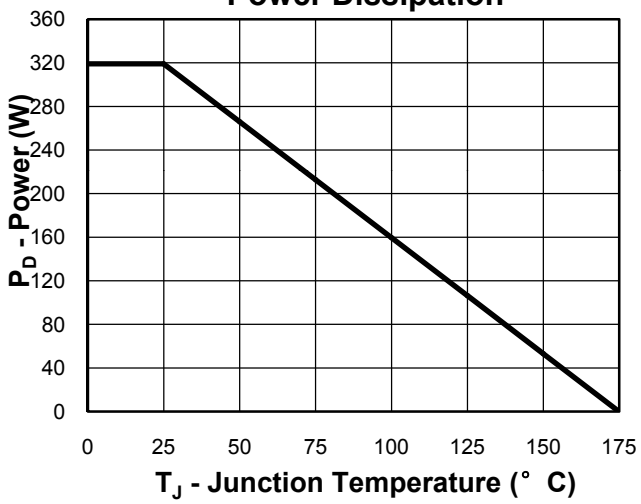
③This value is based on starting T_J = 25° C, L =0.5mH, R_G = 50Ω, I_{AS} = 65A, V_{DD}=48V; 100% FT tested at L = 0.5mH, I_{AS} = 46A.

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

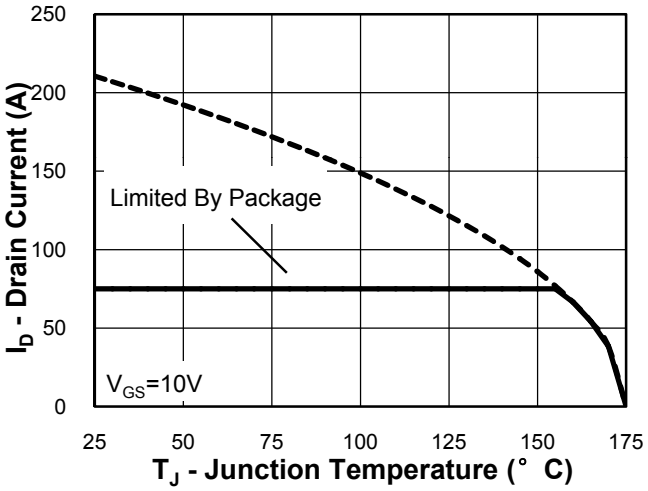
⑤Guaranteed by design, not subject to production testing.

Typical Characteristics

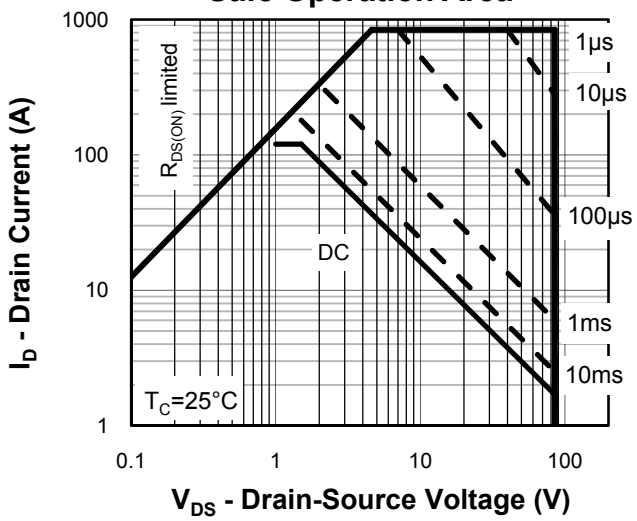
Power Dissipation



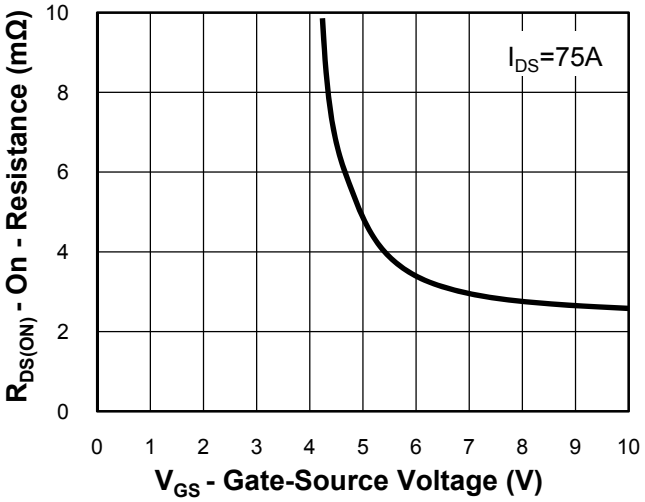
Drain Current



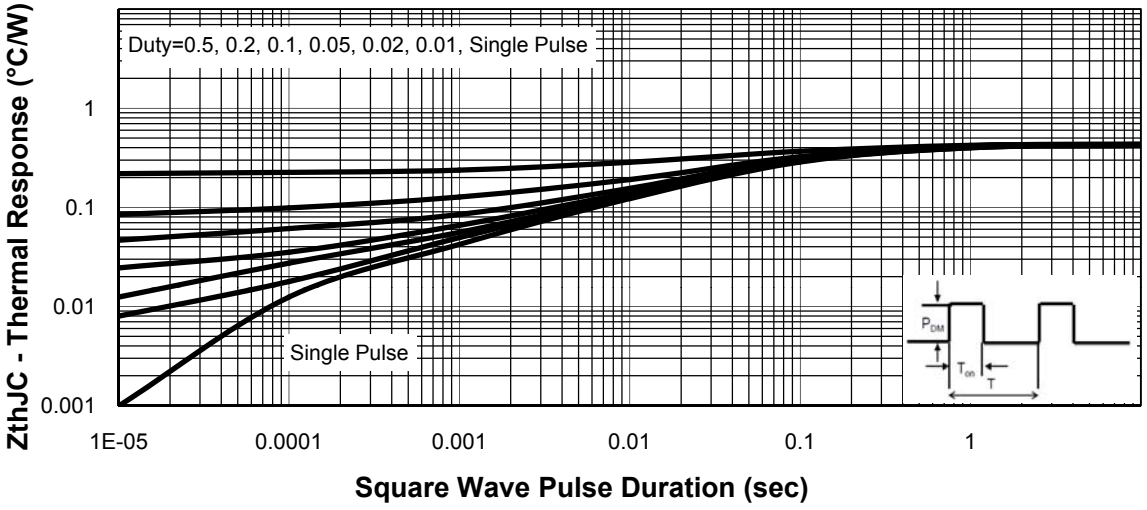
Safe Operation Area



Drain Current

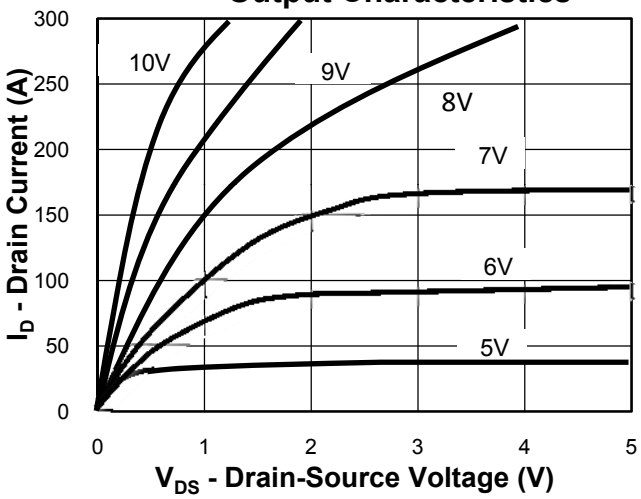


Thermal Transient Impedance

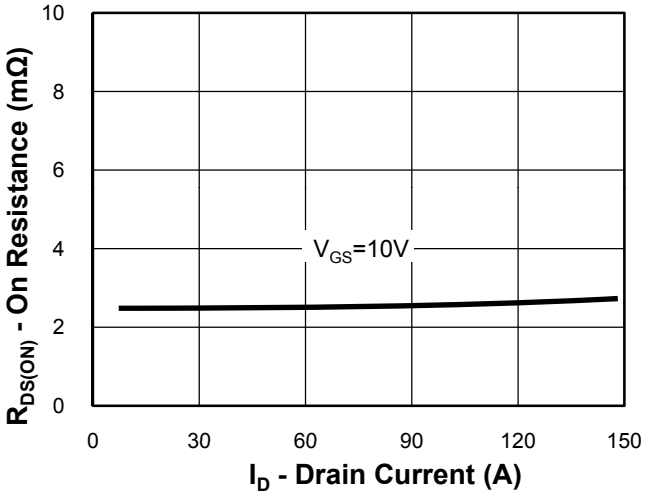


Typical Characteristics

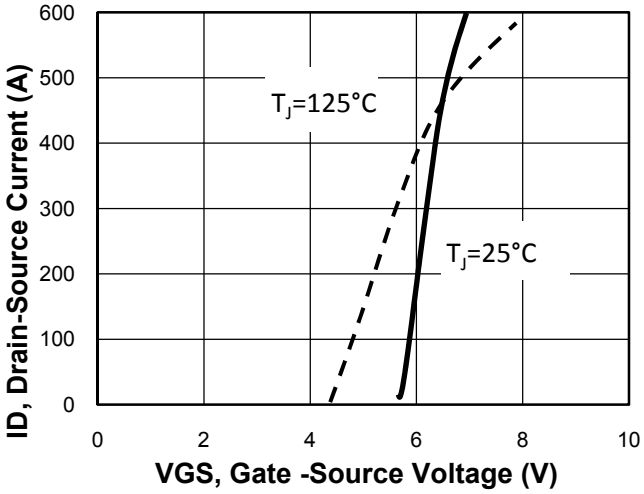
Output Characteristics



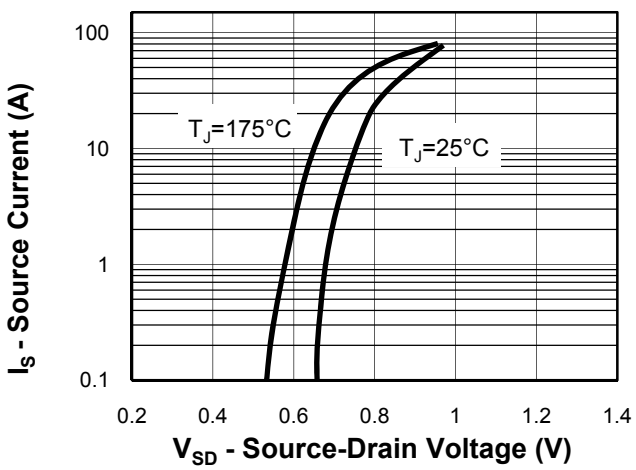
Drain-Source On Resistance



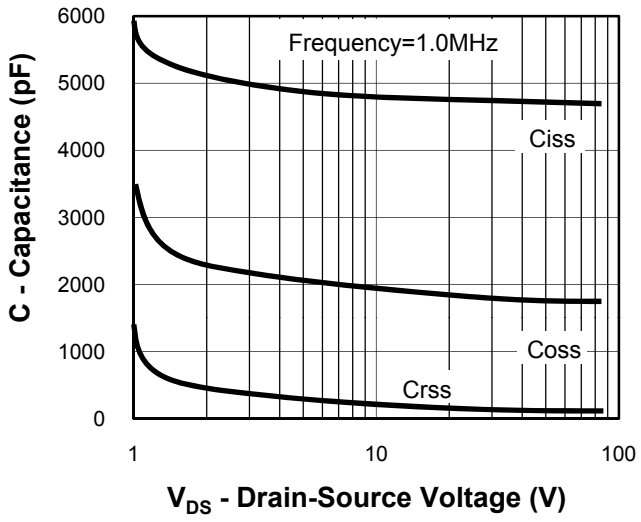
Transfer Characteristics



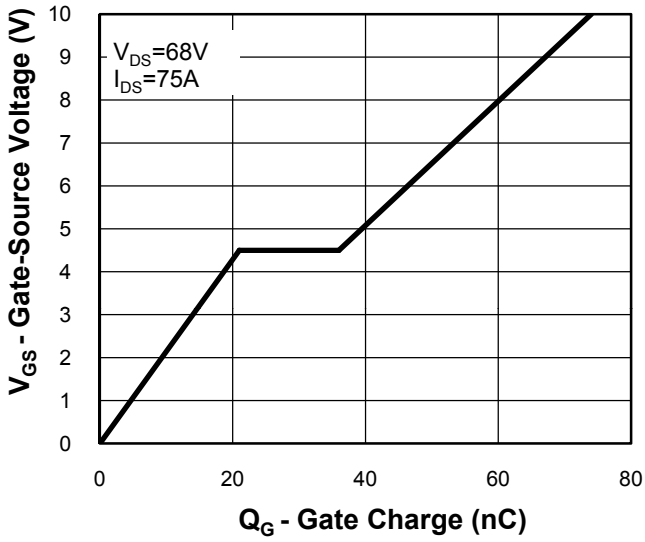
Source-Drain Diode Forward



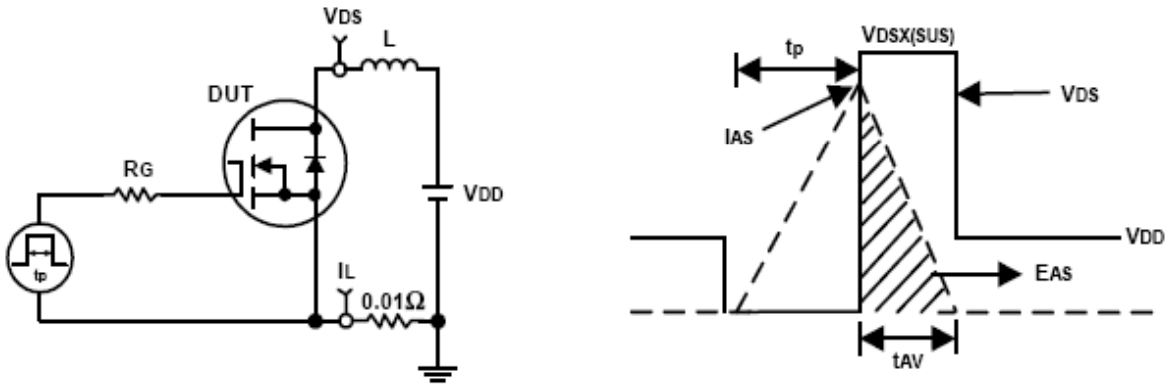
Capacitance



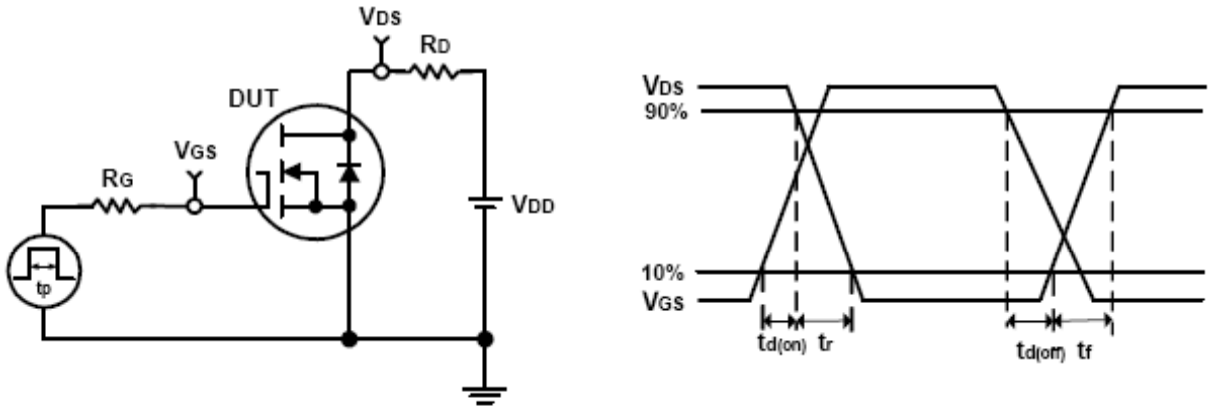
Gate Charge



Avalanche Test Circuit and Waveforms



Switching Time Test Circuit and Waveforms

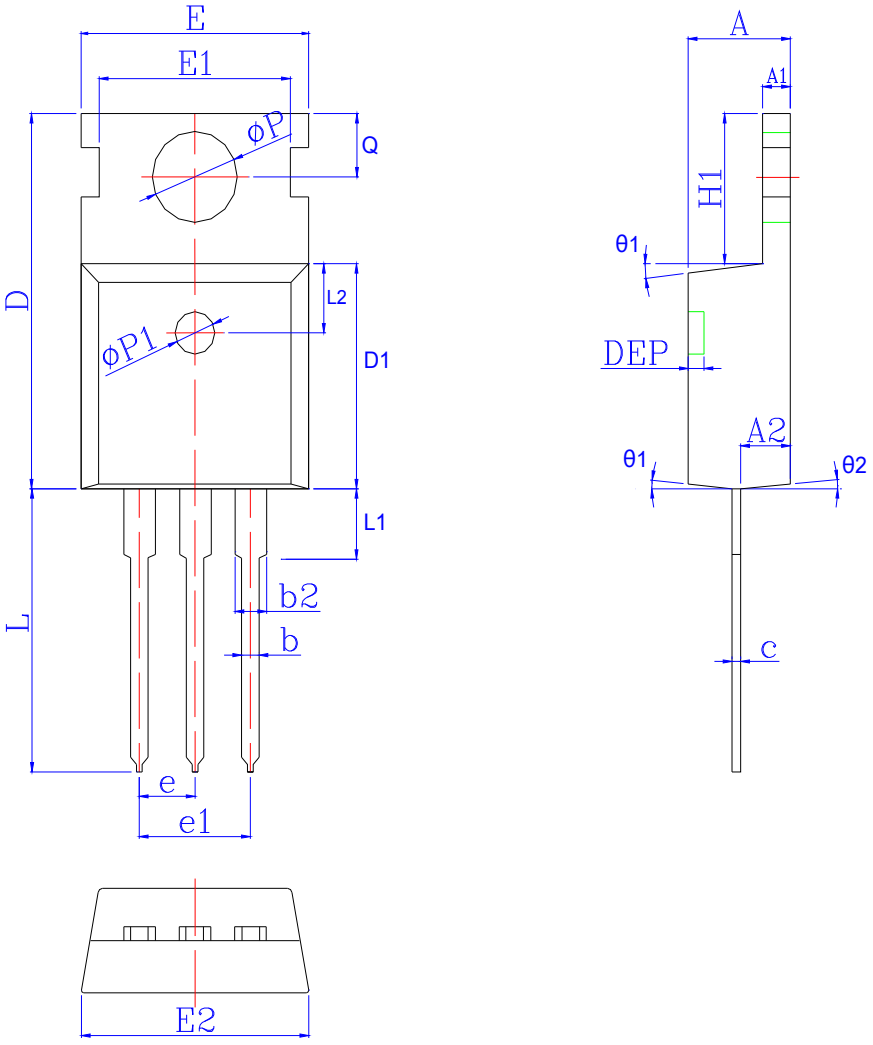


Ordering and Marking Information

Device	Marking	Package	Packaging	Quantity	Reel Size	Tape
RUH85210R	RUH85210R	TO220	Tube	50	-	-

Package Information

TO220



SYMBOL	MM			INCH			SYMBOL	MM			INCH		
	MIN	NOM	MAX	MIN	NOM	MAX		MIN	NOM	MAX	MIN	NOM	MAX
A	4.30	4.54	4.77	0.169	0.179	0.188	Φp1	1.40	1.50	1.60	0.055	0.059	0.063
A1	1.15	1.30	1.40	0.045	0.051	0.055	e	2.54 BSC			0.10 BSC		
A2	1.90	2.25	2.60	0.075	0.089	0.102	e1	5.08 BSC			0.20 BSC		
b	0.60	0.80	1.00	0.024	0.031	0.039	H1	6.30	6.50	6.80	0.248	0.256	0.268
b2	1.17	1.28	1.72	0.046	0.050	0.068	L	12.70	13.18	13.65	0.500	0.519	0.537
c	0.40	0.50	0.60	0.016	0.020	0.024	L1	*	*	3.95	*	*	0.156
D	15.40	15.70	16.00	0.606	0.618	0.630	L2	2.50 REF			0.098 REF		
D1	8.96	9.21	9.46	0.353	0.363	0.372	Φp	3.50	3.60	3.75	0.138	0.142	0.148
DEP	*	*	0.30	*	*	0.012	Q	2.70	2.80	3.20	0.106	0.110	0.126
E	9.66	9.97	10.28	0.380	0.393	0.405	θ1	5°	7°	9°	5°	7°	9°
E1	*	8.70	*	*	0.343	*	θ2	1°	3°	5°	1°	3°	5°
E2	9.80	10.00	10.20	0.386	0.394	0.402							