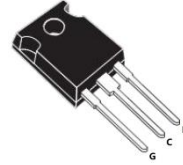


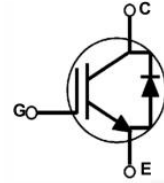
Features

- High Current Capability
- Low Saturation Voltage:
VCE(sat) = 1.30 V @ IC = 50 A
- High Input Impedance
- RoHS Compliant



Applications

- PDP TV



Absolute Maximum Ratings

Parameter	Symbol	Value	Unit	
Collector to Emitter Voltage	V _{CES}	330	V	
Gate to Emitter Voltage	V _{GES}	±30		
Collector Current	I _C	T _C =25°C	100	A
		T _C =100°C	50	
Pulsed Collector Current TC=25°C	I _{CM}	180		
Diode forward current @ TC= 100°C	I _F	30	A	
Maximum Power Dissipation TC=25°C	P _D	328	W	
Maximum Power Dissipation TC=100°C		130		
Operating Junction Temperature	T _J	-55 to 150	°C	
Storage Temperature Range	T _{stg}	-55 to 150		
Maximum Lead Temp. for soldering Purposes, 1/8" from case for 5 seconds	T _L	300		

Thermal Characteristics

Parameter	Symbol	Typ	Max	Unit
Thermal Resistance, Junction to Case	R _{θJC} (IGBT)		0.38	°C/W
Thermal Resistance, Junction to Case	R _{θJC} (Diode)		1.1	

Package Marking and Ordering Information

Device Marking	Device	Package	MOQ
MSG50N350FH	MSG50N350FH	TO-247	

Electrical Characteristics of the IGBT $T_C = 25^\circ\text{C}$ unless otherwise noted

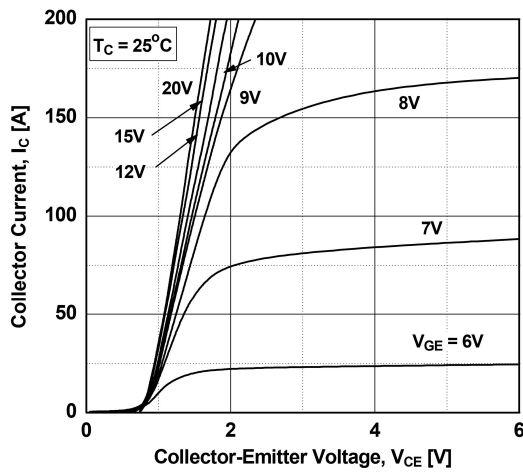
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
On/off Characteristics						
G-E Threshold Voltage	$V_{GE(th)}$	$I_C = 250\mu\text{A}, V_{CE} = V_{GE}$	2.5	4	5.5	
Collector to Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = 30\text{A}, V_{GE} = 15\text{V}$	-	1.15	-	V
		$I_C = 50\text{A}, V_{GE} = 15\text{V}$	-	1.30	-	
		$I_C = 50\text{A}, V_{GE} = 15\text{V}$ $T_C = 125^\circ\text{C}$	-	1.52	-	
Collector to Emitter Breakdown Voltage	B_{VCE}	$V_{GE} = 0\text{V}, I_C = 400\mu$	330	-	-	
Collector Cut-Off Current	I_{CE}	$V_{CE} = V_{CES}, V_{GE} = 0$	-	-	100	μA
G-E Leakage Current	I_{GE}	$V_{GE} = V_{GES}, V_{CE} = 0\text{V}$	-	-	± 1	nA
Dynamic Characteristics						
Input Capacitance	C_{ies}	$V_{CE} = 30\text{V}, V_{GE} = 0\text{V}$ $f = 1\text{MHz}$	-	4700	-	pF
Output Capacitance	C_{oes}		-	198	-	
Reverse Transfer Capacitance	C_{res}		-	83	-	
Switching Characteristics						
Turn-On Delay Time	$t_{d(on)}$	$V_{CC} = 200\text{V}, I_C = 40\text{A},$ $R_G = 5\Omega, V_{GE} = 15\text{V},$ Resistive Load, $T_C = 25^\circ\text{C}$	-	63	-	nS
Rise Time	t_r		-	81	-	
Turn-Off Delay Time	$t_{d(off)}$		-	142	-	
Total Gate Charge	Q_g	$V_{CE} = 200\text{V}, I_C = 40\text{A},$ $V_{GE} = 15\text{V}$	-	175	-	nC

Electrical Characteristics of the Diode $T_C = 25^\circ\text{C}$ unless otherwise noted

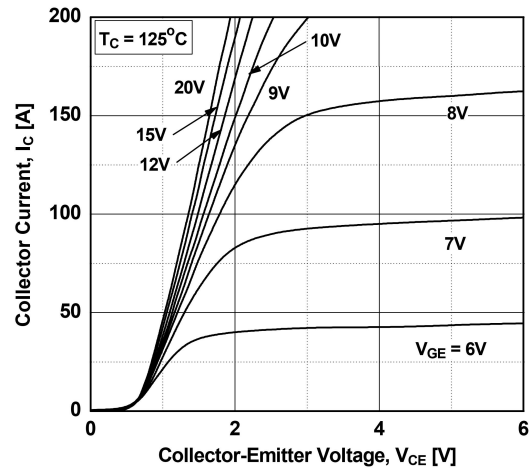
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit	
Diode Forward Voltage	V_{FM}	$I_F = 20\text{A}$	$T_C = 25^\circ\text{C}$	-	1.15	1.4	V
			$T_C = 125^\circ\text{C}$	-	1	-	
Diode Reverse Recovery Time	t_{rr}	$I_F = 20\text{A},$ $di_F/dt = 200\text{A}/\mu\text{s}$	$T_C = 25^\circ\text{C}$	-	35	-	ns
			$T_C = 125^\circ\text{C}$	-	53	-	
Diode Peak Reverse Recovery Current	I_{rr}	$I_F = 20\text{A},$ $di_F/dt = 200\text{A}/\mu\text{s}$	$T_C = 25^\circ\text{C}$	-	4	-	A
			$T_C = 125^\circ\text{C}$	-	6	-	
Diode Reverse Recovery Charge	Q_{rr}	$I_F = 20\text{A},$ $di_F/dt = 200\text{A}/\mu\text{s}$	$T_C = 25^\circ\text{C}$	-	50	-	nC
			$T_C = 125^\circ\text{C}$	-	120	-	

Typical Performance Characteristics

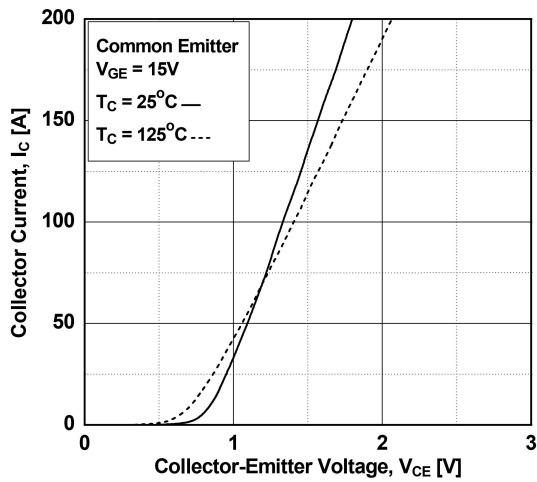
Typical Output Characteristics



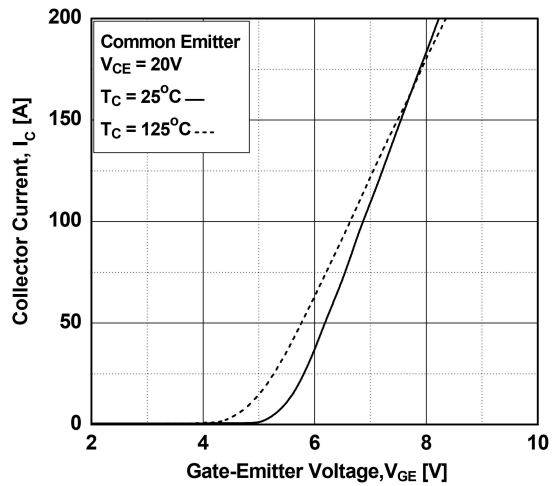
Typical Output Characteristics



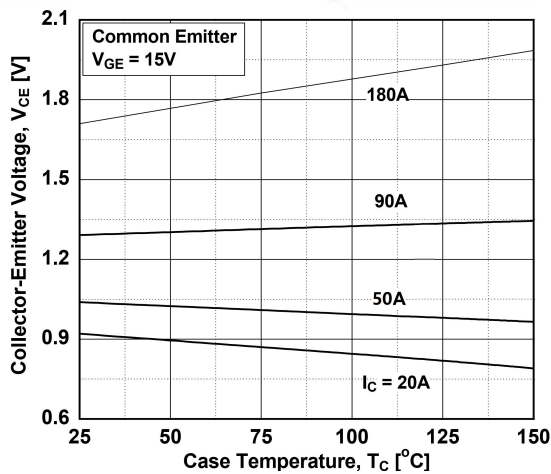
Typical Saturation Voltage Characteristics



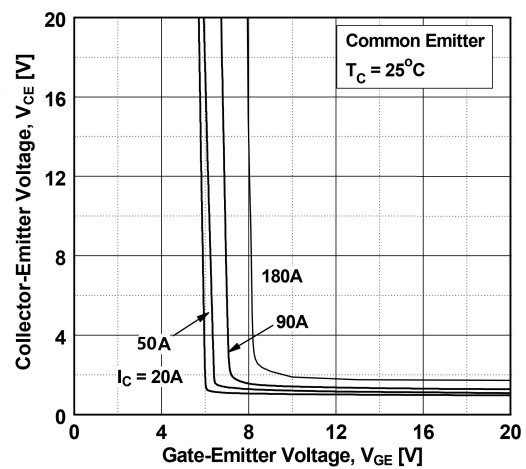
Transfer Characteristics



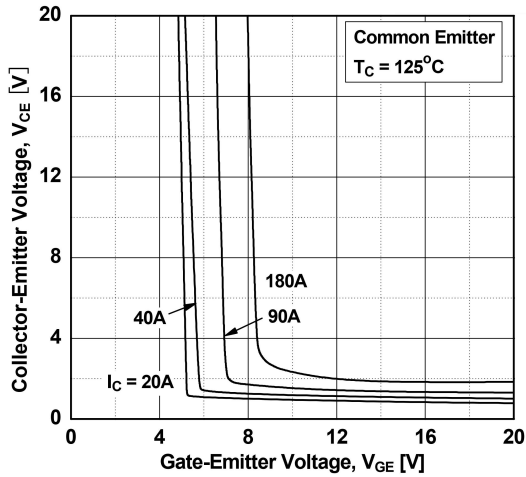
Saturation Voltage vs. Case Temperature at Variant Current Level



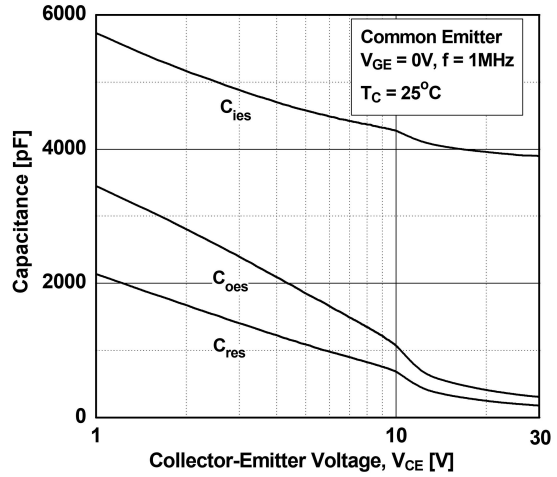
Saturation Voltage vs. V_{GE}



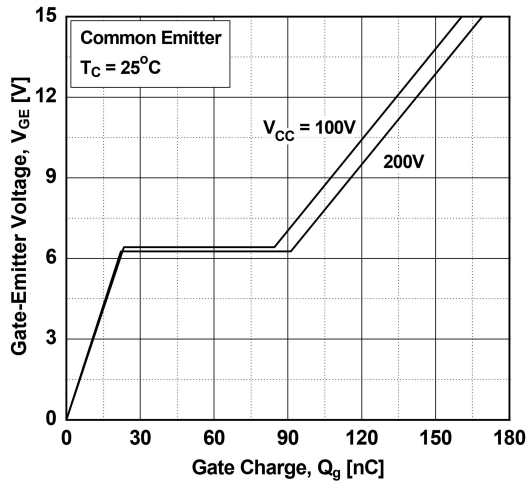
Saturation Voltage vs. V_{GE}



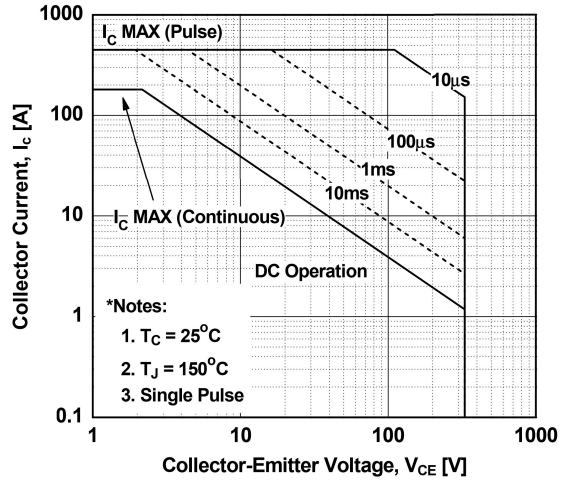
Capacitance Characteristics



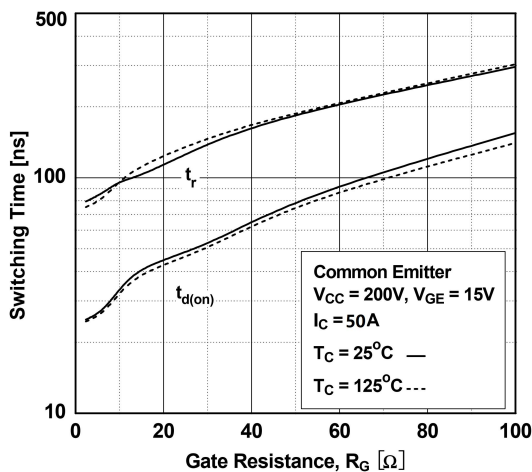
Gate charge Characteristics



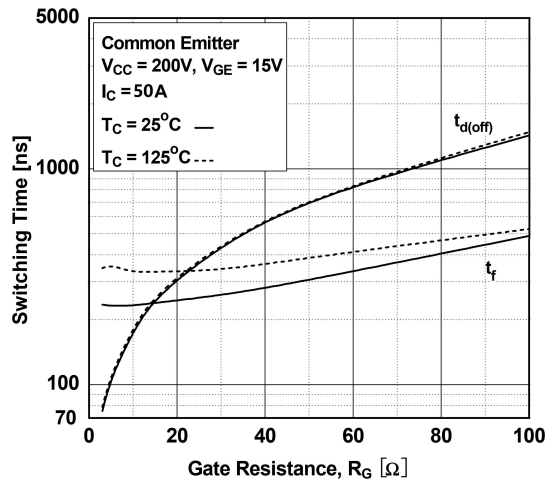
SOA Characteristics



Turn-on Characteristics vs. Gate Resistance

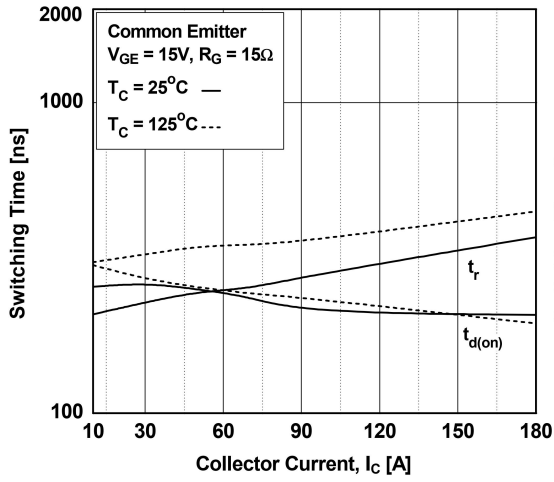


Turn-off Characteristics vs. Gate Resistance

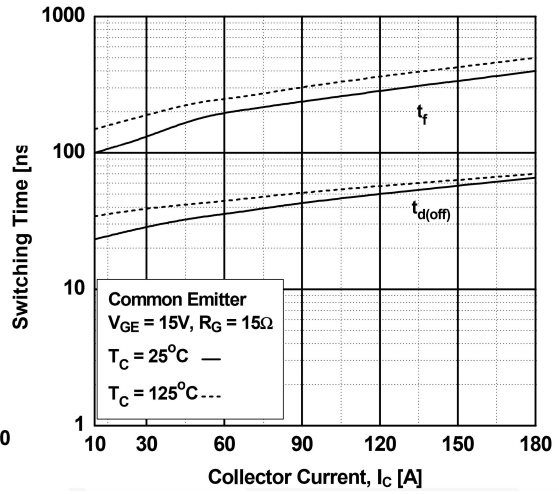




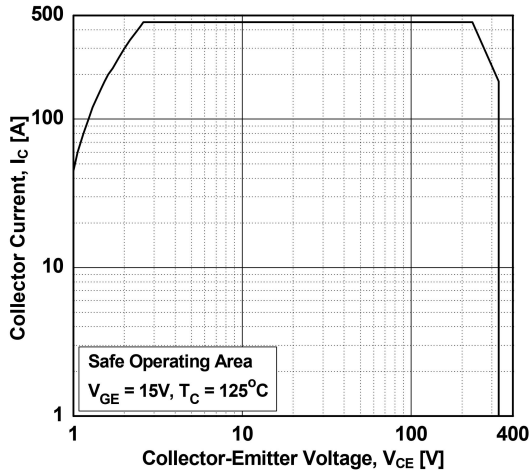
Turn-on Characteristics vs. Collector Current



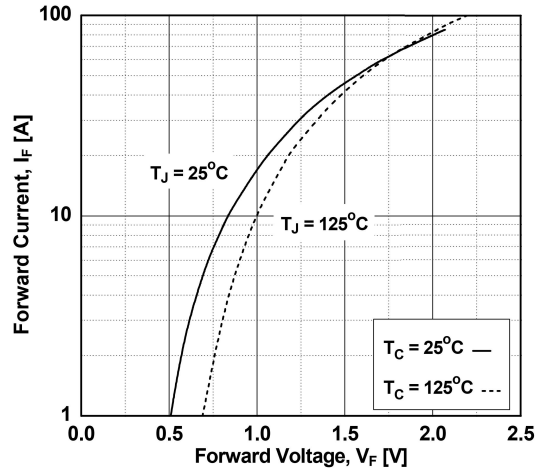
Turn-off Characteristics v Collector Current



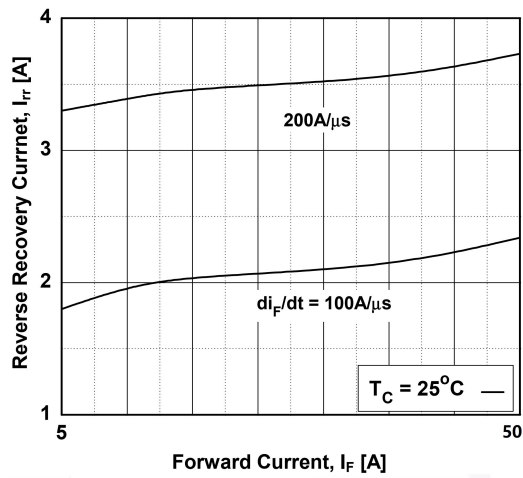
Turn off Switching SOA Characteristics



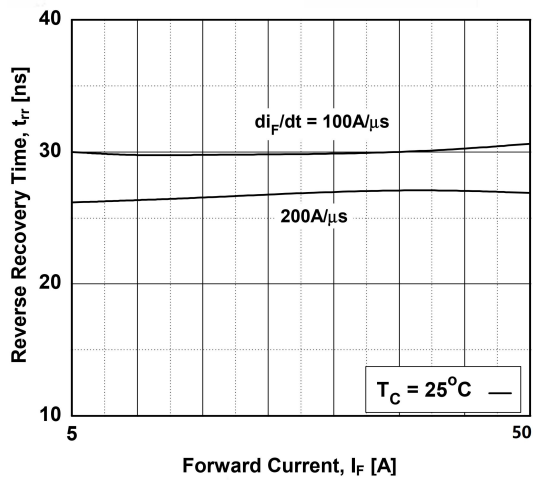
Forward Characteristics



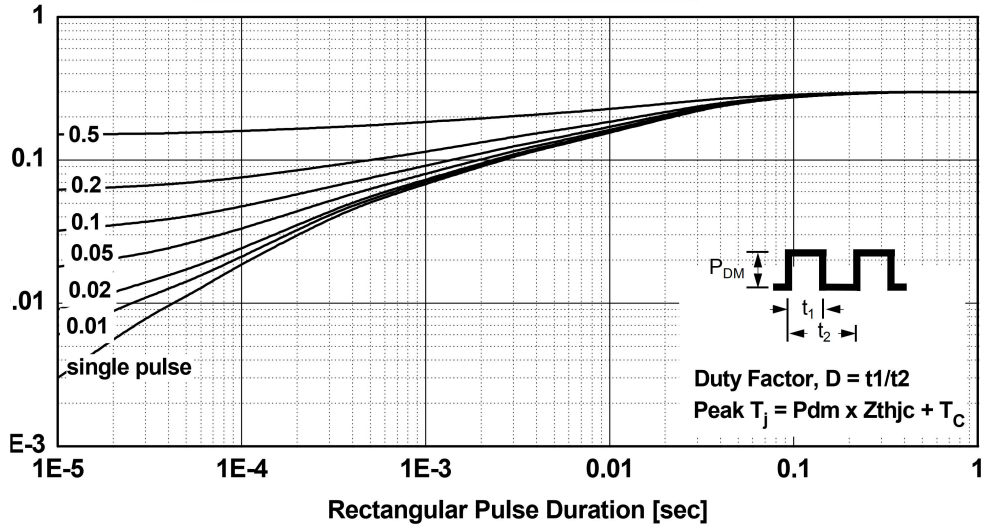
Reverse Recovery Current



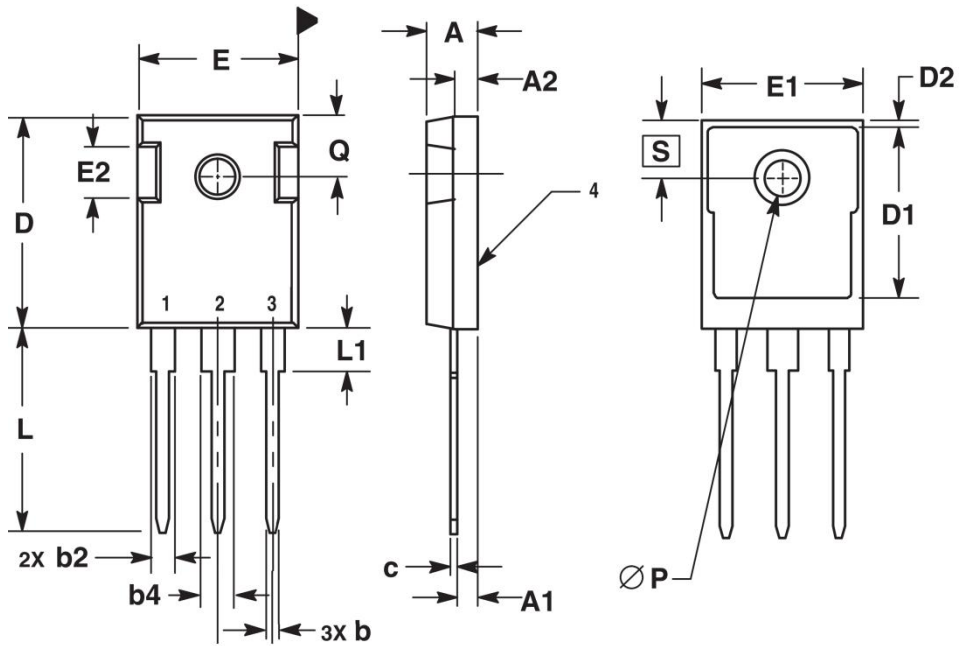
Reverse Recovery Time



Transient Thermal Impedance of IGBT



Package outline dimension



Symbol	Min	Max	Unit
A	4.7	5.31	mm
A1	2.21	2.59	
A2	1.5	2.49	
b	1	1.4	
b2	1.65	2.39	
b4	2.59	3.43	



c	0.38	0.89	
D	20.8	21.46	
D1	13.08	-	
D2	0.51	1.35	
E	15.49	16.26	
E1	13.46	-	
E2	4.32	5.49	
e	5.46BSC		
L	19.81	20.32	
L1	-	4.5	
P	3.56	3.66	
Q	5.38	6.2	
S	6.15BSC		

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